TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

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VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR COMMISSION

OF TURKEY
FOR
2007 – 2011

to be presented at the
XXV. GENERAL ASSEMBLY
of the
INTERNATIONAL UNION of GEODESY and GEOPHYSICS
28 JUNE – 7 JULY, 2011

ADHERING ORGANIZATION
MINISTRY OF NATIONAL DEFENCE
GENERAL COMMAND OF MAPPING
ANKARA-2011 (www.hgk.msb.gov.tr)

TURKISH NATIONAL UNION OF GEODESY AND GEOPHYSICS
(TNUGG)

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MINISTRY OF NATIONAL DEFENCE
GENERAL COMMAND OF MAPPING
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2007 – 2011 TERM REPORT
OF
TURKISH NATIONAL GEODESY COMMISSION

GENERAL COMMAND OF MAPPING
ANKARA
2011

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1. Introduction

Directing and promoting the scientific studies at the field of Geodesy, ensuring cooperation and communication among its members, organizing scientific meetings and following international developments and consequently representing Turkey; could be listed among the activities of Turkish National Geodesy Commission (TNGC).

Geodesy has not taken its place which it deserved in earth sciences yet and it is left in the area of interest of geology and geophysics. Science aims discovering nature and explaining natural events. Scientific information and products are adapted and promoted as long as they are about explaining natural events and facilitating the social life. For this reason; it is considered that the Turkish scientists of geodesy; along with their solely scientific aims, ought to take place in the studies which will support the social life and also do their best to avail geodesy take its respectful position among geological sciences.

Along with the social requirements came into place after the destructive earthquakes of Düzce and Gölcük, happened in 1999 in Turkey and the recorded scientific and technological developments, the regulation of Turkish National Geodesy and Geophysics Association was changed. One of the major changes in the regulation is, creating opportunities to sponsor the projects which will be focused on earth sciences. Although this resource is not used effectively now the studies for availing better conditions are carried on.

It has become inevitable to make fundamental changes in the structure and function of TNGC parallel with national requirements and international developments. In the studies which were resulted as re-establishing TNGC the following criteria were initiated;

a. Ensuring a participating managerial structure for TNGC,
b. Make it active in national and international levels,
c. To participate in studies for determining the institutions sponsoring research projects (TNGGU, TUBITAK, DPT, MINISTRIES etc.) in our country to sponsor geodetic projects,
d. To develop geodetic joint projects and programs,
e. Helping, obtaining data from national and international centres to be used in the projects.
f. To encourage its members to publish qualified works in the international scientific journals.
g. To encourage Turkish scientists of geodesy to be organized in national levels, to take place in activities and producing joint projects.
h. To ensure the communication among the members of TNGC.
i. To ensure the information change among the members of TNGC by organizing scientific meetings.

In TNGC's structure; an executive committee, authorized and functioned to implement all sort of organising about the activities of TNGC, a centre office which will be responsible for application of decisions of the executive committee, a candidate determining commission for determining the candidates to take place in the examination for the personnel who will be employed in the organs of TNGC, were established. Additionally; TNGC working groups (WG) are compatible with those of IAG as reference coordinate systems (WG1), Gravity Field (WG2), Earth Rotation and Geodynamics (WG3) and Positioning and Applications (WG4). TNGC has also been organizing annual scientific meetings since 2002.

It is necessary for TNGC to take the appropriate steps and to produce applicable projects along with the National Earthquake Program, which was introduced in the scope of the

changes made in the structure of TNGGU. The earthquakes and the geodynamic event are the most destructive and deforming events for geodetic networks along with their important social consequences. As our country is a natural laboratory for the studies on the crust of earth movements; after the earthquakes whose magnitudes are Mw >= 6, the basic Geodetic networks should be upgraded and the geodetic methods should be used for modelling and interpreting the movements of the crust of the earthquake along with determining the area of velocity. The three methods that are used in geodynamic researches are; Geodesy, Geology and Seismology and in particular taking into account that the geodetic methods are one of the indispensable and essential methods for verification of the researches, the joint earth science projects should be used constructed.

The public institutions and foundations, private sector and the universities are the three major elements of mapping so of Geodesy. Producing everything that the country requires, the geodetic contributions for solving the problems of earth sciences, education, contribution to the development of the universal science and technology, competitive and profitable production, application and development of new competences, study for taking place among the worlds scientists of geodesy and ensuring the resources of the country to be used effectively are representing the major aims and their subdivisions of those three major elements of Geodesy. Expanding the cooperation and cooperation opportunities among the private sector, public institutions and the universities; should be one of the major aims of TNGC. For attaining this goal; producing and applying original projects including country requirements should be seen as the basic solution.

TNGC’s being successful and attaining its goals in the following term and its being a scientific community which will be found appropriate by the Turkish scientists of Geodesy and in which they would be active is our best wish.

2. Administrative Structure

Turkish National Geodesy Commission (TNGC) acts as one of the sub commissions of Turkish National Union of Geodesy and Geophysics (TNUGG). TNGC activities are carried with respect to TNUGG statutes and TNGC By-Laws.

TNGC Central Bureau
TNGC President
TNGC University Representative
TNGC Secretary

TNGC Executive Committee
TNGC President
TNGC University Representative
TNGC Secretary
TNGC President (past)
TNGC University Representative (past)
Study Group (I) President
Study Group (II) President
Study Group (III) President
Study Group (IV) President
ASCE Representative
TÜBİTAK (The Scientific and Technical Research Council of Turkey) Representative

Working Groups

With the new TNGC By-laws, four Working Groups were constituted according to the present commissions in IAG and national requirements. Also it is possible to constitute Sub Study Groups under the Working Groups.

TNGC Working Groups

Working Group I : Reference Coordinate Systems
Working Group II : Earth Rotation and Geodynamics
Working Group III : Gravity Field
Working Group IV : Point Positioning and Applications

Nominating Committee

Three members of Nominating Committee are selected by TNGC Executive Committee, determined the President and Secretary candidates of Working Groups. On the other hand, Nominating Committee executes its duty for the other subjects determined by TNGC Executive Committee.

3. Working Group Activities of The Commission

There are four working groups that are voluntarily working under Turkish National Geodesy Commission. In this section of the report the reader might obtain information about their activities and strategies for next term activities

a. Reference Coordinate Systems Working Group

(1) Turkish National Fundamental GPS Network

Turkish National Fundamental GPS Network (TNFGN – TUTGA) has been established in 2001 (Figure 3.1) and some of the stations have been re-surveyed due to the earthquakes happened in 1999 with ongoing efforts of periodic observations since then. Definition of a national reference system called TUREF (Turkish National Reference Frame) is still in progress in coordination with the Turkish National Permanent GPS Network. Positional accuracies of the stations are about 1-3 cm whereas the relative accuracies are within the range of 0.1 - 0.01 ppm. Besides, the network has been connected to the Turkish Horizontal and Vertical Control Networks through overlapping stations and time-dependent coordinates of all stations are being computed in the context of the maintenance of the network with repeated GPS observations. Also appropriate models for coordinate transformation from ED-50 system into the WGS84 have been defined in the context of TUTGA. Detailed information about TUTGA can be found at official web of General Command of Mapping. Combining permanent and survey-type GPS measurements is still an on-going effort. Significant progress has been made and preliminary results were obtained.

The total number stations are about 682 and for each station 3D Coordinates and their associated velocities have been computed in ITRF2005.0 (Reference Epoch: 1998.0). Positional accuracy of the stations is about 1-3 cm whereas the relative accuracies are in the range of 0.01 ppm. Also, the network has been connected to the Turkish Conventional Horizontal and Vertical Control Networks through some points and time-dependent coordinates of all the stations are being computed in the context of the maintenance of the network with periodic GPS observations.

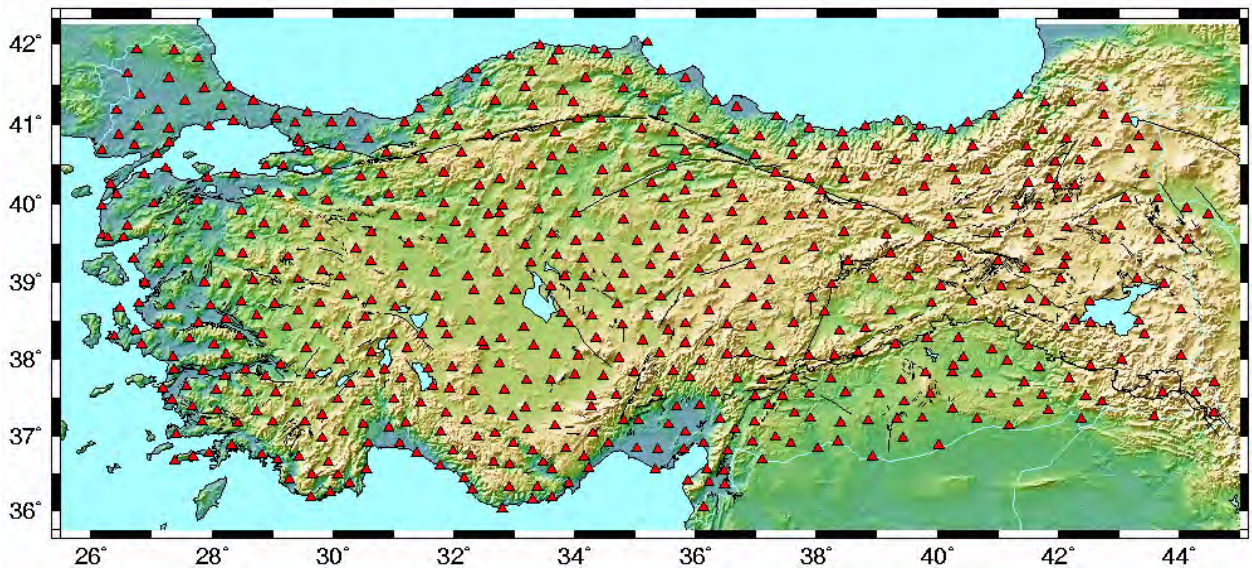

Figure 3.1. Distribution of TNFGN stations

Considering the on-going tectonic feature of the region, second period surveys of the great majority of the points have been completed in 2001, 2002 and 2003 and velocities have been estimated. Also appropriate models for coordinate transformation from ED-50 system into the WGS84 have defined in the context of TNFGN. Detailed information about TNFGN can be found in www.hgk.msb.gov.tr under the name TUTGA in Turkish.

The Turkish national reference system called TUREF (Turkish National Reference Frame) was defined so as to concide with ITRF-96 at epoch 2005.0 to provide backward compatibility. Positional accuracies of the stations are about 1-3 cm whereas the relative accuracies are within the range of 0.1 - 0.01 ppm. Besides, the network has been connected to the Turkish Horizontal and Vertical Control Networks through overlapping stations and time-dependent coordinates of all stations are being computed in the context of the maintenance of the network with repeated GPS observations. Also appropriate models for coordinate transformation from ED-50 system into the WGS84 have been defined in the context of TUTGA. Detailed information about TUTGA can be found at official web site of General Command of Mapping. Combining permanent and survey-type GPS measurements is still an on-going effort. Significant progress has been made and preliminary results were obtained.

(2) Turkish National Permanent GPS Network and Turkish National Permanent RTK Network

The Turkish Permanent GPS Network (TNPGN) is still growing up with the addition of new stations (Figure 3.2). The number of the sites forming TUSAGA is 25 as of 2010. Other than that of those stations, the data from 10 stations around Marmara Sea, established under a private project with TUBITAK Marmara Research Center (TUBITAK – MAM) is being utilized by scientific community. The time-series analyses of TNPGN stations are performed at General Command of Mapping on a daily basis. Collaborate works in and abroad Turkey for geodetic, geodynamic and engineering surveying purposes are increasingly contributing to the development of the static network. Furthermore, TNPGN stations are going to be utilized as geodetic control and for monitoring the crustal movements in geodynamical activities within their continuous data collection and analyses cycle.

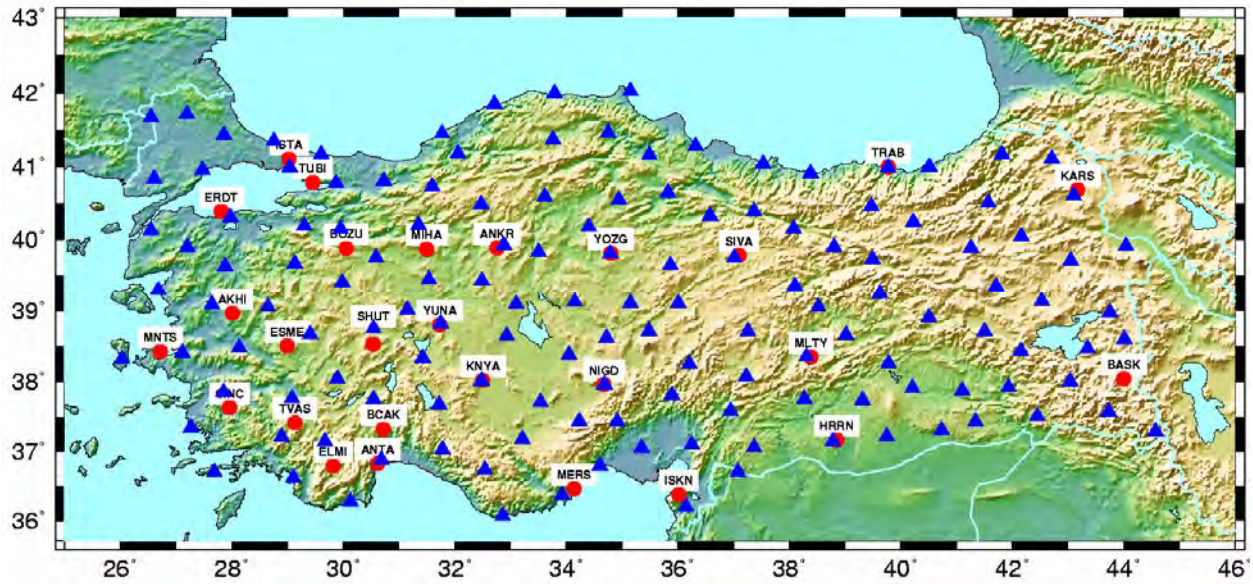

Figure 3.2. Distribution of TUSAGA and TUSAGA-Active stations (as of Jun 2008). Red Circles TPGN sites-25; BlueTriangles: TPGN-ACTIVE stations(144).

Although TUSAGA was preliminarily conceived as a static continuous network, intensive cadastral activities have led to establishing a RTK network which is supposed to cover the whole country. A RTK Network of 144 sites is financed by Turkish National Scientific and Technological Council) and İstanbul Culture University has taken over the responsibility of making the network fully operational by the end of 2008 under the supervision of General Command of Mapping and General Directorate of Registration and Cadastre. While the RTK Network is planned to serve the mapping community, daily GPS data also provides an indispensable tool for earth science community investigating the tectonic and seismic activity of a very active region like Anatolia and surroundings. The feasibility of TUSAGA for DGPS operations and a homogeneously distributed high-precision GPS network enable civilian end users to work at ease in variety of applications ranging from large-scale mapping, GIS and cadastral applications.

Particularly for the applications ranging from large-scale mapping, GIS and cadastral surveys, new project under the name TUSAGA-Active has been completed collaboratively with governmental institution and funded by TÜBİTAK. The stations serves as real-time kinematic basis enabling all users to get differentially corrected positional information as well as updated geoid and datum transformation parameters.

Additionally, more than half of the GPS stations were installed in meteorological parks of General Directorate of State Meteorology. Real-time derivation of Precipitable water (PW) data from TUSAGA provides an important input for short–term weather forecasting and the assimilation studies are on the way. GPS-Derived PW provides a spatial and temporal resolution of 80 km and 1 hour versus those provided by radiosonde stations 500 km and 12 hours. The Figure 3.3 show the consistency of PW estimates from GPS and radiosonde. The variability of PW during the disastrous flood event between 22-28 Ekim 2008 was also observed through TUSAGA network as shown in Figure 3.4.

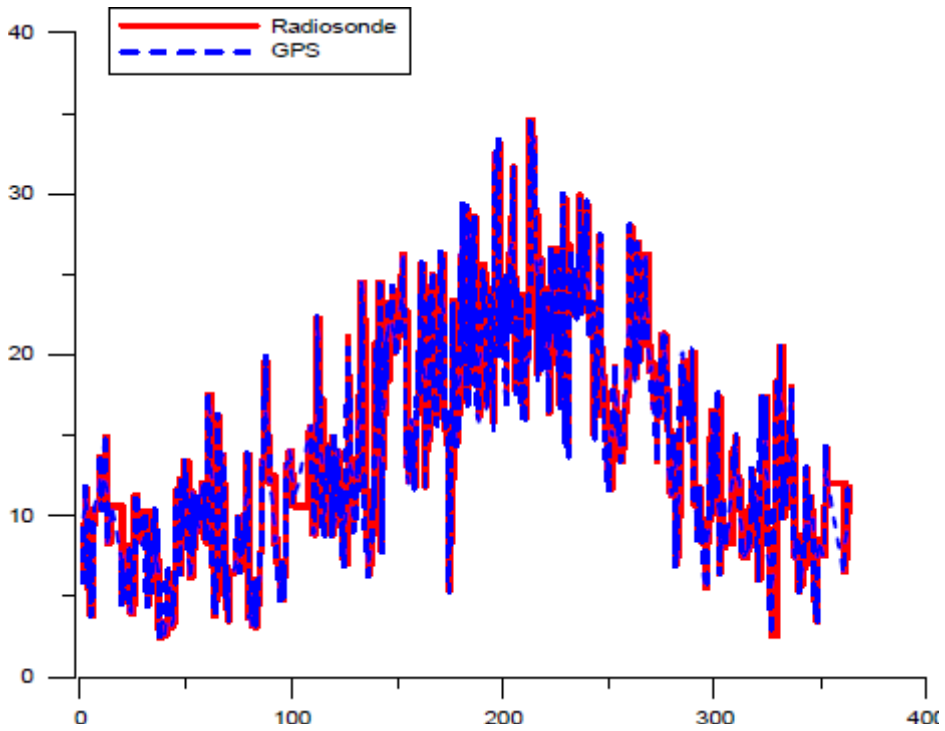

Figure 3.3. GPS-Derived PW estimates and radiosonde observations

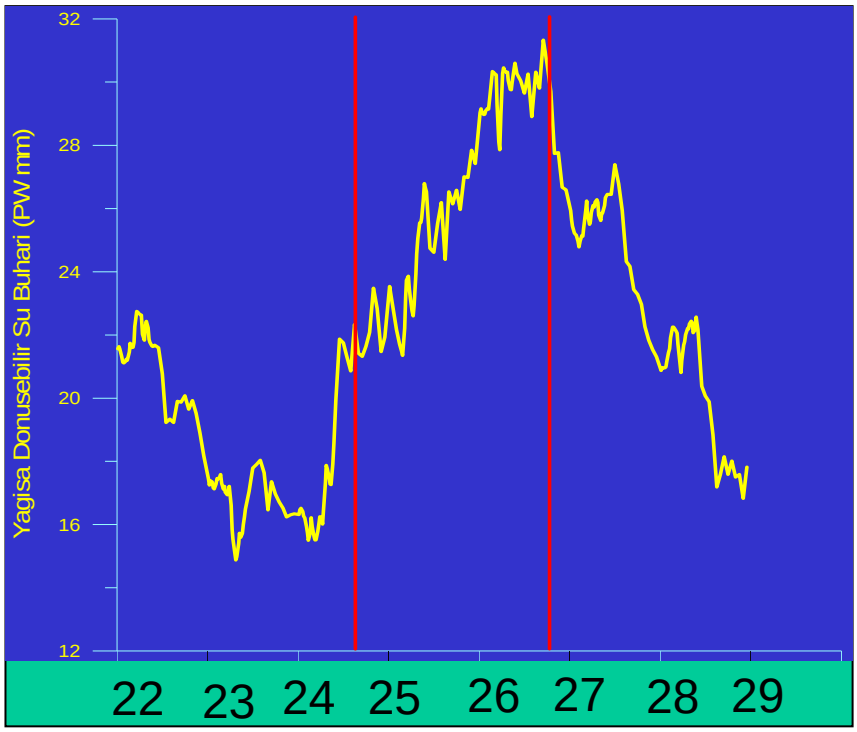

Figure 3.4. 22-28 October 2008 flood event as detected by GPS PW estimates

Another project was also initiated about the real-time determination of Total Electron Content. The project was formed with collaboration with Hacettepe and Bilkent Universities. The project consists of real-time determination of Total Electron Content and formation of a real-time ionospheric tomography. An example of two-dimensional gridded vertical total electron content values are shown in Figure 3.5.

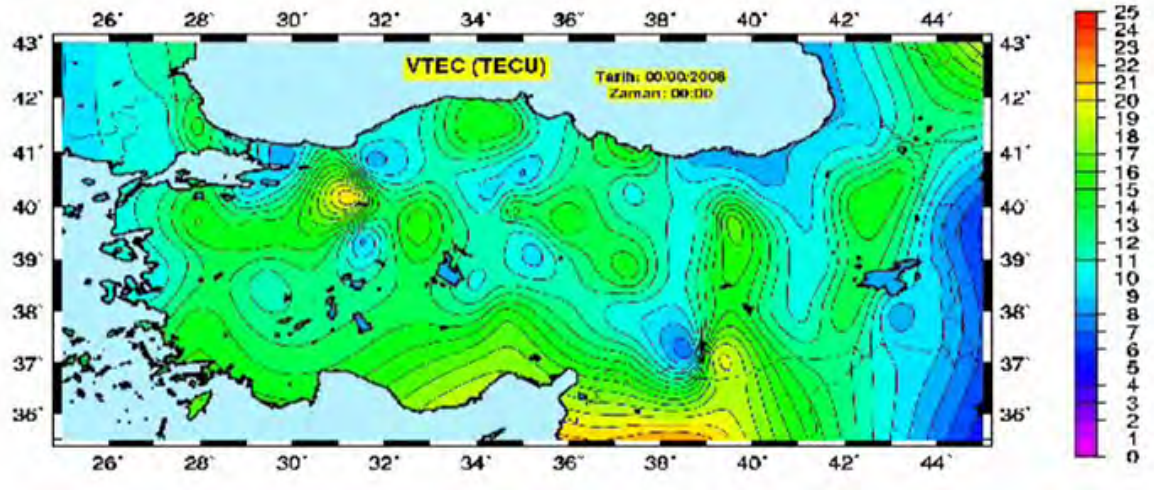

Figure 3.5. Vertical total electron content values at a specific epoch

System operations and computations of coordinate correction parameters are being held in control center established in General Command of Mapping. GNSS data collected at all stations are transferred to the control center via ADSL and GPRS/EDGE and correction parameters are transferred to the users in the filed after computed in these centers. RTK correction parameters which are in current RTCM and CMR+ communication formats are transferred to the rovers via GPRS and NTRIP. Within the Project, at present, transformation parameters which will be used for ED50/WGS-84 datum transformation are being computed.

For this purpose, GPS observations are being held at approximately 6000 ED50 points through Turkey.

GPS data collected at each site are processed via GAMIT/GLOBK V10.35 software in daily basis and coordinate time series are created. After that, these time series are examined for daily positional variations which can be caused by deformations including plate tectonics, earth's crust or other reasons.

(3) Turkish National Vertical Control Network (TUDKA)

Turkish National Vertical Control Network (TNVCN-99) was established with the adjustment of 243 lines of 25680 points with total length of 29316 km. This network includes 151 first and 41 second order lines measured between 1970 and 1993, and 7 first and 44 second order lines measured before 1970 (Figure 3.6). Vertical datum for TNVCN-99 is defined with arithmetic mean of instantaneous sea level measurements recorded at Antalya tide gauge between 1936 and 1971. In the adjustment, geopotential numbers were used as observations and geopotential numbers, Helmert orthometric heights and Molodensky normal heights at all points were calculated. Gravity values in modified Potsdam datum were used in calculating geopotential numbers. The adjustment results in precision of point heights varying from 0.3 cm to 9 cm depending on the distance from the datum point. Differences between TNVCN-99 Helmert orthometric heights and currently used Normal orthometric heights were found to be between –14 cm and +36.9 cm and mean value of it was found as +9.5 cm with standard deviation of ±8.4 cm. Correction value between two height systems at any point given with position can be calculated. Right after 17 August 1999 İzmit earthquake, in November 1999, in order to determine the vertical displacements in TNVCN-99, levelling line of 110 km re-measured in the region; Hersek – Karamürsel – Gölcük – İzmit – Adapazarı - Arifiye and Doğançay.

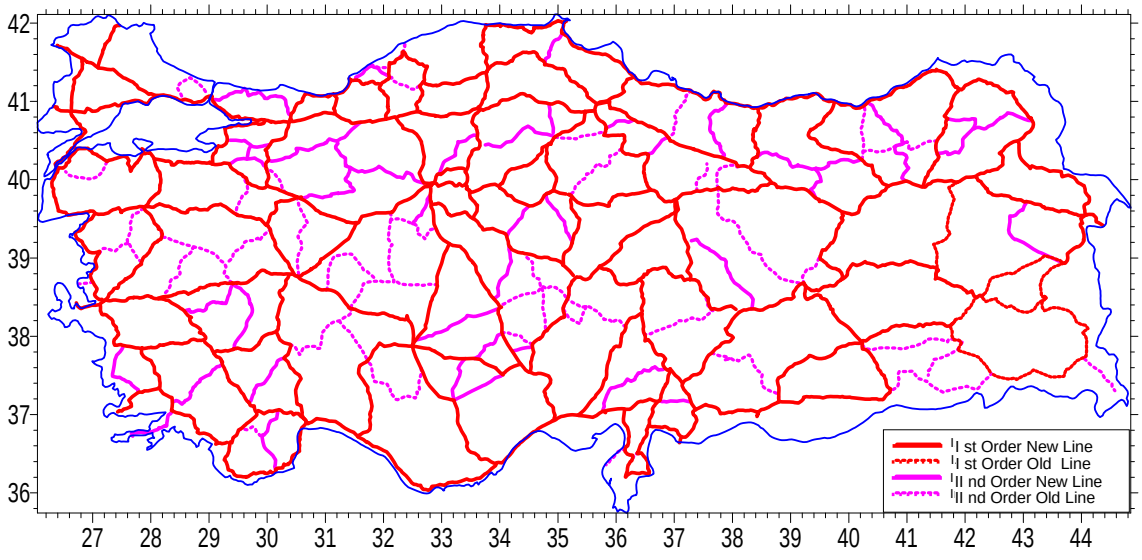

Figure 3.6. Turkish National Vertical Control Network (TNVCN)

(4) Turkish Sea Level Monitoring System (TUDES)

Many coastal countries deploy and operate tide gauges along their coasts to meet sea level related practical and scientific needs. Sea level observation stations (tide gauges) in

Turkey are established and operated by General Command of Mapping in order to determine the geodetic vertical datum precisely that is indispensible for mapping activities and meet the sea level data needs of scientific and engineering communities. Sea level observations have been carrying out by float operated gauges till 1998, since then the gauges have been upgraded and changed with acoustic ones with sounding tubes and Turkish National Sea Level Monitoring Sytem (TUDES) has been established. At the present TUDES consists of one data center and 19 digital and automatic tide gauge stations shown in Figure 3.7.

- A data center located at Ankara,
- Iskenderun, Erdemli, Taşucu , Bozyazı and Antalya tide gauges at the Eastern Mediterranean Sea,
- Girne and Gazi Magusa tide gauges at Turkish Republic of Northern Cyprus,
- Aksaz, Bodrum, Menteş and Gökçeada tide gauges at the Aegean Sea,
- Erdek, Marmara Ereğlisi and Yalova tide gauges at the Sea of Marmara,
- İğneada, Şile, Amasra, Sinop and Trabzon tide gauges at the Black Sea.

Through TUDES project, General Command of Mapping aims to;

- Determine and improve vertical reference surfaces for heights and depths used in topographic, nautical and aeronautical charts,
- Connect the vertical datums of Anatolia, Thrace, Turkish Republic of Northern Cyprus and the other Turkish islands,
- Test the Turkish Geoid at tide gauges,
- Monitor sea level variations in time and space domain from tide gauge, satellite altimetry, GRACE, atmospheric and oceanographic data,
- Find out tidal characteristics and produce accurate tide information,
- Provide sea level data for natural hazards such as earthquake, tsunami, storm surges, and climate change studies.

Figure 3.7. Locations of the existing tide gauge stations of TUDES

Sea level, atmospheric pressure, air temperature, relative humidity, wind speed and direction are measured with high accuracy at TUDES tide gauges and stored in dataloggers every 15 minutes interval and also hourly. Data stored in dataloggers at tide gauges are

transmitted to data center via GPRS. Collecting data from TUDES gauges, quality control and analysis processes are performed at the data center in Ankara.

Since the tide gauges measure sea level relative to land upon which they are located, observed sea level contains true sea level along with any vertical land movement signal (land subsidence or land uplift). Periodic geodetic measurements such as GPS, continuous GPS, and precise leveling are carried out at all TUDES tide gauges at 1-2 years interval to separate vertical land movements from true sea level and to monitor absolute sea level relative to earth center.

Since sea level changes are the main indicators of global climate change due to global warming, sea level data has gained importance in the climate change, oceanographic and meteorological studies for the investigation of the causes and the impact of climate change. In addition, tide gauge sea level data are used as complementary dataset to seismic and geophysical measurements for the tsunami early warning systems. General Command of Mapping takes part in;

- "Integrated Meteorology/Oceanography Network of Excellence (MOMA) Project" supported by The Scientific and Technological Research Council of Turkey (TUBITAK)
- Close collaboration with Bogazici University Kandilli Observatory and Earthquake Research Institute for "Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS) Project" ,
- "European Sea Level Service (ESEAS)".

b. Gravity Field Working Group

(1) Turkish Geoid-2009 (TG-09)

Turkish regional geoid models have been developed by employing a reference earth gravitational model, surface gravity observations and digital terrain models. The gravimetric geoid models provide a ready transformation from ellipsoidal heights to the orthometric heights through the use of GPS/leveling geoid heights determined through the national geodetic networks.

The recent gravimetric models for Turkish territory were computed depending on OSU91 (TG-91) and EGM96 (TG-03) earth gravitational models. The release of the Earth Gravitational Model 2008 (EGM08), the collection of new surface gravity observations (~266000), the advanced satellite altimetry-derived gravity over the sea (DNSC08), the availability of the high resolution digital terrain model (90m) and a larger number of GPS/leveling stations (~2700) have encouraged us to compute a new geoid model for Turkey. We used the remove-restore procedure based on EGM08 and applied RTM reduction of the surface gravity data. FFT technique was then used to obtain the residual quasi-geoid from the reduced gravity. We restored the individual contributions of EGM08 and RTM to the whole quasi-geoid height (TQG-09). Since the Helmert orthometric height system is adopted in Turkey, the quasi-geoid model (TQG-09) was then converted to the geoid model (TG-09) by making use of Bouguer gravity anomalies and digital terrain model. After all we combined gravimetric geoid model with GPS/leveling geoid heights in order to obtain a hybrid geoid model (THG-09) (or a transformation surface) to be used in GPS positioning applications (Figure 3.8). The RMS of the post-fit residuals after the combination was found to be ± 0.95

cm, which represents the internal precision of the final combination. And finally, we tested the hybrid geoid model with GPS/leveling data, which were not used in the combination, to assess the external accuracy. Results show that the external accuracy of the THG-09 is ±8.38 cm. which has not been achieved in Turkey until this study.

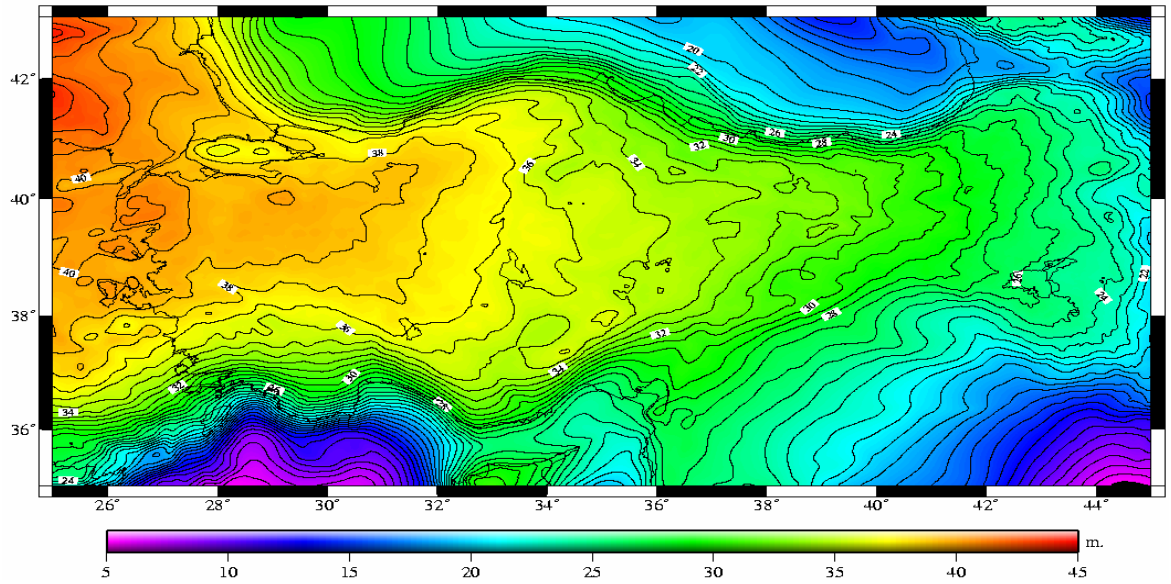

Figure 3.8. Turkish Geoid Model of Turkey (TG-09).

(2) Height Modernization Studies in Turkey

Studies of Turkish National Vertical Control Network (TUDKA) were started in 1935 by the establishment of Antalya tide gauge. By the year 1970, leveling between network points was finished. Between 1985 and 1992 new measurements were performed and adjustments studies were completed and it is named TUDKA-92. In 1999, network was adjusted after including additional leveling measurements.

General Command of Mapping has started a project for height modernization in Turkey. In this context achievement of the 1-cm Turkish geoid model, new, consistent, and precise surface gravity observations, airborne gravity especially in remote areas, vertical velocity field and deformations in the leveling network, more and stable GPS/leveling stations establishment, topographic density model, digital terrain model issues are being investigated.

c. Geodynamic Working Group

Anatolia, which takes place among major plates Africa, Arabia and Eurasia, is an ideal place to study both inter-plate tectonic and the deformation. GPS studies in Turkey which date back to late 1980's, have revealed the current northward motion of Arabia with respect to Eurasia and eastward escape of Anatolian Plate due to compression along East Anatolian Fault where the two plates collide. This rigid body rotation gives an upper bound of 24 mm/yr along North Anatolian Fault with an Euler pole near Sina, Egypt as well as compression in Marmara region which was implication of the catastrophic earthquake sequence (17 Aug 1999 M_w=7.5 İzmit and 12 Nov 1999 M_w=7.5 Düzce Earthquakes) in 1999. Figure 3.9 shows a

recent velocity field of Anatolia in a Eurasia-fixed frame. Survey-type GPS observation campaigns initiated just after the earthquakes enabled the precise determination of co-seismic displacements reaching up to a few meters. While the post-seismic phenomena is still under investigation by survey-type campaigns and a continuous network, current results have not proved any significant change in the inter-seismic velocity field after the earthquakes possibly due to the on-going post-seismic signals.

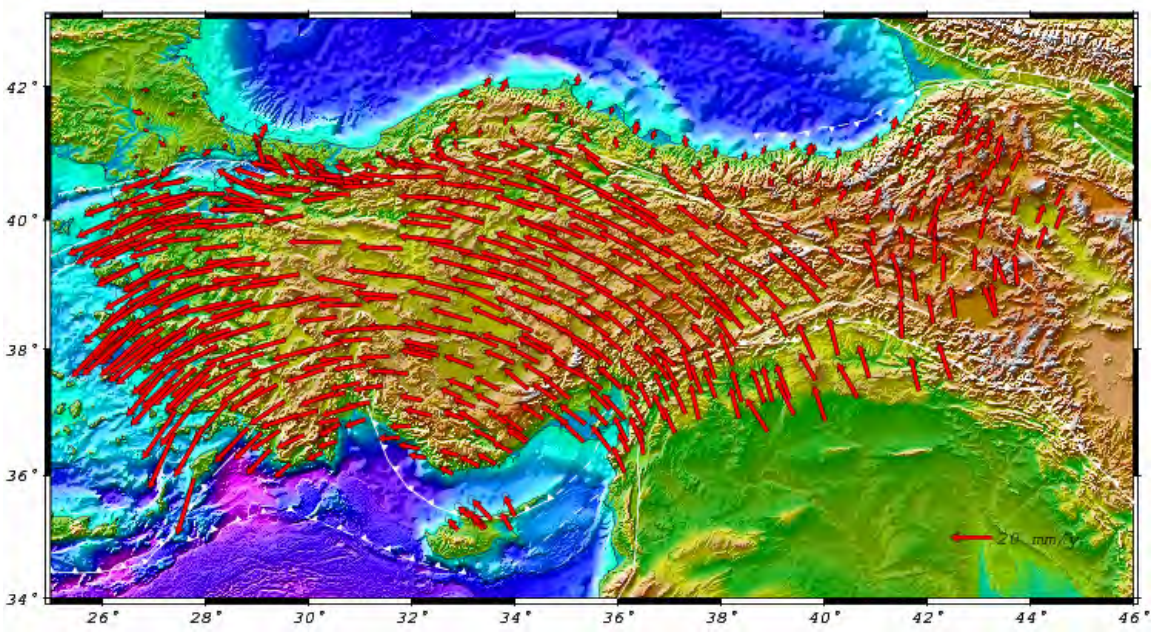

Figure 3.9. Horizontal Velocity Map of Turkey acquired from inter-seismic data before the earthquakes (Eurasia Fixed)

Interseismic deformation is monitored by periodic GPS and leveling measurements across Turkey while specific densified networks are established for local and regional secular deformation in certain regions. Analyses of velocity field have been carried out to expose areas of secular deformation and seismic hazard. Strain analyses utilizing secular movements shed light on rigid block rotations, local compression and faulting areas that well conform to the geological and geophysical evidence of Anatolia. Shear strain rates and rigid-body rotation rates are given in Figure 3.10 and Figure 3.11, respectively. Due to high seismic activity, co-seismic and post-seismic deformation is also monitored by independent GPS campaigns. Earthquakes with magnitude equal and higher than Mw 6.0 cause surface displacements that should be taken into account in high-precision geodetic studies. Six such earthquakes have occurred since the establishment of Turkish National Fundamental GPS Network. and survey-mode GPS measurements in collaboration with international earth scientists.

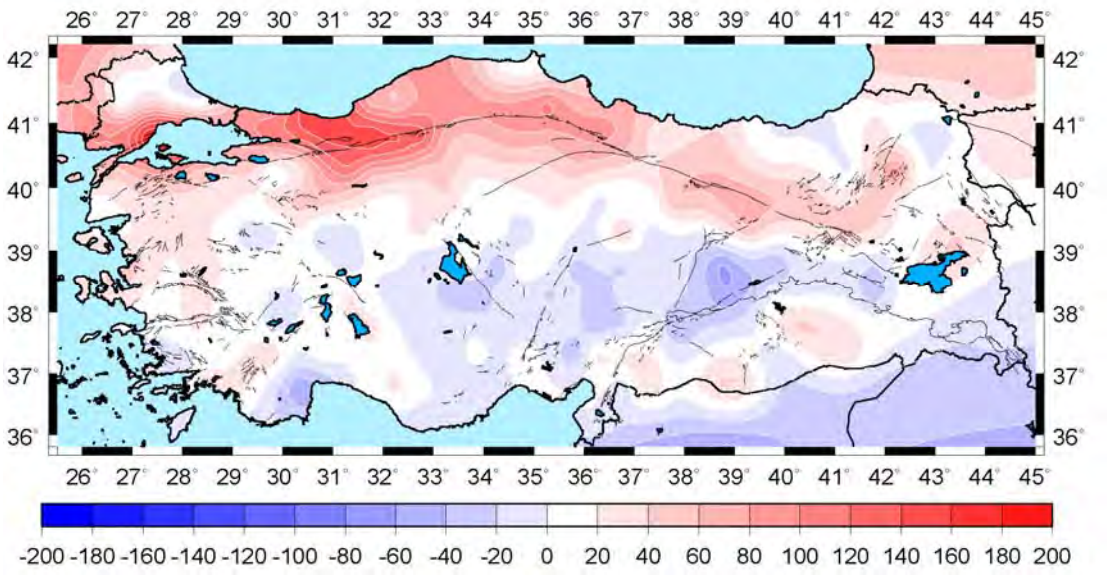

Figure 3.10. Shear strains in nanostrain per year

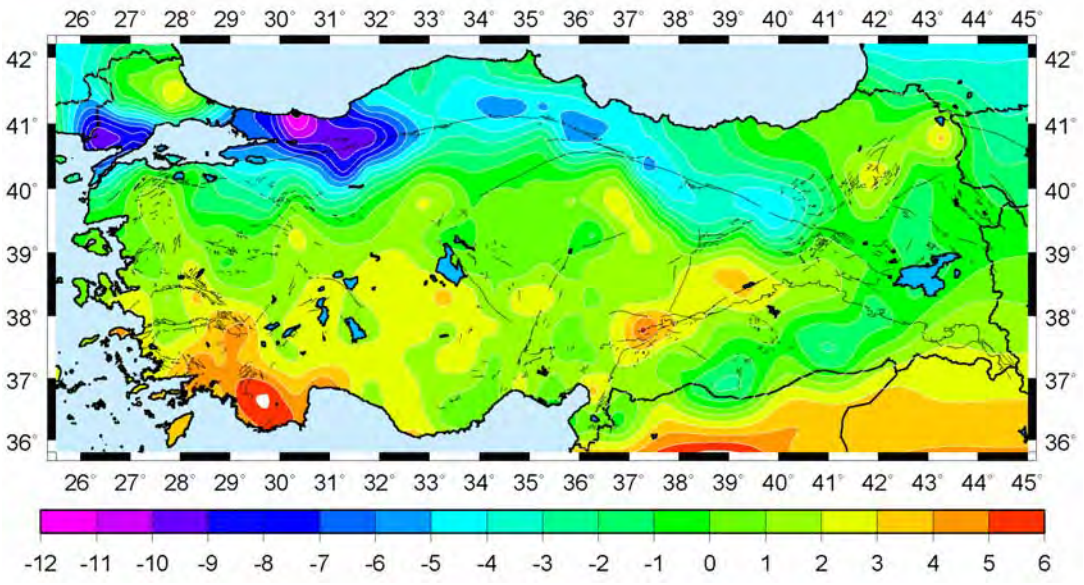

Figure 3.11. Rigid-body rotations in °/Myr

Co-seismic surface displacements obtained from survey-type pre-earthquake and post-earthquake GPS observations are analyzed and modelled in an elastic isotropic medium. Depending on the time interval, computed inter-seismic deformation is dispersed from observed co-seismic deformations and published to civilian users surveying in the regions under earthquake influence. TUTGA as well as other existing stations comprises a set of precise coordinates along with their velocities and possible co-seismic corrections for the earthquake prone areas. Specifically, certain parts of Anatolia are still investigated through permanent measurements.

d. Positioning and Applications Working Group

Positioning and Application Working Group is mainly concentrating on collecting information from the institutions and private sectors to identify their technical problems and needs to create a specific project that will compensate their needs and solve for their

problems. In order to realise this, the group has determined some subjects and list their titles to get some contribution to turn them back with a real project benefiting to the institutions and professionals. The main titles that are exploded are as follows,

- Providing Geodetic Infrastructure knowledge to the GIS users
- Following contributions are going to be made by the group member for understanding of professionals who are directly practicing Large Scale Map and Map Information Production Regulation.
  - Educational support
  - More explanations and comments will be made to clarify some of the articles (especially on new technologies related ones) of the regulation
  - Alternative solutions will be advised on statistical test
  - Determining local geoid models
  - Way of improving existing local geoid models and also Turkish Geoid-2009
  - Monitoring problems of the regulation in practice and recommending solutions
- Supporting groups who develops standard on engineering surveying and engineering geodesy.

Currently Large Scale Map Making Regulation is used in Turkey. However this does not fit the needs of surveying authorities. It was approved in 1988 and therefore it mostly covers conventional surveying standards rather then modern standards. Therefore new and updated one has been prepared with in last two years, and it is now on the stage of approval. It is called Large Scale Map and Map Information Production Regulation. It is going to bring new and extended technical standards to surveying profession.

Firstly it has been design to cover all current needs of surveying authorities. Moreover its design is suitable to cover coming technologies and technical developments in the profession. Moreover two additional national standards have been developed and integrated as its appendix to the regulation. One of them is XML based "***National Data Exchange Format***" for Digital Maps and the other one is "***Detail and Attribute Catalogue***". Both are prepared to fully compensate the national needs; but compatible with international standards.

The advantage of this regulation against the previous one is its approval authority. It is going to be approved by the Cabinet. The meaning of this is: It is going to be a regulation for all kind of large scale map making and map information collection. Therefore all will be in a single standard.

4. Annual Scientific Meetings

Commission was agreed to organise periodically annual scientific workshops; and then decided to start last year. Therefore since 2002, workshops have been organized under the directive of TNGC. National scientists from geodesy, geology and geophysics disciplines, graduate and undergraduate students and professionals are participated in these workshops. Invited and selected submitted papers are presented, discussed and knowledge is shared by different professional disciplines. The scientific meeting between 2007 and 2011 are as follows:

- Geodesy and Atmosphere – Ankara 2007
- Reference Frames – İstanbul 2008
- Deformation Analysis – Konya 2009
- Geodesy in Spatial Planning – İzmir 2010

One of the main philosophies of Turkish National Geodesy Commission is to contribute and organise educational activities for professional surveyors and students in Geodesy and Photogrammetry departments. Therefore it organises annual scientific workshops and encourages institutions and private firms to provide quality training periods for undergraduate students who might have found a chance to observe both practical and theory combination on real professional applications. More on to that, encourage working groups to concentrate on some educational based projects that are generally drawn as follows

- Supporting researchers such as providing data, information and etc.
- Contributing course programs for updating and/or extending their coverage
- Supporting national and international accreditation works at the universities
- Encouraging researchers and surveying engineers to publish or present their works on quality national and international journals and symposiums
- Organising activities that professionals can discuss and criticise technical problems
- Contributing to develop common terminology for surveying profession
- Establishing data base to distribute and share commissions' paper works such as minutes, publications, technical reports and etc.

5. List of Articles Published in The Surveying Journal

In this section only title of the publications are given. Full copy of the articles can be obtained via General Command of Mapping web site, http://www.hgk.msb.gov.tr. This journal is an official journal of General Command of Mapping and published twice a year. Full text of these articles is in Turkish. However English Abstracts exist for all of them.

2007 Issue: 137

- Investigation of Long Term Absolute Sea Level Changes By The Time Series Analysis of Tide Gauge And Continuous GPS Time Series
- Accuracy Assessment of Digital Elevation Models, Produced In Different Scales From Different Sources By Using Various Techniques
- A Case Study Based On Marketing of Spatial Data In Scope of E-Government In Turkey
- The Role of Information Technologies In Effectiveness of State And An Application For Internet Sale
- International Initiatives Related To Spatial Data Infrastructure

2007 Issue: 138

- Derivative Based Parameter Estimation Methods
- Investigation of Sea Level Variations In Marmara Sea By Means of Ers-1, Ers-2 And Topex/Poseidon Satellite Altimetry Observations An Application For Semi-Automatic Extraction of Line Features From Aerial Photographs
- Contour Simplification And Its Automation In The Production of Topographic Maps Internet Gis And Its Usage In Forest Fires
- Spatial Access Methods

2008 Issue: 139

- Evaluation of Global Geopotential Models By Gps-Leveling Data In Turkey
- Adaptation of Turkish Topographic Database At The 1:1.000.000 Scale To European Topographic Database And Publishing On The Internet/Intranet Environment
- Investigation of Sea Level Variations In The Eastern Mediterranean Sea By Using Satellite Altimetry Data
- Efficiency of Methodology In Determination of Earthquake Source Parameters Through Geodetic Measurements

2008 Issue: 140

- ITRF-2005 And Relations Between Previous Reference Frames
- Dem Production From Aerial Photographs And Accuracy Modeling of Dem
- Building Detection From High Resolution Satellite Imagery Using The Genetic Algorithm Approach
- Accuracy Assessment of The Effect of Digital Elevation Models Generated From Different Sources On Orthophoto
- Oem GPS Receiver And A Map-Matching Algorithm

2009 Issue: 141

- Seismicity of Ankara And Source of The 2005-2007 Afşar (Bala-Ankara) Earthquakes
- Accuracy Investigation of The Methods of Determining Orthometric Heights From Ellipsoidal Heights By Using Geoid
- Evaluation of The Production of 1/25.000 Scale Topographic Maps From Spot 5 Stereo Imagery
- Presenting The Data of Permanent GPS Stations On The Internet/Intranet Environment
- Serving of Orthophotos On The Web

2009 Issue: 142

- Clock Error And Tropospheric Delay Parameter Estimation Models of The Very Long Baseline Interferometry Technique
- Global Geodetic Observation System (Ggos) And Earth’s Gravity Field: An Investigation Concerning Turkey
- Direct Georeferencing And Orthorectification of Airborne Digital Images
- Digital Spherical Photogrammetry Techniques Recently In Use
- Georeferencing Methods For Terrestrial Laser Scanner Poınt Clouds

2010 Issue: 143

- Georeferencing Methods For Terrestrial Laser Scanner Point Clouds
- L1 Norm Minimization In Geodetic Networks: The Case of Levelling Network
- The Accuracy Assessment of Insar Measurements
- Digital Aerial Camera And Acquisitions For Photogrammetry
- Automation In Selection of Road Features From 1:2500 Scale To 1:100000 Scale
- Free And Open Source Desktop Gis Software Programs: A Comparative And Systematic Evaluation

2010 Issue: 144

- Isostatic Gravity Anomaly Map of Turkey
- Improving Deformation Velocities Via Utilizing Time Series Analysis of Continuous GPS Stations
- Analysis And Interpretation of Temporal Change of Gps Coordinates: A Case Study In İzmir Region
- An Overview of Network Hierarchy, Observation Time Spans And Precision Criteria of In View of The Recent Developments
- Software Design For Self-Calibration of Digital Cameras
- Camera Mounting To The Terrestrial Laser Scanners And Estimation of The Camera Position with Respect To The Scanner Reference Frame
- Investigation of The Effects of Kernel Functions In Satellite Image Classification Using Support Vector Machines

2011 Issue: 145

- Computation of The Actual Coordinates And Velocities of Turkish National Fundamental GPS Network
- Data Quality Control & Management System of Turkish Sea Level Monitoring Network
- A Calculation Model For Fisheye Lens Distortion Used In The Camera Cluster
- A New Approach On The Usage of Internet-Based Gis For Civil And Military Applications In
- Emergency
- Analysis of The Prediction Method Used In Environmental Noise Mapping From Gis Data

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF GEOMAGNETISM AND AERONOMY COMMISSION OF TURKEY FOR 2008 – 2011

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS 28 JUNE – 7 JULY, 2011

GEOMAGNETISM AND AERONOMY COMMISSION OF TURKEY

(www.mta.gov.tr)

TURKISH NATIONAL UNION OF GEODESY AND GEOPHYSICS

NATIONAL REPORT

OF

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FOR

2008 – 2011

Prepared For the XXV General Assembly
of the International Union of Geodesy and Geophysics

27 June – 08 July 2011
Melbourne/Australia

GEOMAGNETISM AND AERONOMY COMMISSION OF TURKEY

(TUJAK)

ANKARA 2011

GEOMAGNETISM AND AERONOMY COMMISSION OF TURKEY

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INTRODUCTION

National Geomagnetism and Aeronomy Commission of Turkey (TUJAK) works on and encourages studies on the subjects such as geomagnetism, paleomagnetism, magnetotelluric, magnetic induction and aeronomy. This National Report has been prepared for the XXV General Assembly of IUGG to present newly and/or developed scientific researches of Turkish geoscientists. The National Report represents homage to our scientists and their colleagues.

WORKS

Prospecting By Magnetic Methods

General Directorate of Mineral Research and Exploration has carried out studies on magnetic prospection for the purposes of geothermal energy and mining. The Turkish Petroleum Corporation works in some regions in Turkey for petroleum exploration.

Geomagnetic Researches

Kandilli Geomagnetism Laboratory of Bogazici University, Kandilli Observatory and Earthquake Research Institute, observes and records regional magnetic variations in Turkey. Components of the magnetic field (H, D, and Z), and total magnetic field (F) are recorded for every minute. These data are sent to INTERMAGNET (International Real-Time Magnetic Observatory Network) by e-mail. Furthermore, in the vicinity of İznik town of Bursa City, another observatory H, D, Z components of the magnetic field are recorded every second and twice a week absolute observations for D, I and F components are made. On the other hand in order to determine the tectono-magnetic effect in the Western Part of the North Anatolian Fault Zone, around Iznik-Mekece Fault, total magnetic field measurements have been recording every minute at 9 stations since 1986.

Also geomagnetic variations during the Total Solar Eclipse in 1999 and 2006 were observed in 3 Components (H, D and Z) of the geomagnetic field.

Magnetotelluric and magneto-variational methods have been applied in the Western part of the North Anatolian Fault Zone in a North-South alignment in order to reveal shallow and deep electrical resistivity structure and to get valuable information about the Earthquake mechanism since 1999. Studies are continuing with the methods to image the resistivity structure beneath Marmara Sea and its surroundings.

Studies of Kandilli Geomagnetism Laboratory of Bogazici University, Kandilli Observatory and Earthquake Research Institute

(i) Internal (main) geomagnetic field studies

A major part of geomagnetic secular variation can be represented by a rotation of the main geomagnetic field about the geographical pole. This phenomenon is called the westward drift and is related to the non-dipole part of the Earth's main geomagnetic field. The International

Geomagnetic Reference Field (IGRF) is a series of mathematical models of the Earth's main geomagnetic field and its secular variation. In this study, we attempted to compare IGRF models of different epochs by rotating them about an optimum pole which does not necessarily coincide with the geographical pole because such a rotation provides a closer approximation to the non-dipole secular variation than simple westward drift. Our purpose was to find the optimum pole positions and rotation rates and compare them with different epoch's results. The continuity of the path of the optimum poles suggested that it is a real phenomenon rather than a mathematical artifact.

(ii) External geomagnetic field studies

Regular geomagnetic daily variations, S_R**,** result from electric currents flowing mainly in the E-region of the ionosphere. The currents result from dynamo action due to the movement of conducting ionosphere across the Earth's main geomagnetic field. The ionosphere conducts because it is ionized by electromagnetic radiation from the Sun. In the absence of this, the ions rapidly recombine and the E-Region conductivity drops to zero. During a solar eclipse the part of the ionosphere in the umbra is shielded from Sun's ionizing radiation. In this study, we attempted to measure the changes of the three components of the geomagnetic field on the surface of the Earth near Elazig, Eastern Turkey during the 11 August 1999, solar total eclipse and compared our results with measurements done on other sites (or observatories) signature of an eclipse,

(iii) Electromagnetic induction studies in the crust and upper mantle.

This subject can be further classified into the following two.

- Studies on electrical resistivity structure of seismogenic zones

Fluid is an important factor in the fault zone and many of the active faults are characterized by a great volume of groundwater. Physico-chemical behavior at the fault zones is mostly determined by fluid-rock interactions. Electrical resistivity is a physical parameter that heavily depends on the fluid content of one medium. Magnetotelluric (MT) is an efficient electromagnetic method used in geophysics to image the electrical resistivity structure within the crust.

- Studies on electrical resistivity structure of volcanoes

Hydrothermal systems develop mostly in the vicinity of sources of heat within the Earth's crust. Most volcanoes are associated with hydrothermal systems in which convection causes heat to transfer from depths to the surface. Magnetotelluric and audio-frequency magnetotelluric methods are sensitive to presence of fluids and are viable tools for mapping the conductivity (reciprocal of resistivity) anomalies near the hydrothermal systems.

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Electromagnetic imaging of fluids in the seismogenic zone at the western part of North Anatolian Fault Zone", Head of project, Japan Society for the Promotion of Science (JSPS),

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Organizations Active in TUJAK Interests

1 – General Directorate of Mineral Research and Exploration – Ankara
http://www.mta.gov.tr
2 – General Command of Mapping – Ankara
http://www.hgk.mil.tr
3 – Turkish Petroleum Corporation – Ankara
http://www.tpao.gov.tr
4 – University of Istanbul – İstanbul
http://www.istanbul.edu.tr
5 – Boğaziçi University Kandilli Observatory – Istanbul
http://www.koeri.boun.edu.tr
6 – Istanbul Technical University – Istanbul
http://www.itu.edu.tr
7 – Middle East Technical University – Ankara
http://www.metu.edu.tr
8 – University of Dokuz Eylül – İzmir
http://www.deu.edu.tr
9 – Turkish Scientific and Technical Research Association – Ankara
http://www.tubitak.gov.tr

International Activities in TUJAK Interests
of The Chamber of Geophysical Engineers of Turkey

18th International Petroleum and Natural Gas Congress and Exhibition of Turkey, IPETGAS 11-13 May 2011 Ankara, Turkey.

The Turkish Oil & Gas Conference and Showcase (TUROGE) celebrated its 10th Anniversary in 2011 on 16-17 March Ankara, Turkey.

The Turkish Oil & Gas Conference and Showcase (TUROGE) celebrated its 9th Anniversary in 2010 on 16-17 March Ankara, Turkey.

The 19th International Geophysical Congress and Exhibition of Turkey, 23-26 November 2010 Ankara /Turkey

17th International Petroleum and Natural Gas Congress and Exhibition of Turkey, IPETGAS 13-15 May 2009 Ankara, Turkey.

5th Congress and Exhibition of Balkan Geophysical Society 10-16 May 2009 Belgrade, Serbia

The Turkish Oil & Gas Conference and Showcase (TUROGE) celebrated its 8th Anniversary in 2009 on 11-13 March Ankara, Turkey.

The Turkish Oil & Gas Conference and Showcase (TUROGE) celebrated its 7th Anniversary in 2008 on 18-20 March Ankara, Turkey.

The 18th International Geophysical Congress and Exhibition of Turkey, 14-17 October 2008 Ankara /Turkey

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF HYDROLOGICAL SCIENCES COMMISSION OF TURKEY FOR 2007 – 2010

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS 28 JUNE – 7 JULY, 2011

HYDROLOGY COMMISSION OF TURKEY

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TURKISH NATIONAL UNION OF GEODESY AND GEOPHYSICS (TNUGG)

THE REPORT OF TURKISH NATIONAL HYDROLOGY COMMISSION

(2007 – 2010)

GENERAL DIRECTORATE OF STATE HYDRAULIC WORKS (DSI)

ANKARA

May, 2011

CONTENTS

THE NATIONAL REPORT OF TURKISH NATIONAL HYDROLOGY COMMISSION

A. INTRODUCTION

Among the hydrology related organizations in Turkey are the General Directorates of the State Hydraulic Works (DSI), Electrical Power Resources Survey and Development Administration (EIE), State Meteorological Affairs (DMI) and the universities namely Middle East Technical University (METU) and Hacettepe University, Gazi University, Istanbul Technical University (ITU), all who are major contributing members of Turkish hydrological community.

In Turkey, General Directorate of State Hydraulic Works (DSI) is actively engaged in coordinating all hydrology-related organizations including private sector, newly emerging institutions, water-related establishments and universities.

During the last four years, it can be generally stated that the educational and technological capacities of the hydrometeorological services, and organizational abilities as well at the national level have been improved. In order to achieve the function of coordination in a more efficient manner, DSI has the principle responsibility of the hydrometeorological organizations, as being the focal point of national committees, covering the provision of advice to the Government on all related research, training, educational and practical matters in hydrology and giving the increased responsibility to DSI having more power in shaping national water resources policies. During the last four years, many conferences and symposiums related to hydrology and its most prevalent subtopics has been held in order to enhance the knowledge sharing among the pivotal institutions in both national and international level.

B. HYDROLOGICAL ACTIVITIES IN TURKEY

Turkish involvement in the international regional projects has been rather limited. However, the support to the international postgraduate hydrological course of UNESCO "*Sediment Transport Technology*", preferably for the specialists from the developing countries, is the main activity organized by DSI in this framework.

As a concrete improvement**,** it can be stated herewith that a forum page, with the e-mail address of hidroloji@yahoogroups.com, linked to the DSI's Web Site (http://www.dsi.gov.tr) to inform and to discuss the related issues of hydrology has been found quite effective. This report, with the extra information with respect to the IAHS activities in the Country and other details, can be available in the related page of above given Web address.

Meanwhile, in order for dealing with the IAHS related issues, in coordination with the other international hydrological relations, a special section entitled as Section of International Hydrological Affairs has been established in State Hydraulic Works (DSI).

Moreover, there has been some improvements regarding to Hydrologic Archive established in DSI. In this regard, all available hydrological documents, including IAHS publications are stored in an archive, and introduced to the hydrological community in the Internet environment.

B.1 Ongoing projects

The following projects are currently being studied:

- Developing GIS Based Discharge Estimation Models to Determine Discharges in Ungauged Basins: Case Study Kızılırmak Basin, May 2011

B.2 Other initiatives

The celebration of World Day of Water, March 22nd, with the themes of urban water management, has been celebrated in Turkey with a series of activities carried out to increase public awareness of water in the country. In order to promote extensive public awareness in water use and the role of water for development, the day was a great opportunity to raise the discussion on this matter and make it known as much as possible.

Some brief information giving on the manner in which World Water Day 2011, with the theme of “Coping with Water Scarcity” was celebrated by DSI. For the purpose of celebrating World Day of Water, General Directorate of State Hydraulic Works (DSI) arranged a number of

activities such as competition of composition, picture, photo and placard, celebration of the day and exhibition display.

B.3 International training courses

Turkey is among the countries to respond to the UNESCO call in 1970's for the promotion of hydrological training on an international extent. For this purpose, the Department of Technical Research and Quality Control of DSI has announced her first UNESCO sponsored International Post-Graduate Course on Hydrology as early as 1970s. Since then, DSI has been organizing a one month-long training course on the issue of sediment technology. In this course, the lectures on both theory and experiments are given to the participators.

B.4 National / Local Scientific and Technical Meetings, Seminars and Courses

The General Directorates of DSI and EIE, and some of the Universities have organised some local cources on the subject of operational hydrology. Most of them are related to the various hydrology-related practices including snow measurement, gauging of water level, project hydrology and hydrological evaluation of the major basins. Also, the important activities as a part of the hydrological program carried out by different institutions in Turkey, in the period of 2007-2010 are listed as following.

- 25-29 October 2010, Water Database Systems Seminar 2, Şanlıurfa
- 11-15 October 2010, Water Database Systems Seminar 1, Izmir
- 26-28 October 2010, International Sustainable Water and Waste Water Management Symposium, Konya

B.5 Flow Measuring Stations

During 1999-2002 in Turkey, some improvements have been achieved regarding the hydro-meteorological observing stations. To the most of the hydrometric observing stations, the electronic gauges have been installed. This improvement improved the station conditions, removing the observation errors and failures. Additionally, the measurements now are conducted in a more sensitive way and the observed data are transferred by modern telemetry technology. Using the modem facilities, it is now possible also to read, evaluate and store the real time data at the office. We plan on increasing the number of electronic gauges in basins.

B.6 Snow Observation

Seasonal snow-melt runoff estimates are extremely important in mountainous regions with semi-arid climatic conditions, like eastern part of Turkey. For that reason, automated snow and meteorological stations are established at higher altitudes since 1996, in the upper Euphrates River from the jointly research project carried by Middle East Technical University(METU) and General Directorate of State Hydraulic Works(DSI). It is still ongoing research in order to run near real time operational melt model to forecast runoff (rate / volume) melting from snow and rain on snow during early spring season.

Knowing the seasonal discharge volume in advance increases the flexibility in planning and operational of water resources systems as well as various water management decisions. For that purpose, RS techniques to trace the snow cover areas are used in the project.

Broad area observation systems are capable of monitoring macro-scale atmospheric and terrestrial features at varying spatial and temporal resolutions. Spatial and temporal requirements are important factors governing choice of satellite retrieval method.

During the last decade, besides to the classic snow observations, new technologies in snow studies have been applied by Turkey to improve the classical methods in use. Starting from 1998, the model studies using the available snow network observations have been applied. Application of remote sensing techniques in snow monitoring was initiated in 1996, through the NATO SfS fund support in the east part of Turkey. In the scope of these studies utilizing the Snow Runoff Model has started the project for estimation of snow-water equivalent potential of Karasu basin followed by other models as SLURP, HBV and others. In that study, remotely sensed snow cover data obtained by the NOAA (AVHRR) system were used to estimate the runoff from snowmelt. One of the major contributors of water to the Keban Dam is the Karasu River, which joins the Euphrates River at Keban Dam. Snowmelt from mid March to June contributes 65-70 % of the total annual runoff. NOAA (1x1 km) and MODIS (500m) resolution images of the region are obtained, processed and combined with GIS in order to monitor time and spatial distribution of snow-covered areas. Real time snow depths are measured and received regularly from the field using snow measuring ground stations

using the (Inmarsat Mini M) GSM and telephone line systems. Two satellite-receiving stations (Meteosat and NOAA) are present in DSI

Since the traditional point measurements are not representative enough from the point of "distribution in elevation" and cannot fully meet the necessary data requirements. Satellite remote sensing is expected to be a potential solution to this problem because broad area observation systems are capable of monitoring macro-scale atmospheric and terrestrial features at varying spatial and temporal resolutions. Spatial and temporal requirements are also important factors governing choice of satellite retrieval method.

Starting from 1996 winter, 3 snow pillows were purchased and placed at Guzelyayla, Ovacık and Cat through DPT (State Planning Organization) project to collect snow depth and water equivalent data automatically. It is intended that the data collected at prescribed dates are recorded electronically and the data can be stored and transferred to a central unit in Ankara. Each station is equipped with data logger unit, Snow depth measurement by sound electronic sensors, Snow pillow, and Air temperature and Pressure sensors. At these stations depths are also measured through snow courses to cross check the data collected and new additional automated stations are being installed by DMI within the same experimental basin at higher altitudes in 2007.

With the data obtained from these stations and other snow courses where snow depth and water equivalent are measured manually by DSI and EIE and density is computed and checked with AWOS records, the following snow parameters are determined: Percentage of spatial snow cover, snow depth, snow water equivalent, snow density, temperature profile of snow pack. Several scientific papers are produced and published at International journals and some of them are presented at national and international symposium and conferences.

B.7 Institutional relations and cooperations

The members of the Turkish hydrologic community are cooperated with many other institutions listed as following:

- IAEA, International Atomic Energy Agency
- JIIHP, Joint International Isotopes in Hydrology Program

- IAH, International Association of Hydro-geologists
- IAH, Karst Commission
- IAHS, International Association of Hydrological Sciences
- TUBITAK, Scientific and Technical Research Council of Turkey
- U.S. National Committee for Scientific Hydrology
- NIMH, Bulgarian National Hydrology and Meteorological Institute
- UNESCO, Division of Water Sciences, International Hydrology Program
- UNESCO, FRIEND
- UNESCO-IHE Institute for Water Education and/or international / regional / water centers under the auspices of UNESCO
- WMO, World Meteorological Organization
- WWC, World Water Council

B.8 Completed Projects

In the period of 2007-2010 at national level, following projects have been completed by General Directorates of DSI, EIE and Universities:

1. The Project on Capacity İmprovement for Flood Forecasting and Flood Control in the Turkey Bulgaria Cross Border Cooperation Region
2. Capacity Buiding Support to the Water Sector in Turkey (Buyuk Menderes River Basin Management Plan)
3. Water Database Project

It is kindly informed that the other details, mostly related to the studies done by universities, can be available in the related pages of the Web site of www.dsi.gov.tr , in which the secretariat works of IAHS are introduced also.

2. Istanbul International Water Forum has been organized in İstanbul 3-5 May,2011.

B.9 Activities foreseen for the future

1. International Water and Forestry Symposium will be held in September 2011
2. VI. National Hydrology Congress will be in Isparta in 2013

In the long term, it is proposed to be more effective in finding a way that the national community, under the leadership of DSI, has a real impact on all hydrologic activities and water related politics in the Country.

C. PUBLICATIONS BOTH NATIONAL / INTERNATIONAL

It can be firstly indicated that the flood yearbooks, prepared by DSI's hydrologists, includes the preliminary information used for strategic and socio-economic planning in the basins.

As for the international publications, it would be gladly stated herewith that the increasing number of the members of the Turkish hydrological community are involving in preparation of the national and international publications.

D. ORGANIZED SYMPOSIUMS AND CONFERENCES

D.1 National Proceedings / Symposium / Conference Proceedings

- 5.National Hydrology Congress, *2010, Denizli*
- International Sustainable Water and Waste Water Management Symposium, 26-28 October 2010, Konya
- 1.International Istanbul Water Forum, *January 2009, Istanbul*
- II.Symposium for Izotope Techniques in Hydrology, *10-14 September 2007, Istanbul*
- III. Symposium for Izotope Techniques in Hydrology, *13-17 October 2008, Istanbul*
- IV. Symposium for National Water Engineering, *06-10 July 2009, İstanbul*
- International River Basin Management Congress *22-24 March 2007, Antalya*
- Snow Hydrology, *27-28 March 2008, Erzurum*
- İrrigation and Drainage, *10-11 April 2008, Adana*

- Thermal and Mineral Waters, *24-25 April 2008, Afyonkarahisar,*
- Drought and Water Management, *15-16 May 2008, Ankara*
- Karst Hydrology, *22-23 May 2008, Antalya*
- Irrigation and Salination, *12-13 June 2008, Şanlıurfa*
- Floods, *19-20 June 2008, Edirne*

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF METEOROLOGICAL AND ATMOSPHERE SCIENCES COMMISSION OF TURKEY FOR 2008 – 2011

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS 28 JUNE – 7 JULY, 2011

METEOROLOGICAL AND ATMOSPHERE COMMISSION OF TURKEY

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TURKISH NATIONAL UNION OF GEODESY AND GEOPHYSICS (TNUGG)

THE REPORT OF TURKISH NATIONAL METEOROLOGY AND ATMOSPHERIC PHYSICS COMMISSION

(2008 – 2011)

Prepared For the XXV General Assembly

of the International Union of Geodesy and Geophysics

27 June – 08 July 2011

Melbourne / Australia

TURKISH STATE METEOROLOGICAL SERVICE (TSMS)

ANKARA

May, 2011

OUTLINE

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INTRODUCTION

From the very existence of human beings due to effects of meteorological phenomena on life; atmospheric events have always been researched. By this manner, human beings tried to find variable forecasting ways, either to benefit from positive effects or to protect from negative effects.

Turkish State Meteorological Service (TSMS) is a member of World Meteorological Organization (WMO) which also has 189 member services as the representative of countries under the umbrella of United Nations (UN). As one of the most successful sample of international cooperation since its establishment, WMO has increased societies interest on climate change and meteorological events based natural disasters. Moreover, World Climate Research Programme (WCRP) has been established by WMO and UNEP (United Nations Environment Programme). Meteorology Services studies on observing, weather forecasting, early warning and climate studies are also globally serving for health, food and water safety, poverty reduction.

Increase in world population, unplanned urbanization and migration problems and negative effects of global warming originated climate change and services need on food and water sources sectors have been increased and accessed new liabilities to the meteorological services.

Activities made by Turkish National Commission of Meteorology and Atmospheric Physics (TUMAK) in the period of 2008-2011

67th Council Meeting of ECMWF (European Centre for Medium-Range Weather Forecasts) was held in Reading/England on 8-9 April 2008. It has been decided that

Greece, Spain, Turkey and Portugal to represent Finance Committee for South group for 2008.

1- Attendance provided to First Regional Meeting of Fifth World Water Forum in Oman/Jordan in 26/27 February 2008.

2- Attendance provided to the 65th Council Meeting of EUMETSAT(European Organization for the Exploitation of Meteorological Satellites) which has been held in Darmstadt/Germany in 9 September 2008

3- On 30 November 2007, our service has made official application over the WMO's invitation to take a part in RCC (Regional Climate Centre) Network in Region Six Studies (Europe Region of WMO). With the 15 September 2008 dated letter of WMO, five countries plus Turkey has been invited to the RCC meeting. Then, attendance has been provided to the WMO-RCC Network meeting on 20-21 October 2008 in Geneva/Switzerland.

4- **Regular General Assembly** of Turkish National Confederation of Geodesy and Geophysics (TUJJB) has been held in Regional Meteorological Directorate of Istanbul in March 2009

5- Attendance provided to the EUMETSAT's 54th Science and Technical Group (STG), 41st United Meeting of Science and Technical Group and Administrative and Finance Group (STG/AFG) and 52nd Administrative and Finance Group (AFG) meetings.

6- Attendance provided to the 29th ECOMET (The Economic Interest Grouping of the National Meteorological Services of the European Economic Area) General Assembly in Utrecht/Netherland on 26 November 2009. Also, with the 1999 dated and 99/13896 reference numbered Council of Ministers' Decision Turkey is a member of ECOMET which is basically aimed to free and unlimited change of national meteorology/hydrology services' operationally needed meteorological data, and access to meteorological data and products for commercial applications in the frame of WMO rules.

7- TSMS hosted three separate activities in February 2010. They are 15th session of the WMO Climatology Commission that was held between 19-24 February in Antalya and a technical conference held between prior to the Commission

meeting on “Needs of the Climate Services with respect to Climate Variability Sustainable Development”. Lastly, the TSMS hosted the Joint Science Committee (JSC) meeting of World Climate Research Programme between 15-19 February. More than 250 experts from 82 countries attended the all those three events.

8- “INITIAL WORKSHOP on Regional Flash Flood Guidance System – Black Sea and Middle East Regions as Part of the Global Flash Flood Guidance System (FFGS)” was held in Istanbul between 29-31 March, 2010 under hospitality of the TSMS. The workshop was supported by WMO, US Hydrologic Research Center (HRC), USAID, and US National Weather Service (NWS) and several countries in the region including Azerbaijan, Armenia, Georgia, Iraq, Syria, Bulgaria and Romania participated in to the workshop along with the local institution and agency representatives from TSMS, State Hydraulic Works (DSI), Electrical Power Resources Survey and Development Administration (EIE), Disaster and Emergency Management Directorate (AFAD), METU, ITU and Water Foundation. The representatives who attended the meeting proposed TSMS to be Flash Flood Guiding Center for the Black Sea and Middle East regions.

9- A one-day workshop in “Aviation Meteorology” was held at Istanbul Sabiha Gökçen Airport with participation of 120 people from 40 organizations on 20 April 2010. During the workshop, Meteorological services provided to the aviation sector were assessed. The intense interest and demand expressed to the workshop led to organization of another joint workshop on Aviation Meteorology between TSMS and Turkish Airlines on 5 July 2010.

10- During 28-29 April 2010, a two-days meeting was held in Ankara on “Meteorology and Environment” with participation from Turkey, Iran, Iraq and Syria. During the meeting, Turkey was represented by Prof. Dr. Veysel EROĞLU (Minister of Environment and Forestry) while Iran, Iraq, and Syria were represented by Muhammed Cevad Muhammedizade, Narmean Othman Hassan and Kaoukab Alsabah Daya respectively. The meeting was concluded with signing of “Ankara Declaration of Ministers”.

11- As decided during the Ankara meeting held on 28-29 April 2010, “Drafting Action Plan” meeting was held in Tehran between 26-29 September 2010 with participation of Turkey, Iran, Iraq, Syria and Qatar delegations to discuss cooperation matters in Environment and Meteorology.

12- First International Symposium on Meteorology was held in Ankara between 27-28 May 2010. The symposium was unique in the sense it was the first international Meteorological symposium held in Turkey. The symposium was hosted by the TSMS and specifically focused on “Meteorology for Sustainable Development and Life”.

13- In order to mitigate damage, casualties and economic losses due to flooding in high risk areas located throughout Turkey, the U.S. Trade and Development Agency (USTDA) awarded a grant today to the Turkish State Meteorological Service (TSMS) for a feasibility study to develop a comprehensive roadmap for a fully operational flood forecasting and early warning system. The project offers opportunities for Turkey to develop commercial relationships with U.S. companies that have expertise in flood mitigation. Turkish State Meteorological Service (TSMS), State Hydraulic Works (DSI) and Disaster and Emergency Management Directorate (AFAD) will carry out the feasibility studies together.

14- Turkish State Meteorological Service hosted “Informal Conference of South European National Meteorological and Hydrological Directors on 21-22 September 2010 in Istanbul. (NMHS). At the conference not only the NMHSs directors were present but also leading European Institutions like EUMETSAT and ECMWF and of course World Meteorological Organization (WMO). The NMHSs countries which attended the meeting were of Turkey, Montenegro, Slovenia, Serbia, Bosnia and Herzegovina, Moldova, Macedonia, Croatia, Romania, and Bulgaria making the total participating countries ten.

15- Second Meeting of the Director Generals of the Economic Cooperation Agency (EIT) countries was held in Antalya between 18-20 October 2010 with aim of improving cultural and economic ties among the EIT countries. The meeting was hosted by TSMS and attended by Afghanistan, Azerbaijan,

Iran, Kazakhstan, Kirgizstan, Pakistan, Uzbekistan, Tajikistan and Turkmenistan.

16- TSMS provides meteorological support to military flights and trained staff to the meteorology office located at International Airport in Kabul, Afghanistan under the authority of International Security Assistance Forces (ISAF) as part of its obligations as being NATO member.

17- Two separate training events were held on the subjects of "Forecasting and Early Warning System of Dust Storms" and "Erosion Prevention and Control Techniques and Reforestation" in Istanbul as a result of the First Ankara Declaration of Ministers signed among the Turkey, Iraq, Syria, and Qatar ministers on 28-29 April 2010 in Ankara and the Action Plan drafted during the second meeting of the ministers that was held in Tehran, Iran. A total of 17 experts from Iraq, Iran, Lebanon, Iran, Syria, Saudi Arabia and Jordan attended meetings along with WMO and EUMETSAT representatives. In addition, academicians from Turkish and Spanish universities and experts from Ministry of Environment and TSMS also attended the training events.

18- The Aviation Workshop was organized by TSMS on 28 February 2011 in cooperation with the Turkish Airlines, Directorate General of Civil Aviation and General Directorate of State Airports Authority

19- Within the activities of the Regional Program on Disaster Risk Reduction in South East Europe by WMO in Bosnia on 28-30 March 2011, TSMS attended the Regional Meeting for Strengthening Regional Cooperation in Meteorology, Hydrology and Climate Services for Disaster Risk Management.

20- TUMAK working group update studies are started by March 2011

21- TSMS has attended the 8th WMO/UNEP Ozone Research Managers Meeting which is held in Geneva, Switzerland on 02-04 May 2011.

22- WMO Regional Training Center, Turkey

One of the main objectives of WMO is to support education in the field of meteorology and hydrology and coordinate this kind of activities in worldwide. The Education and Training Program (ETRP) of WMO is established to coordinate such activities. In this

way, the educational need of the regional meteorology and hydrology staff is expected to be achieved.

Along this line, an agreement between WMO and TSMS was signed on 18 May 2000 and Turkey is recognized as one of the WMO Regional Training Centers (RTC) in addition to the other 22 RTC. The RTC Turkey was started in the headquarters of the TSMS in Ankara and after the year of 2005, additional educational centers are included in Alanya and Istanbul to be used as part of the RTC Turkey.

For the 2008-2011 period, RTC Turkey organized several courses. During these courses, 266 participants from 72 countries have attended the courses listed below.

- Course on Satellite and Radar Meteorology for the Saudi Arabian Meteorological Service staff.
- International course on Preventing and Mitigating Meteorological Natural Disasters by Means of Remote Sensing.
- International course on severe weather effect on the aviation and forecasting techniques.
- International course on Meteorological Communication and Turkish METCAP software.
- International course on Meteorological Radars.
- International course on Upper Atmosphere observation systems
- International course on Automated Weather Observation Systems
- International course on Agricultural Meteorology
- Meteorological Education programs for the Iraq and Syria Meteorological Service Staff
- International course on MSG-Metop applications and nowcasting techniques
- International course on Climate applications
- International course on Climate change for Mediterranean basin
- International course on global telecommunication systems and meteorological softwares, METCAP & KARDELEN

In addition to these courses, various regional education seminars are organized and hosted by the RTC Turkey for the various institutions.

SOME ACTIVITIES IN THE FIELD OF METEOROLOGY AND ATMOSPHERIC PHYSICS IN TURKEY (2008-2011)

RESEARCH PROJECTS:

A.SUPPORTED BY TUJJB IN TUMEHAP

- 2007-2009. Evaluation of photochemical pollution in Istanbul by using model TUJJB-TUMEHAP-03-06 project- **Principal Investigator. Selahattin İncecik** Researchers:U.İm, O.Yenigun, **S.Topcu** (resulted).

- 2006-2010-Investigation of the effects of Global Climate Changes on Turkey by Regional Climate Model (in Turkish), **Principal Investigator: Yurdanur S. Ünal**, Researchers:**B. Önol, S. Menteş. Y. Borhan, Abdullah Kahraman, Deniz Ural**, TUJJB-TUMEHAP-02-06(resulted)

- 2010-2012. Investigation of VOCs in İstanbul-Kağıthane region (in Turkish) TUJJB-TUMEHAP-01-10, **Principal Investigator:Hüseyin Toros**, Researchers: **Ali Deniz, Ali Öztürk**, Mustafa Coşkun **(**on going project).

B. **SUPPORTED BY Turkish National Scientific and Research Council**

- 2007-2010. Investigation of ozone and its precursors over Istanbul (in Turkish) – TUBITAK-COST Project-105Y005, **Principal Investigator: Selahattin İncecik**. Researchers: Ulaş İm, Orhan Yenigün, **T.Kindap, S.Topcu**, T.Odman, A.Tek, M.Tayanc (resulted)

- 2009-2012.Investigation of air quality in İstanbul -Kağıthane region (in Turkish) 109Y132 –TÜBİTAK- **Principal Investigator: Ali DENİZ**, Researchers:**Selahattin İNCECİK, Hasancan OKUTAN, Orhan YENİGÜN, Yurdanur S. ÜNAL, Hüseyin TOROS, İsmail MERT** (on going project)
- 2010-2012. Short term forecasting system for wind energy (in Turkish, TUBİTAK, No., 110Y050, Principal Investigator: Ş. S. Menteş, Researchers: **Y. S. Ünal**, **S. İncecik, S. Topçu, Y. Borhan, B. Barutçu, B. Önol, H. Toros, E. Tan**, A. Akçakaya, C. Dündar (on going project)

- 2009-İklim Değişiminin Bitki Gelişimine Olası Etkilerinin Bitki Gelişimi Modelleri İle İncelenmesi(in Turkish), TÜBİTAK, COST Project, 108O567 Principal Investigator: **L. Şaylan** Researchers: **Z. Kaymaz**, F. Bakanoğulları, **B. Çaldağ** (ongoing project)

- 2010-2012 'Prediction of transport and dispersion of the hazardeous pollutants by Lagrangian model and radar(in Turkish) **TÜBİTAK, 110Y155**, **PI: Yurdanur S. Ünal**, Researchers:H. Karan, **E. Tan, B. Önol, A. Deniz, H. Toros**, F. Demir, (on going project)

- 2009-Buğday bitkisinin Karbondioksit, su buharı ve enerji akılarının belirlenmesi, (in Turkish)TÜBİTAK 1001 Project, 108O567 Principal Investigator: **L. Şaylan**, Researchers: F. Bakanoğulları, **B. Çaldağ**, (on going project).

- 2009-2012- Magnetic and Magnetospheric Storms and Upper Atmospheric Consequences: Applications in Space Weather and Spacecraft Operations, PI: **Zerefsan Kaymaz**, TÜBİTAK Scientific Research Project, Project No. 109Y058, (on going project)

C.Others:

- 2009-2011-Operational Improvement Potential of the EUAS's Thermal Power Plants as mitigation of CO2 to be privatized in Turkey – Principal Investigator E. Gorgun-Researchers:**S.Incecik**, B.Ozer, Prime Ministry Higher Privatization Authority in Turkey

- 2007-2008-Cloud and Aerosol Research in Istanbul, , Teller, A., Axia, D., Buriitjes, R., Collins, D., Mutlu, A., Li, R., Kluzek, C.,Pocernich, M.,Busecek, P.,Freney, E.,Hunter, S.,Tessendorf, S., Salazar, V., Breed, D., **Şen, O, Kocak., Toros, H.,**Köse, A**.,** Tunc, M. Prepared by: Research Aplications Laboratory, National Center for Atmospheric Research, Boulder. Colarado, USA. Supponsored by IMM.

- 2011-Themis Spacecraft Dayside Observations, Researcher: **Z.Kaymaz**, NSF project.

- 2008-2011. MEGAPOLI PROJECT-FP7-Megacities: Emissions, urban, regional and Global Atmospheric POLlution and climate effects, and Integrated tools for assessment and mitigation, PI: A.Baklanov. Vice-coordinators: M. Lawrence and S. Pandis Researchers: S. Finardi, N. Moussiopoulos, P. Barmpas, M. Beekmann, H. Cachier, J. Sciare, P. Laj, L. Gomes, J-Luc Jaffrezo, A. Borbon, V. Gros , J. Kukkonen, S. Galmarini , F. Giorgi, S. Grimmond, I. Esau , A. Stohl, B. Denby, U.Baltensperger, P.Builtjes, D. van den Hout, H. D. van der Gon, B. Collins , H. Schluenzen , M. Kulmala, S. Zilitinkevich, G.t de Leeuw, R. Sokhi, R. Friedrich, L.Jalkinen, T. Halenka, A. Wiedensholer, P., Rossow, P. Lameloise , V. Matthias; G.Carmichael, J. Ching, K. Schere, J. C. McConnell, L. Molina, R. D. Bornstein, H.J.S. Fernando, G. Katul, G. Grell, T. K. Keating; J. Kaminiski B. R. Gurjar, V. Sethi, N. Thi Kim Oanh, N. Kasimov, L. Karlin, R. Vilfand, T. Xu , **S. Incecik**, E. Gayev , M.M. A. Wahib , H. Jorquera. (on going project).

PEER -REVIEWED PUBLICATIONS:

- Unal, Y.S., A. Deniz, H. Toros ve S. Incecik, Temporal and Spatial Patterns of Precipitation Variability for annual, Wet and Dry Seasons in Turkey, **Int. Journal of Climatology** published online DOI: 10.1002/joc.2274. 2011.

- Im U., Poupkou A., Incecik S., Markakis K., Kindap T., Unal, A., Melas D., Yenigun O., Topcu S., Odman M.T., Tayanc M., Guler M. “The impact of anthropogenic and biogenic emissions on surface ozone concentrations in Istanbul” **Science of the Total Environmen**t, 409(7), 1255-1265, 2011.

- Deniz, A, H.Toros, S.Incecik, Spatial variations of climate indices in Turkey, **Int. Journal of Climatology**, 31, 3, 394-403. 2011.

- Deniz A. An examination of the tourism climate index in Turkey. **Fresenius Environmental Bulletin**, 20 (6): 1414-1424.2011.

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TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF OCEANOGRAPHIC
COMMISSION OF
TURKEY FOR 2008 – 2011

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS 28 JUNE – 7 JULY, 2011

OCEANOGRAPHIC COMMISSION OF TURKEY
(www.shodb.gov.tr)

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OCEANOGRAPHY COMMISSION OF TURKEY

FOR
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Prepared For the XXV General Assembly
of the International Union of Geodesy and Geophysics

27 June – 08 July 2011
Melbourne/Australia

OCEANOGRAPHY COMMISSION OF TURKEY

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ANKARA 2011

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INTRODUCTION

National Oceanography Commission of Turkey (TUOK) works on and encourages studies on the subjects such as physical oceanography, hydrobiology, marine geology and geophysics. This National Report has been prepared for the XXV General Assembly of IUGG to present newly and/or developed scientific researches of Turkish scientists. The National Report represents homage to our scientists and their colleagues.

PROJECTS

Istanbul University

Faculty of Fisheries

- Monitoring of terrestrial inputs and water quality in Izmit Bay and improvement of suggestions for the prevention of pollution (2008-2009). (supported by The Scientific and Technological Research Council of Turkey (TUBITAK))
- Examination of the factors that control the formation of mucilages/mukus in the marine environment under laboratory conditions (2008-2010). (supported by TUBITAK)
- The establishment of emergency intervention centers and feasibility study to determine the current situation in various seas (2006-2009). (supported by TUBITAK and Undersecretariat of Maritime Affairs)
- Research of levels of pathogenic bacteria in ballast water of ships navigating the Sea of Marmara (2009-2010). (supported by TUBITAK)

Institute of Marine Sciences and Management

- Upgrade Black Sea Scene Project (Up BSScene) (EU 6^{th} and 7^{th} Framework Project) (Dokuz Eylul University Institute of Marine Sciences and Technology, Institute of Marine Sciences METU, Karadeniz Technical University Faculty of Marine Sciences, Istanbul University Institute of Marine Scienses and Management) (2008-2011)
- PEGASO Project (EU 6^{th} and 7^{th} Framework Project, Proposal No: 244170) (2008-2011)
- "Programme of Integrated Actions (PIA) – Bosphorus" research project support program. "The geological and paleoceanographical evolution of Bosphorus-Black Sea confluence (BBSC)". (Supported by TÜBİTAK – France Ministry of Foregn Affairs) Project no: 105Y156 (2007-2009),
- Tsunami Risk and Strategies For the European Region (TRANSFER) (EU 6^{th} and 7^{th} Framework Project) (2006-2009)
- Research of Shallow seismic structure of The Marmara Island and The Surrounding Area and traces of possible landslides and underwater slumps (ONAP-2914).

- Hydrocarbon contamination in sediment offshore Yeşilırmak River, Black Sea, Turkey, (BYP–4354)

Middle East Technical University (METU)

Institute of Marine Scienses

- Research of eutrophication in Adana Cukurova Basin that can be explained by circulation, transport and over-fertilization (2007-2008).
- SESAME : Southern European Seas: Assessing and Modeling Ecosystems changes sustainable development, global change and ecosystems. (…-2008)
- Investigation of changes in stocks of small pelagic fish in the North-eastern Mediterranean (supported by TUBITAK) (2007-2008)
- Oil spill modelling studies for Baku-Tiflis-Ceyhan terminal. (2007-2008).
- SINHA : Urban wastewater management along coastal areas of Turkey: Reidentification of hot spots and sensitive areas, determination of assimilation capacities by monitoring and modelling and development of sustainable urban wastewater investment plans (2008-2011). (supported by TUBITAK)
- Accreditation of "Applied Hydrograph Education Program" (2009)

TUBITAK (Scientific and Technological Research Council of Turkey)

Earth and Marine Sciences Institute (YDBE)

- Upgrading Seismicity Monitoring Infrastructure Capacity in the Sea of Marmara (2006-2009)
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Environment Institute

- SINHA
- Investigation of limnological properties of Buyukcekmece Lake and development of recommendations for solution of environmental pollution (2006-2008).
- Monitoring of sediment pollution in Omerli Dam Lake and water quality (2006-2008)
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ITU

Faculty of Naval Architecture and Marine Engineering

- EMCOL, "Eastern Mediterranean Centre for Oceanography and Limnology" (ECFP6 Project No: 017970) (finished on 2008).
- HYPOX: In situ monitoring of oxygen depletion in hypoxic ecosystems of coastal and open seas and land- locked water bodies (EC FP7) (2008)
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Boğaziçi University (BU)

Kandilli Observatory and Earthquake Research Institute

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- Intergovernmental Coordination Group for The Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, The Mediterranean and Connected Seas (ICG/NEAMTWS)
- Seismology: New protocols for developing the existing network (Bulgaria, Romania, Thessaloniki, Georgia, Tunisia), SeisComp3 tests, establishing a sea floor observatory (2009-2010)
- Sea Level: Updating the stations, data transfer via EumetSat, Data transfer software (2009-2010)
- Tsunami Modelling: installing ODTU Programme and tests, constituting data bases for Tsunami scenarios, preparing interface programmes for the input to be used by NAMI DANCE (2009-2010)

Dokuz Eylül University

Institute Of Marine Sciences And Technology

- Gulf of İzmir Sedimentology and Current System Project (Metropolitan Municipality of İzmir)
- Revealing Bathymetric and Seismic Characteristics of the Gulf of İzmir and Examining and Modelling the Current System of the Gulf.
- Detecting the Present Sediment Structure and Sea Floor Geomorphological Characteristics of the Western Black Sea Project.
- Mutual Interaction between Black Sea Sedimentation and Mediterranean Sea Water Exchange Project.
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TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR COMMISSION OF TURKEY FOR 2007 – 2011

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS 28 JUNE – 7 JULY, 2011

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(www.afad.gov.tr)

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ADHERING ORGANIZATION

REPUBLIC OF TURKEY
PRIME MINISTERY
DISASTER AND EMERGENCY MANAGEMENT PRESIDENCY
EARTHQUAKE DEPARTMENT
(AFAD)

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1. INTRODUCTION

The Turkish National Commission for the Seismology and Physics of the Earth's interior, being one of the commission of Turkish National Union of Geodesy and Geophysics, is authorized to coordinate the research activities on related topics as well as participate for improvement of activities in these fields. The commission composed of personel and institutional members coming from the public research organizations and universities.

The chairmanship and the secretariat of the commission, in accordance with the organisatonal and operational by-laws of Turkish Geodesy-Geophysics Union, are carried out by the Prime Ministry, Disaster and Emergency Management Presidency Earthquake Department.

This report includes summary of the activities of the organisations which provide members to the commission for the years between 2007 and 2011.

2 . ACTIVITIES OF THE RESEARCH INSTITUTIONS AND UNIVERSITIES

a. DISASTER AND EMERGENCY MANAGEMENT PRESIDENCY, ANKARA

http://www.afad.gov.tr

http://www.deprem.gov.tr

Turkey changed her disaster management structure in 2009 by merging previously responsible 3 actor. The new organisation is established under Prime Ministry and called Disaster and Emergency Management Presidency (AFAD).

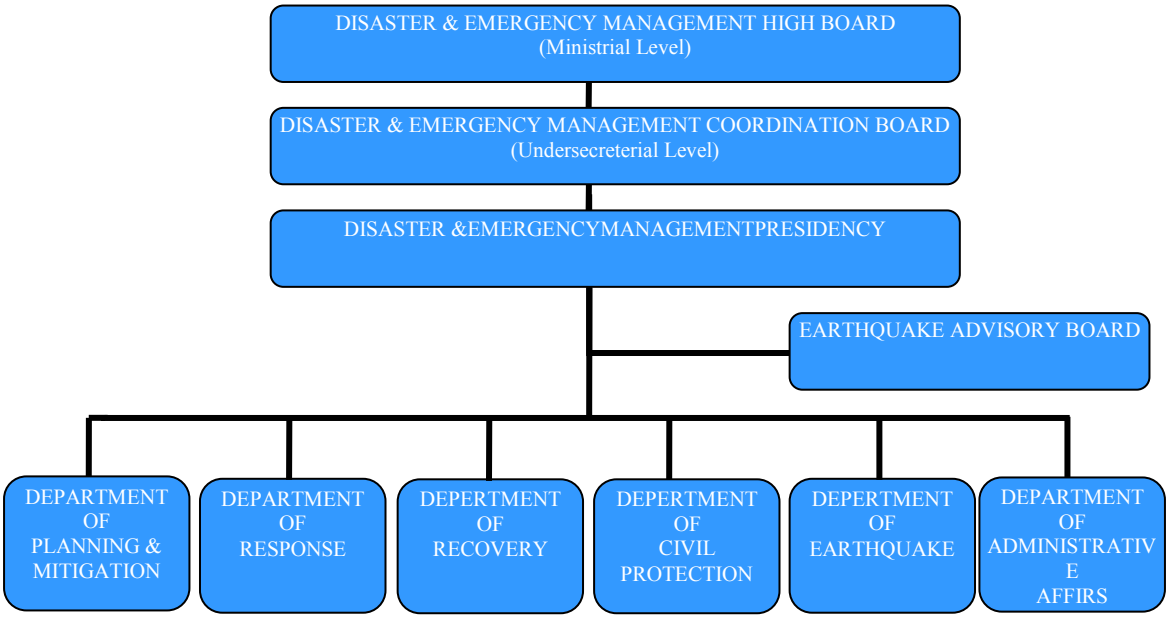
AFAD is responsible from implementing and coordinating;

- pre-disaster works such as preparedness, mitigation and risk management,

- syn-disaster works such as response, emergency aid,

- post disaster works such as recovery and reconstruction.

- Law No: 5902
- Enacted by TNGA 29.05.2009
- Promulgated 17.06.2009
- This new law describes the necessary administrational structure, its activities, responsibilities, relations with other units, and running of tasks related to disaster and emergency management of natural, technological and human originated hazards
- This law aims;
  - To take necessarry precautions and measurements on disaster and civil protection related services at country level,
  - To maintain coordination amongst the orgnisations those have a role pre and post disaster activities,
  - Policy making and implementation on disaster management



EARTHQUAKE DEPARTMENT

(1) NATIONAL SEISMOLOGICAL OBSERVATION NETWORK

Observation studies along North Anatolian Fault System have been carried out since 1990 by continuous and online data acquisition. Especially since 2000, earthquakes occurred in the country have been observed continuously on real-time basis. A high quality data has been provided by broad band stations of DDA (Disaster and Emergency Management Presidency, Earthquake Department). Data presentation and revision of database studies were completed in December 2008. Communication from the stations are provided by Satellite, GPRS, ADSL and Leased Line (Table 1).

As of March 2011; 176 Broad-Band stations, 2 Three Component Short Period, 7 One Component Short Period stations (Fig-1) have been operated by Earthquake Department. In addition to 185 stations, it is planned to establish 20 broad-band stations (Fig-2) until the end of 2011. All of the stations transmit continuously their signal to the Earthquake Department seismic data center in Ankara. Capability of the network is to determine an earthquake which is minimum local magnitude ML= 2.8 generally, in some region local magnitude threshold is ML=1.5. The places where the stations are concentraited. Earthquake activity in Turkey and surrounding region has been observed 7 days / 24 hours, in Eearthquake Department data center in Ankara (detail info: http://www.deprem.gov.tr). In addition to the manual solutions; automatic solutions programs are used for the solutions of earthquake as Earthworm and Seiscomp3 (Fig-3). After the manual location of an earthquake, if the earthquake magnitude is over 4.0, system sends to SMS (message) automatically to the authorized people deal with it (such as public and national local crisis center) and inform immediately scientific institutions, press, public and national-local crisis center by fax and e-mail (Fig-4). Data exchange has been carried out EMSC-CSEM. Besides focal mechanism solution (according to P wave first motion), moment tensor solution are done and this solutions are sent to CSEM.

Disaster and Emergency Management Presidency is a official authority in Turkey about where all real-time data recorded (weak and strong motion) at existent station in Turkey is collected, stored, archived and shared with all users.

Specification of the Sytem :

The data are provided by Scream or Earthworm in real-time.
Data format (SUD, SAC, miniSEED).
Request methods (FTP).
Continuous data, Data acquisition format GCF.
Archiving (Scream and Earthworm for waveform data).
MSSQL for bulletin and catalog.

Table 1. Stations According to Types of Communication.

Communication Type	*Station*
Satellite	***84***
GPRS	***80***
ADSL	***12***
Leased Line	***9***

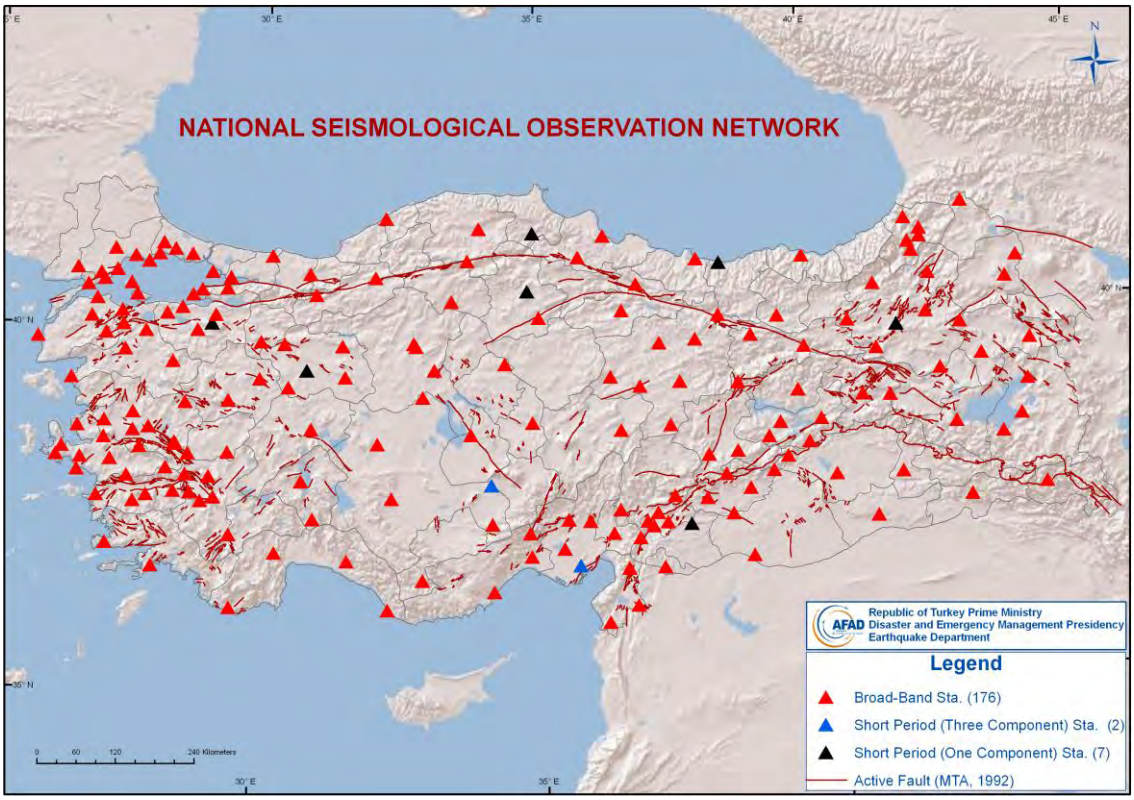


Fig-1. National Seismological Observation Network of Turkey.

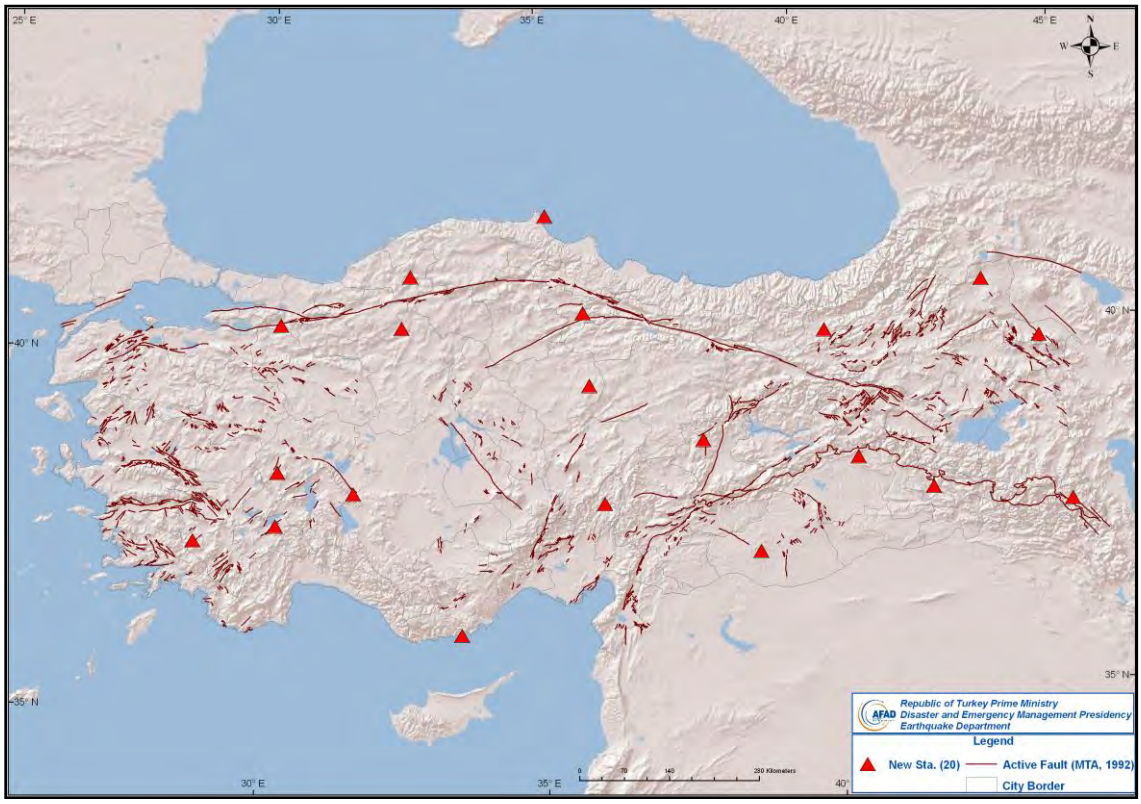
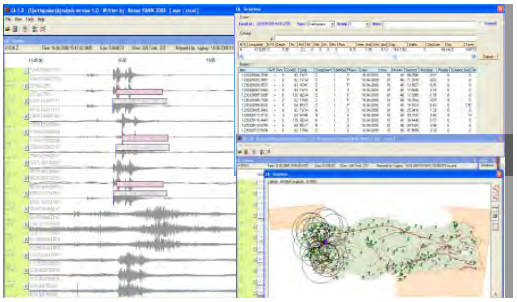
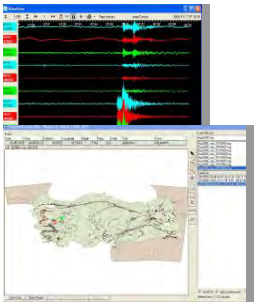


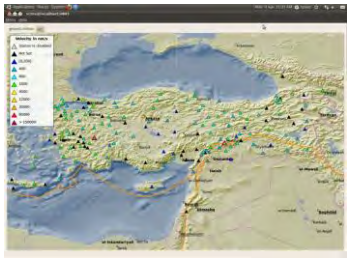
Fig-2. Approximate location of 20 New Broad-Band Stations (Planned to be established in 2011).



Earthquake Analysis Program for manuel Solution (EA)



Automatic Solution Program (Earthworm)



Automatic Solution Program (Seiscomp 3)

Fig-3. Determination of Earthqauke Parameter.

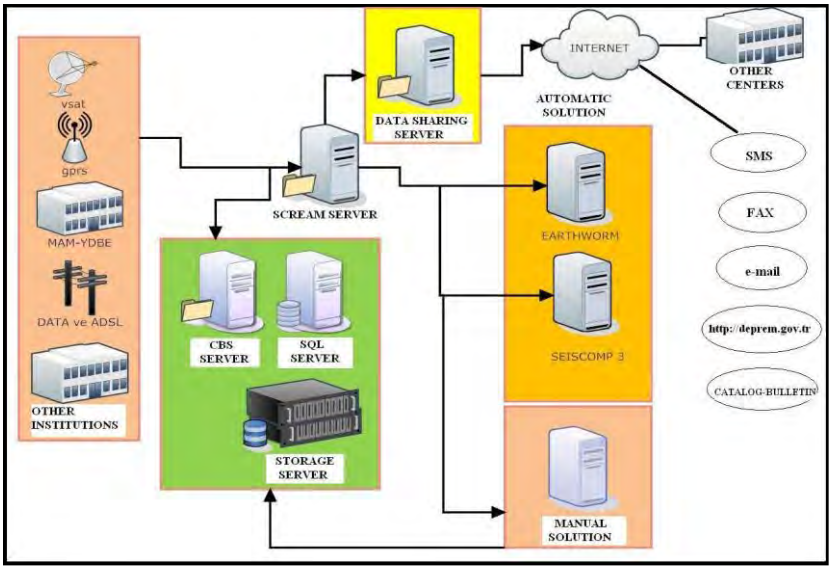


Fig-4. Data Processing System.

PROJECTS

- **Development Of The Natıonal Seısmologıcal Observatıon Network Project (Usag)**

In order to mitigate disaster losses, it is necessary to establish an effective disaster management and risk system. The first step of the management is constituted by preparedness studies before the earthquake (disaster). In order to determine disaster and risk information it is necessary to have a seismological observation network. Due to the monitoring earthquakes in the country wide scale, recording, evaluation and archiving and after a probably destructive earthquake inform the public authority immediately, a project named **"Development of the National Seismic Network Project"** has been started in 2004. This Project has been supported by State Planning Organization.

- **Multı - Dıscıplınary Earthquake Researches In Hıgh Rısk Regıons Of Turkey Representıng Dıfferent Tectonıc Regımes Project (Turdep)**

For earthquake hazard reduction, it is aimed to observe earthquake activity and earthquake precursors by multidisciplinary studies related to the three main fault zones in our country and to introduce the earthquake hazard seriously in the regions under risk (Fig-5). Thus, a database information will be obtained for a disaster management system in the international standards. 14 universities participate in this project which is supported by TÜBİTAK Marmara Research Center
(http://www.mam.gov.tr/eng/institutes/ydbe/ydbeprojeler/turdep2009.html).
Although this project completed on October 2010, it is planned to further developed it in the next years.

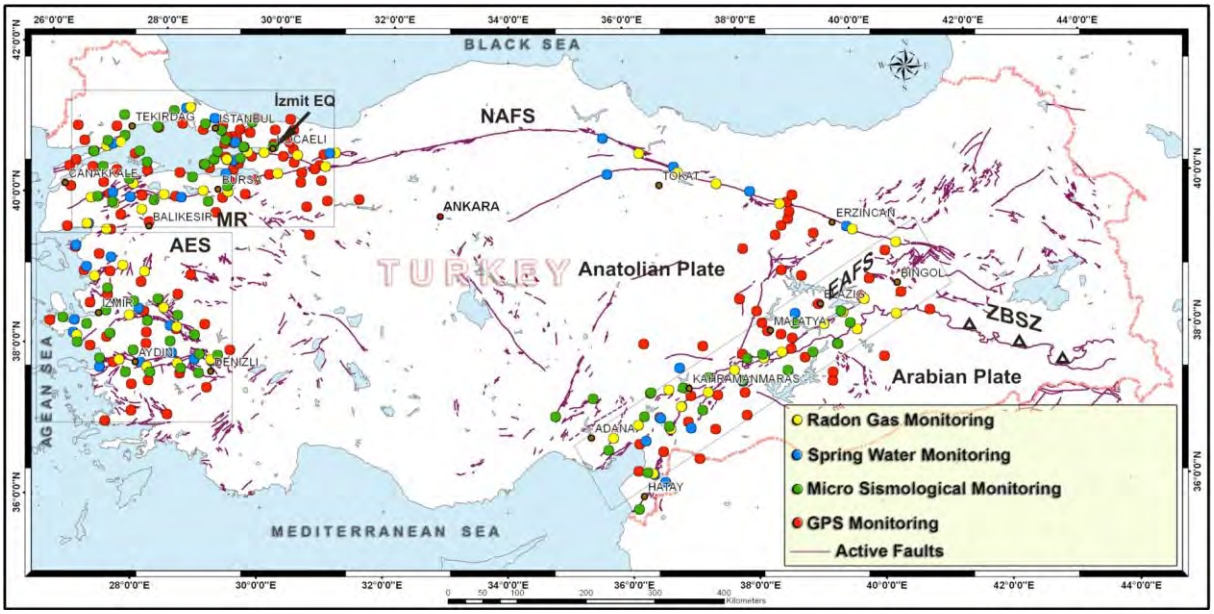


Fig-5. Locations of the established and continuously run monitoring stations under the scope of the project. Abbreviations are MR, Marmara region; AEP, Aegean Extensional Province; EAFS, East Anatolian Fault System; NAFS, North Anatolian Fault System; ZBSZ, Zagros-Bitlis suture zone. Arrowhead points to the epicenter of the İzmit earthquake of 17 August 1999.

Benefits of the Project

-Investigate the causes of earthquakes,
-Determine the origin time, magnitude, location and depth of earthquakes,
-Observe all active faults,
-Study on earthquake hazard and risk analysis,
-Determine the reoccurrence period of the earthquakes,
-Study on the earthquake prediction research,
-Prepare hazard maps and to direct Emergent Aid System,
-Prepare bulletins, earthquake catalogs and archive data,
-Constitute data base for the earthquake information system,
-Inform immediately scientific institutions, press, public and national-local crisis center,
-Improve earthquake resistant building techniques,
-Provide the utilization of the network as Early Warning System at the places which have
strategically importance.

- **Turkey Earthquake Data Center Project**

With this project, it is aimed to be center where all real-time data recorded (weak and strong motion) at existent station that have been operated by AFAD, another universities and institutions in Turkey is collected, stored achieved and shared with all users (Fig-6). Disaster and Emergency Management Presidency

(AFAD) is an official authority to perform and coordinate all kinds of scientific studies in the matter of earthquake in Turkey. This Project has been supported by State Planning Organization. Project duration: 2011-2014.

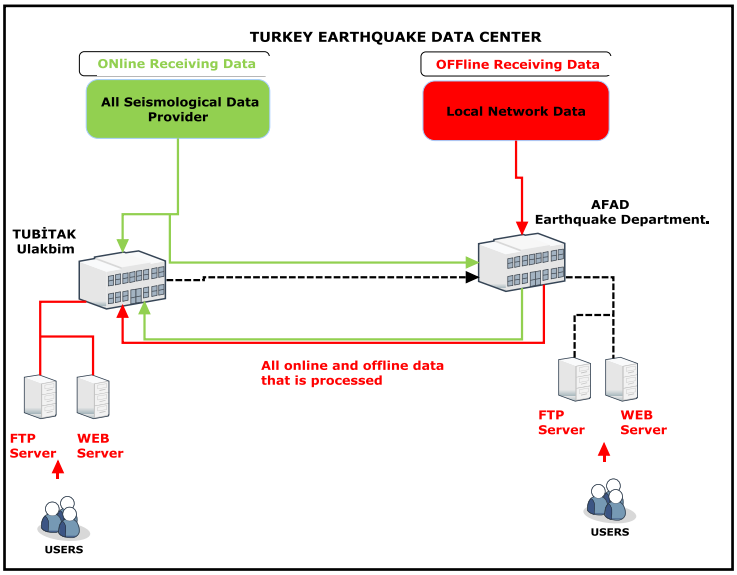


Fig-6. Data Transformation System

ACTIVITIES IN THE FIELD OF SEISMOLOGY

- Host a **International Training Course on Seismology, Seismic Data Analysis, Hazard Assessment and Risk Mitigation, (September 20 to October 22, 2010)** Organised and sponsored by Helmholtz Centre Potsdam, GFZ German Research Center for Geosciences, Kandilli Observatory and Earthquake Research Institute, İstanbul, Tübitak Marmara Research Center, Gebze, Kocaeli University, Izmit, Prime Ministry - Disaster and Emergency Management Presidency, Ankara, Dokuz Eylül University, Izmir.

- "Seismic Data Analaysis Course" Tokyo-JAPAN (in accordance with protocol between JICA, Prime Ministry Disaster and Emergency Management Presidency, Bosphorus University, Kandilli Observatory). It started 2010 and will countinue until 2012.

- National Cooperation

INSTITUTION NAME	STATION NUMBER
Antalya Governership	**2**
Bosphorus University Kandilli Observatory and Earthquake Research Institue (KOERI)	**10**
Çankırı Governership	**1**

DSİ	**4**
Erzurum Atatürk University	**10**
Eskisehir Anadolu University	**6**
Gediz District Governership	**1**
Isparta Süleyman Demirel University	**3**
Sivas Cumhuriyet University	**5**
TURDEP Project	**70**

- International Cooperation

- M> 3 earthquakes solution are sent to CSEM automatically
- Online Station Data are sent to ORFEUS
- Catalog Data are sent to ISC
- Data Exchange has been carried out IRIS
- ANTO Station (It belongs to USGS) has been operated from ERD
- Data Exchange has been carried out Georgia Sesimological Center (only 4 station)

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(2) THE NATIONAL STRONG MOTION NETWORK OF TURKEY

The National Strong Motion Network of Turkey (TR-KYH) was established in 1973. This network has been operated by the Republic of Turkey Prime Ministry Disaster Emergency Management Presidency Earthquake Department since December 2009. The national network have been operated only by TR-KYH in the country-wide scale.

The aim of the Network has the primary responsibility for recording each damaging earthquake in the Turkey on the ground and structures in active fault zone and densely urbanized areas to improve public earthquake safety. The TR-KYH maintains national network, data center, and a supporting strong-motion data analyses and research center in support of this responsibility. In addition, fundamental for earthquake engineering studies such as advanced structural analyses, seismic hazard evaluation, site effects and calibration of ground motion attenuation relationships. The accelerometers are mostly installed on the North Anatolian Fault Zone (NAFZ), East Anatolian Fault Zone (EAFZ) and Aegean Graben System where the big earthquakes occurred or the expected active areas with a distance about 50-80 km. Currently, there are 5 different models and total number of 305 digital accelerometers (Figure1,2). The instruments are placed inside institutional buildings such as meteorology stations or local ministerial offices for safety and ease of maintenance. These instruments are installed as free fields.

Initially, analog acceleration records were installed as they were the then-available technology. After 1993, also digital accelerometers were added to the Network. Since 1993, a world standard and real time Strong Motion Network that has high quality data has been achieved by increasing the number of stations rapidly. At the end of 2011, it is aimed to have 450 stations in the network. Furthermore, total station number will be 1000 in the network until 2023.

Since the establishment of the Network, acceleration data of earthquake, which is occurred in Turkey are collected, stored and always updated. To date, KYH was recorded more than 5000 earthquakes' acceleration records that are presented through Internet (http://kyh.deprem.gov.tr) to all researchers and scientific areas.

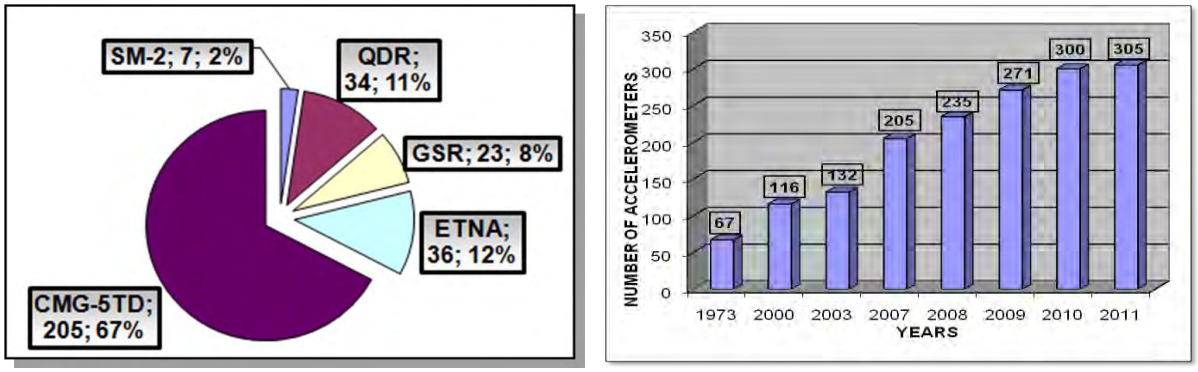


Figure 1. Types of Accelerometers and distribution of the number.

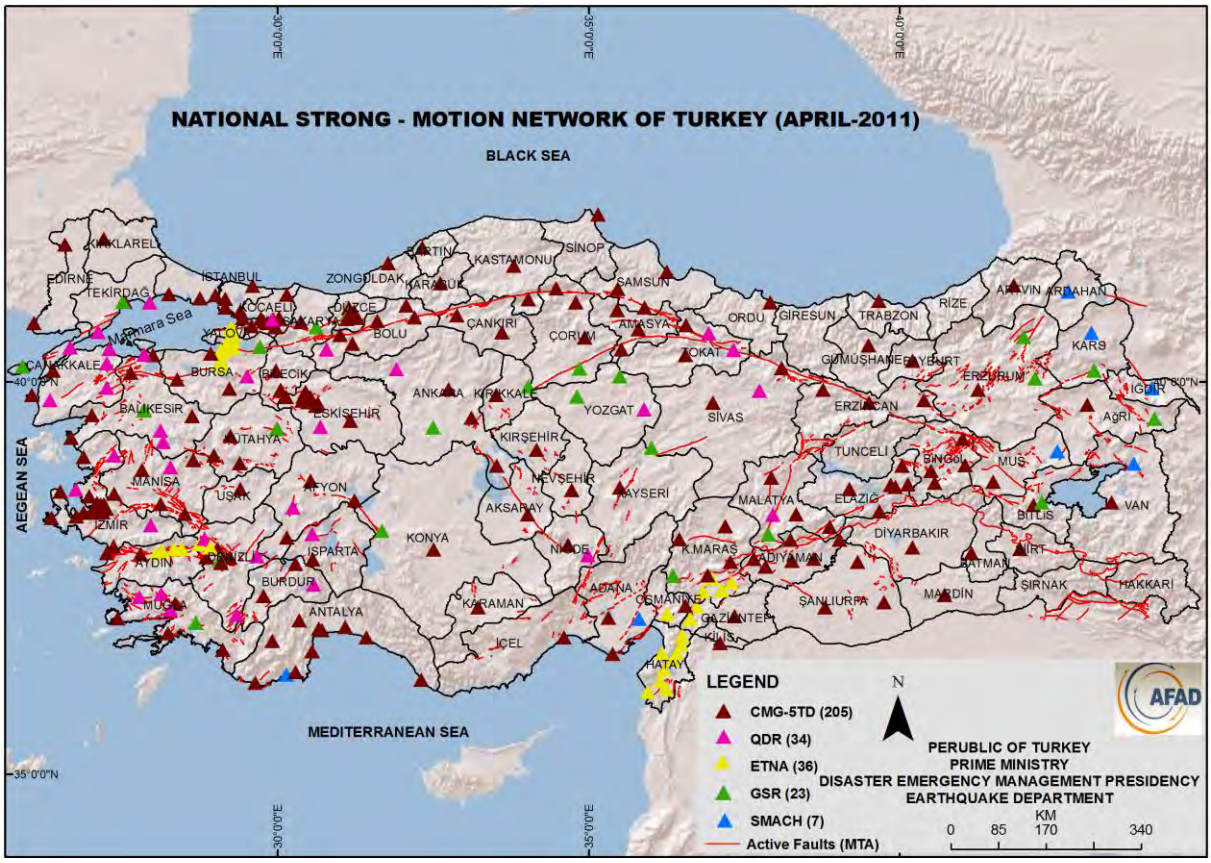


Figure 2. National Strong-Motion Network of Turkey.

LOCAL NETWORKS

For observing the seismicity of our country, local networks established with specific geometrical arrays on active fault zones. The aim of this local Networks are, physics of the fracture, the distribution of destructive waves, earthquake and site-building relation in urban and regional scale, secure zones for secure buildings, knowing the

spectral characteristic of the earthquake and development of more reliable attenuation relationships.

There are 8 networks (Figure 3) within TR-KYH that are BYTNet (20) between Bursa-Yalova, DATNet (17) between Denizli-Aydın, MATNet (23) between K.Maraş-Gaziantep-Hatay-Osmaniye, ANANet (15) in Eskişehir, DÜZNet (8) in Düzce , Antalya ANTNet (11) in Antalya, KOCNet (14) in Kocaeli and İZMİRNet (27) in İzmir (Figure 4).

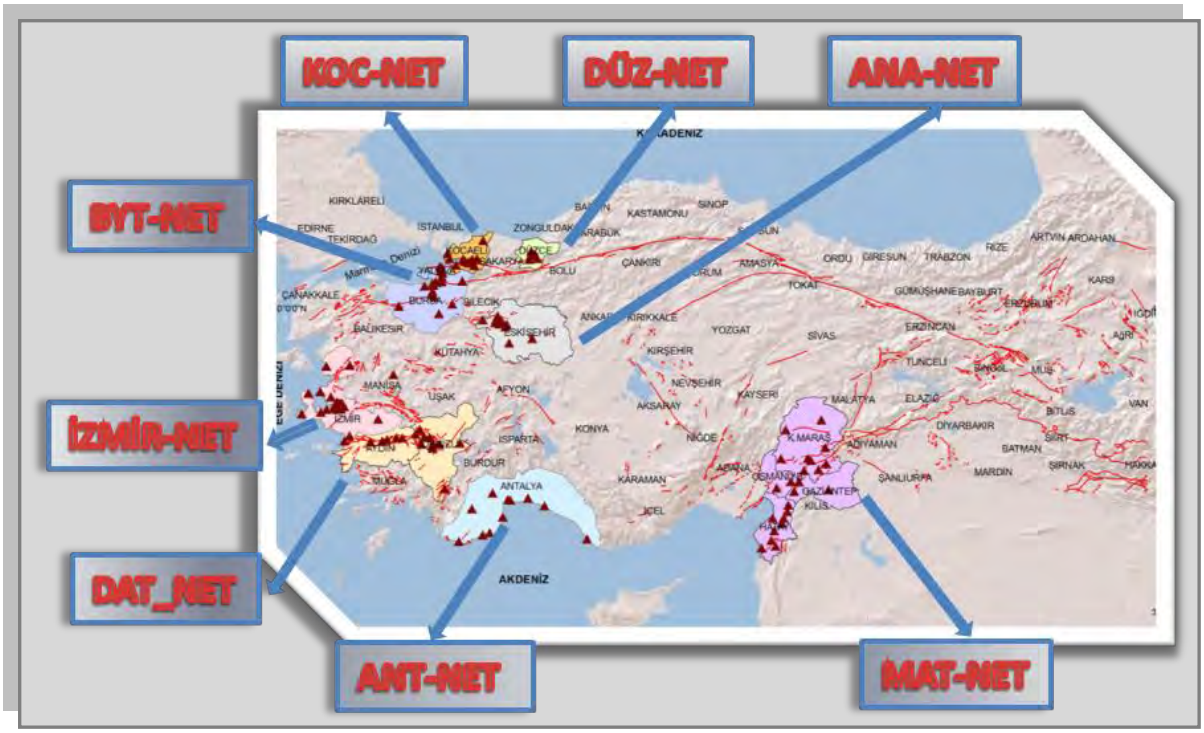


Figure 3. Local Networks map of TR-KYH.

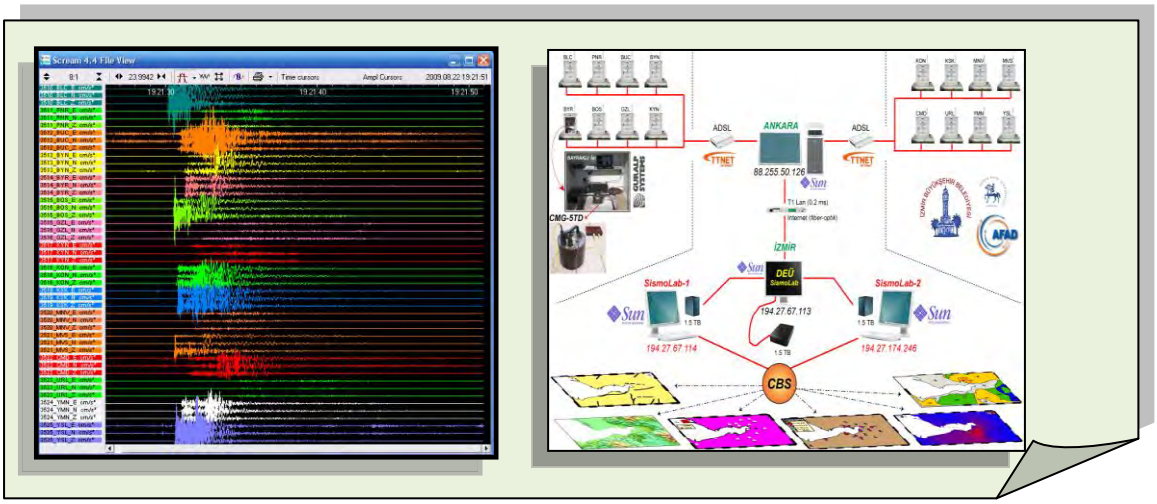


Figure 4. Example for local networks; IZMIR-Net

ACCELEROMETER STATIONS AND DATA

Accelerometers are installed on free-field in special constructed containers. Data are transferring to the central Office continuous or trigger mode with communication devices (Dial-up, Internet, ADSL, GPRS/EDGE etc.). Data are submitted to users from the main network after they are processed Figure 5,6).

For site selection of stations, first of all the active tectonic lines of our country and the intensity of building for different geological structures, energy, communication, security, environmental noise, transportation etc. are considered.

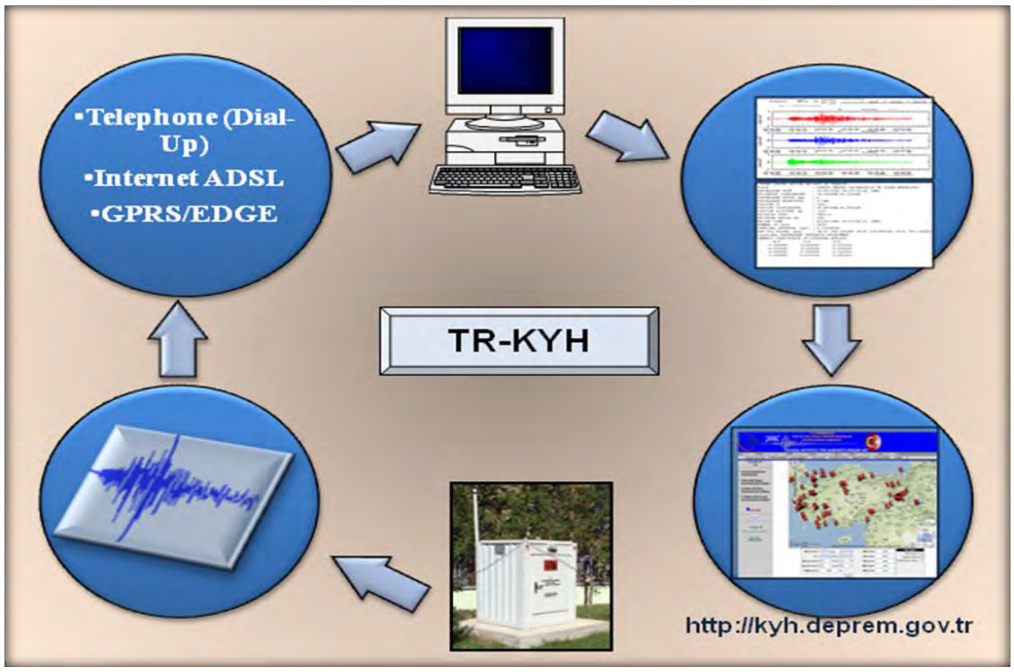


Figure 5. Data transfer system of TR-KYH

Figure 6. Main Server and Data Process Center.

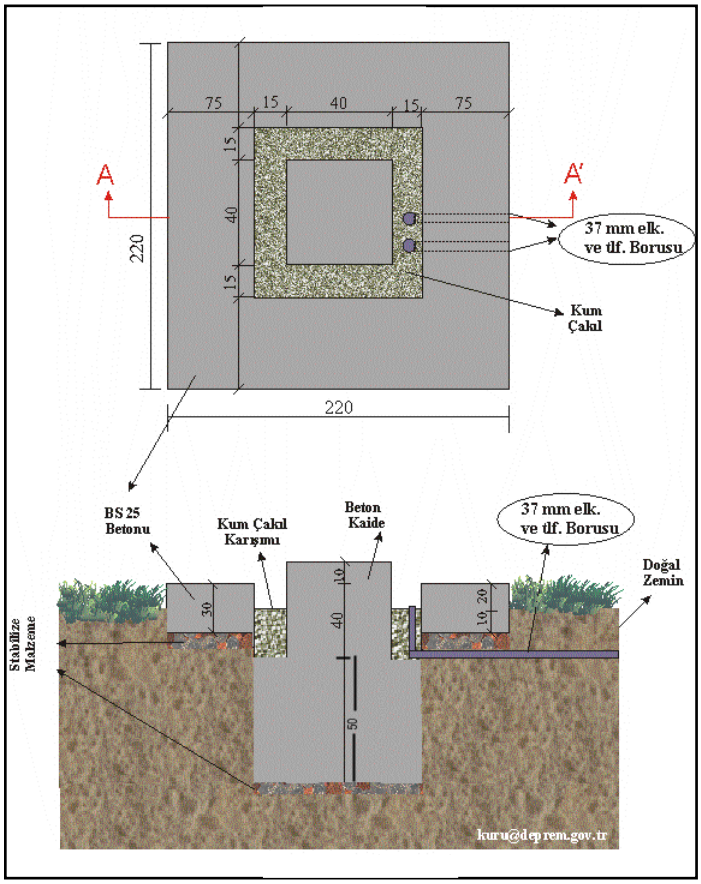
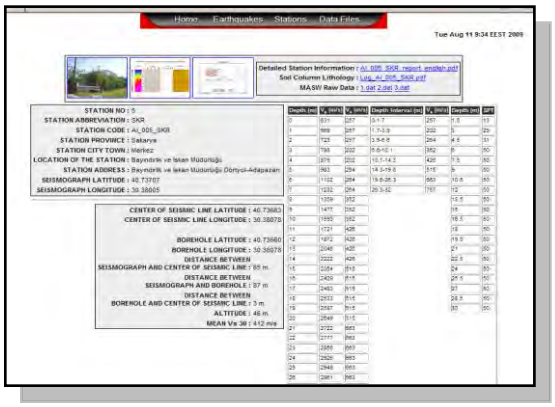


Figure 7. Configuration of the TR-KYH Station.

SITE INVESTIGATION OF STATIONS

The local site condition of stations were obtained by in-situ geotechnical and geophysical surveys. The average shear-wave velocity of the upper 30 m soil layer (V_{S30}) obtained at each strong-motion site through multi-channel analysis of surface waves (MASW) was used for describing the pertaining soil classification. (Figure 8).



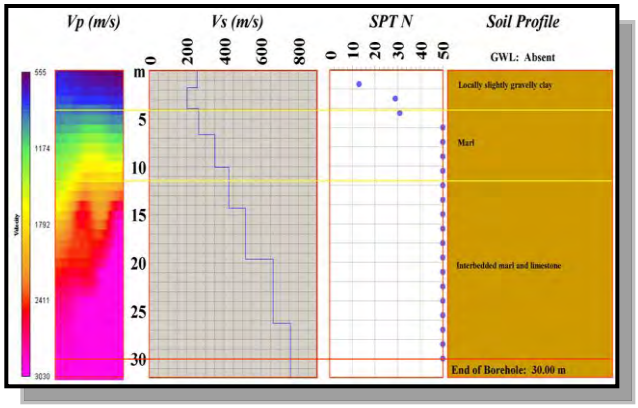


Figure 8. Site Profile and Site Information Form of a Stations.

DATA FORMAT

Since the establishment of Turkish National Strong Ground Motion data center (1973), it is possible for users to reach all of accelerograms. File names are as follows in an example: Date(yyyymmdd)+time(hhmmss)+abbreviation of the station (1201)(ex.20030501002704_1201). All data's of recordings are zipped in ASCII data format as seen in Figure 9. Beneath the header information there are three components of acceleration data like; N-S(North-South), E-W(East-West) and U-D(up-down). Besides sample intervals for each recording could be found beneath the header "SAMPLE INTERVAL".

Records obtained from analog recorders are converted to digital ones by using related software. Time Series obtained from analog and digital instruments weren't subjected to frequency change and also other processes. For uncorrected data no corrections are implemented. For untreated data only set-off correction process is implemented. All data are acceleration data with unit's cm/sn^2 (gal).

```
STRONG GROUND MOTION RECORDS OF TURKIYE
PLACE                    : DENIZLI MERKEZ METEOROLOJI MUDURLUGU
EARTHQUAKE DATE          : 19/08/1976 01:12:39 (GMT)
EPICENTER COORDINATES    : 37.71000N-29.00000E
EARTHQUAKE DEPTH (km)    : 20
EARTHQUAKE MAGNITUDE     : 5.0ML
STATION ID               : 2001
STATION COORDINATES      : 37.76219N-29.09222E
STATION ALTITUDE (m)     : 427
RECORDER TYPE            : SMA-1
RECORDER SERIAL NO       : 986
RECORD TIME              : 19/08/1976 01:12:40 (GMT)
NUMBER OF DATA           : 1601
SAMPLING INTERVAL (sec)  : 0.01000000
RAW PGA VALUES (gal)     : (N-S) 348.5268 (E-W) 290.3560 (U-D) 173.2901
Copyright EARTHQUAKE RESEARCH DEPARTMENT
GENERAL DIRECTORATE OF DISASTER AFFAIRS
       N-S           E-W           U-D
   -13.107400    -47.950600    -18.514590
   -13.104980    -47.952520    -27.176980
   -12.865700    -46.140580    -22.777830
   -11.157570    -41.740460      6.933893
       ...           ...           ...
       ...           ...           ...
```

Figure 9. Data Format (ASCII)

PROJECTS

Enhancement of the National Strong Motion Network and Establishing Seismic Arrays in Turkey **(Nato Science For Peace Program – Sfp977484)** **"BYTNet and DATNet"**
Establishment of Local Strong Motion Seismic Array **"MATNet"** **(TÜBİTAK İÇTAG-1578/YMAÜ)**
Establishment of Local Strong Motion Seismic Array **"AnaNet"** **(Project Number: 040302)**
Compilation of The National Strong Motion Network Database According to International Standart **(TUBITAK Project Number :105G016)**

WEB PAGE AND DATA COMMUNICATION

All digital acceleration data for all earthquakes from 1976 to date are stored in a data base within http://kyh.deprem.gov.tr that are open to all researchers and scientific areas (Figure 10). Daily strong motion records, Earthquake Reports that are M≥4, Station informations and Maps are always up to date.

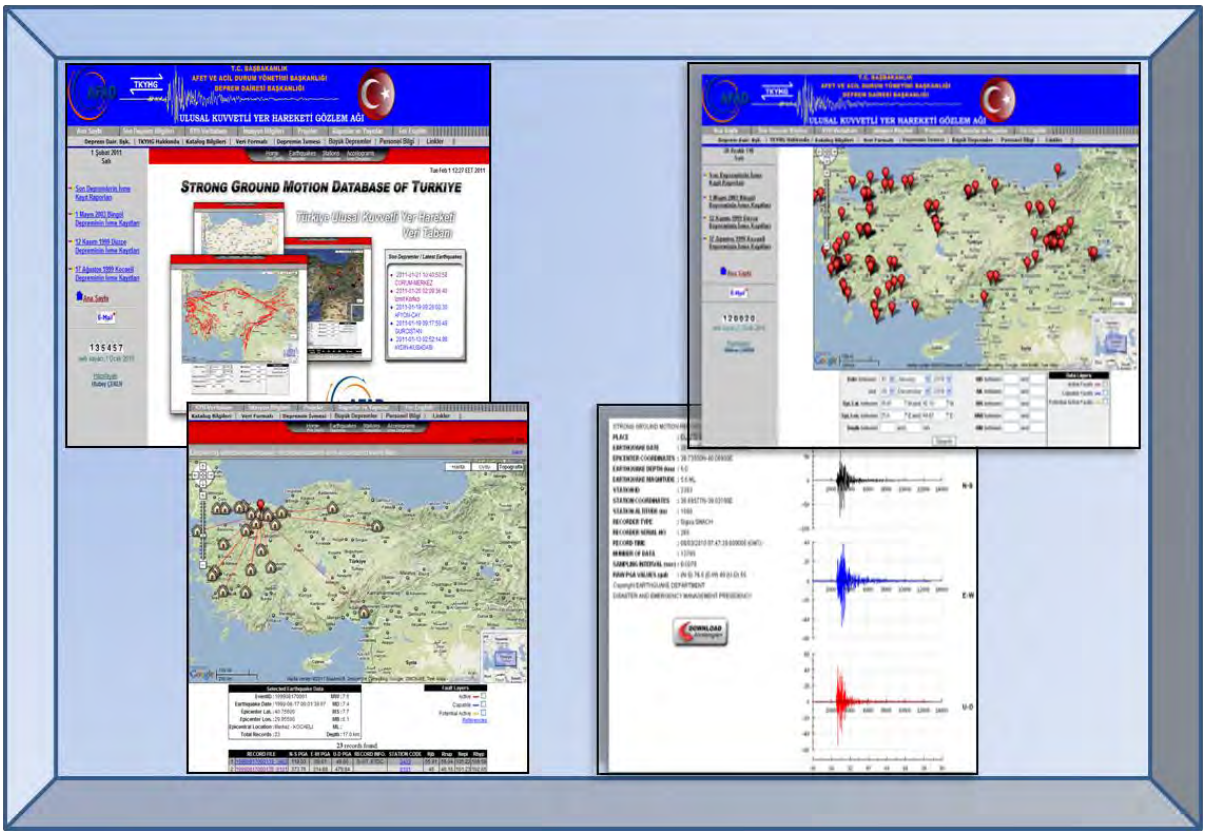


Figure 10. Web Page of TR-KYH.

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Alkan.A., Altıok.S., Estimation of local site effect using strong motion records, International Earthquake Symposium on 17-19 August 2009, Kocaeli University Umuttepe-Turkey

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Kuru, T., Çeken, U., Apak, A., Altiok, S., Kokbudak, D., and Tepeugur, E. (2010). Strong-Motion Observation Network in Turkey. Europen Seismological Commission 32nd General Assembly, September, 6-10, Montpellier, France.

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Çeken, U., Beyhan, G. and Selim, H.H. (2011). City of Bingöl in May 2003; Assessment of Strong Ground Motion Records, Journal of Earthquake Engineering (Submitted).

(3) TURKİSH – JAPANESE PROJECT

Turkish and Japanese Government have been decided to make a project in order to mitigate disaster loss in Turkey. Because of this purpose an agreement signed between Japan International Cooperation Agency (JICA) and General Directorate of Disaster Affairs in 1993. JICA has been supported the project titled as Earthquake Disaster Prevention Research Project. A research center has been established at Earthquake Research Department (ERD) in Ankara in 1997 to mitigate earthquake risk in Turkey. The aim of the center is to collect earthquake data and make rapid real-time loss estimation for cities located along middle part of the North Anatolian Fault Zone in case of an earthquake. The system that was installed at the Earthquake Data Collection and Vulnerability Evaluation Sub-center (EDCVE) receives seismic wave data automatically which are recorded by velocity type seismometers installed at 10 observing terminals. It then determines hypocenter of earthquake from P and S arrivals by simulating annealing algorithm and calculates moment magnitude (Mw) with the long period seismograms and sends this information via short message service (SMS) and e-mail to the researchers. It also produces Seismic Intensity Distribution and Peak Ground Acceleration maps. Consequently, it estimates casualties, damaged buildings and roads by considering seismic intensity, population and building stock database of the project area.

The system has been developed by the Follow-Up Project which has been supported by Japan International Cooperation Agency (JICA) in 2005 and 2006. In the scope of this project, all the system softwares have been moved from SUN to LINUX and the database from ORACLE to MySQL. Besides, the system has become more user-friendly for the operator and able to estimate disaster loss not only project area but also whole Turkey.

In future, data of nationwide strong ground motion network which are operated by new governmental agency will be linked to the system in order to determine more reliable source location of the earthquakes.

The project targets of EDCVE Sub-center are as follow;

a) To determine the earthquakes parameters and making a pre-estimation about the human loss and damage just after the earthquake,

b) To provide a reliable data transmission between local stations, the regional and main centers by using a computer network,

c) To evaluate the results and transmit them to administrative organizations in approximately within 20 minutes.

The project service area is located in the central part of the North Anatolian Fault Zone and covers Samsun, Sinop, Kastamonu, Çankırı, Çorum Yozgat, Amasya, Tokat and Ordu provinces. The Earthquake observation system consists of a main center in Ankara and local stations in Amasya, Çankırı, Çorum, Kastamonu, Samsun, Vezirköprü, Tokat, Niksar and Yozgat.

The system properties are;

a) Intelligent: aiming at automatic determination of earthquake parameters and estimation of damages,

b) Experimental: for practical utilization of this kind of new approach,

c) Upgradeable: open to developments by using new data and findings.

The main center is now active in Earthquake Research Department, General Directorate of Disaster Affairs in Ankara. It depends on the activities of the subgroups for data collection and evaluation, seismological studies and analysis, data transmission and system control.

Hardware in the main center consist of one workstation for determining the earthquake parameters and estimating the damage distribution, and two PCs and accessories for controlling the system.

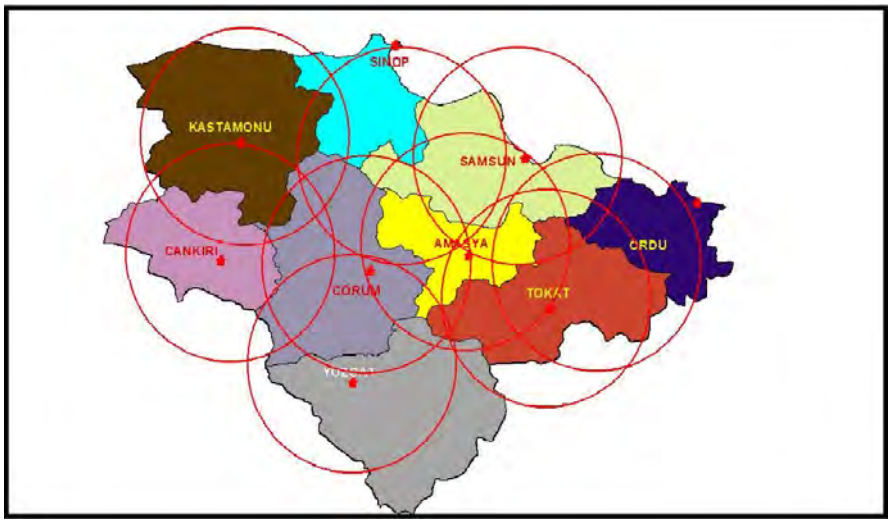
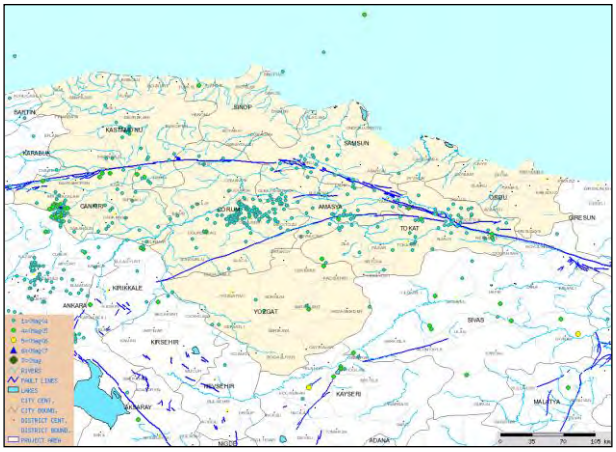
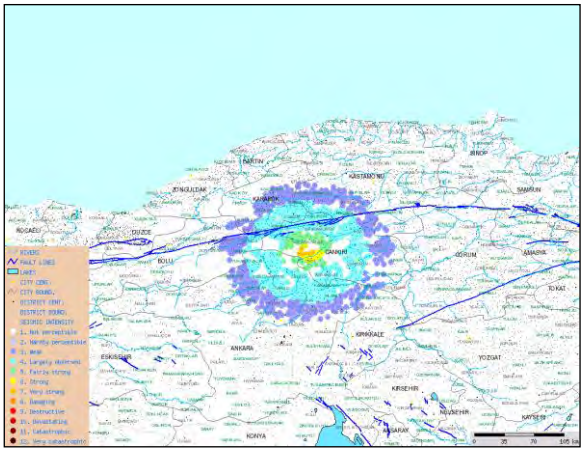


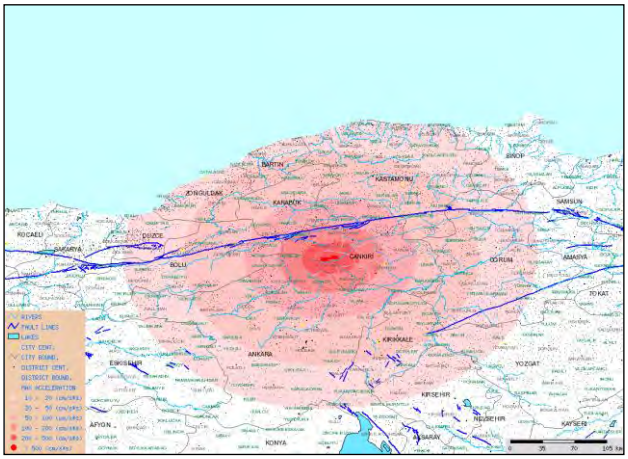
Fig-1. The Stations Map of Turkish – Japanese Project



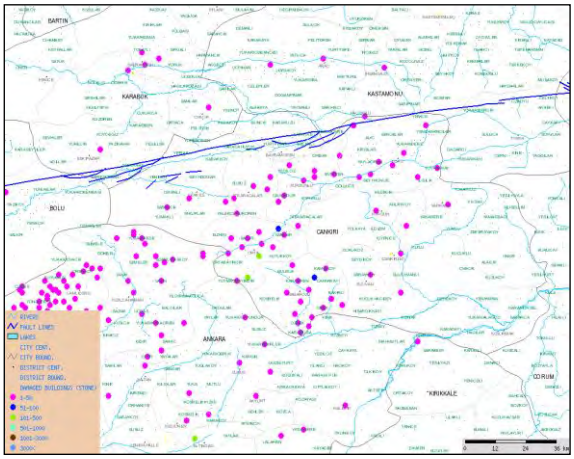
Project Area and Recorded Earthquakes



Seismic Intensity Distribution Map



Peak Ground Acceleration Distribution Map



Building Damage (Stone)

PUBLICATION

Suzuki Sadaomi, Takao Kagawa, Murat Beyhan, Engin Coruh, Bekir Tuzel, Mayumi Sakamoto, Yutaka Ohta. Speaker Suzuki Sadaomi, Improvement of the Experimental System in Turkey Automatically Estimating Seismic Source, Ground Motion and Damage, XXIV IUGG General Assembly, 2-13 July 2007, Poster No :SS002/81 Perugia, Italy

b. BOĞAZİÇİ UNIVERSITY KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI), ISTANBUL

http://www.koeri.boun.edu.tr

Kandilli Observatory was annexed to Boğaziçi University on the basis of cabinet executive order 41 on 28 March 1983 and has acquired an institutionalstatus, namely KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI).

From 1868 to today, the development of the Observatory and the researches conducted can be summarized into three important periods: 1868-1909-1911-1982, and from 1982 to the present: an Academic Institute.

After annexed to Boğaziçi University and given an institutional academic status, Kandilli Observatory and Earthquake Research Institute (KOERI) extended its activities into various observational fields with the main emphasis oriented towards earthquake research, education and relevant observational service activities. KOERI today has evolved into a multidisciplinary earthquake research organization providing graduate education in three departments namely Earthquake Engineering, Geophysics and Geodesy. KOERI is a unique organization in Turkey encompassing earthquake observation, research, education and application services within a single, integrated body.

KOERI provides seismological observation services with its continuously expanding network distributed throughout Turkey. Currently, the 50 station network is operational (two stations located in North Cyprus) with on-line, leased-line, radio-link and dial-up connections. The network provides continuous earthquake information to KOERI and this information is quickly forwarded to proper authorities.

About 60 strong motion accelerometers are operated by KOERI in and around Istanbul. A 5 station array has been placed in North Cyprus together with Near East University. The instrumented structures in Istanbul include 2 monuments namely Haghia Sophia Museum and Suleymaniye Mosque and a high-rise building. For aftershock studies and other special projects 12 strong motion instruments are utilized. Preparations are underway for the strong motion instrumentation of several important bridges and dams in Turkey.

Besides this, the Astronomy, Meteorology and Magnetism observatories have been updated with state of art technology.

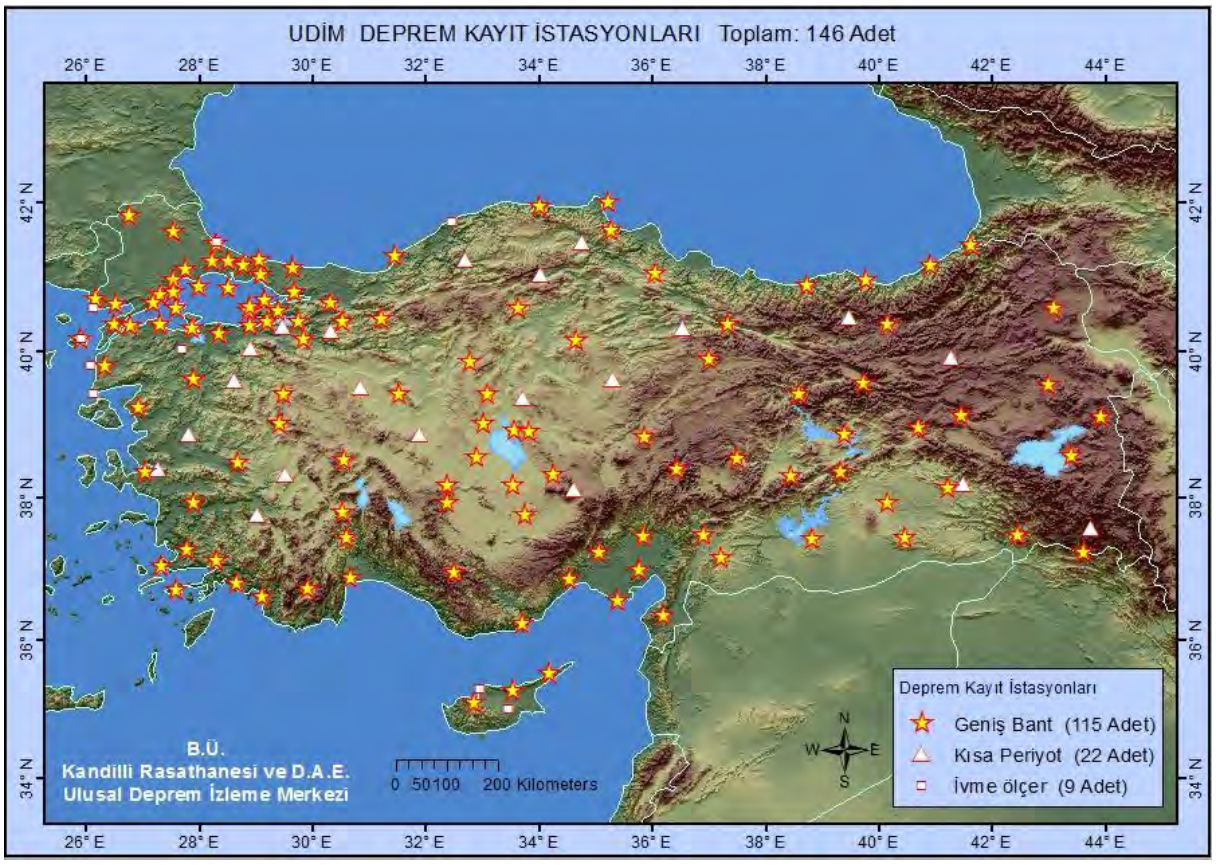


Figure 1. UDIM(Boğaziçi University Kandilli Observatory And Earthquake Research Institute Earthquake Research Center)

(1) GEOPHYSICS DEPARTMENT

Geophysics department at Boğaziçi University, Kandilli Observatory and Earthquake Research Institute gives the highest priority to original research with the aim of promoting young researchers and scientists reflecting the mobility of the modern science and the fast progress in technology within their research, together with the essential human qualities such as environmental awareness and preservation of the nature, while identifying and providing solutions in the part of the world we are living.

The core elements of the MSc and PhD curriculum at our department provides necessary mathematics and physics background and aiming at educating young researchers in the field seismology with a wide range of topics, such as elastic wave propagation, earthquake source mechanisms, signal processing, strong ground motion and instrumentation.

Investigation of earth's crust using seismic, electrical, magnetic and electromagnetic methods, engineering seismology, geo-magnetism, paleo-magnetism and

archeomagnetism applications are among the main fields of study in our department.

Identification of active faults and understanding related lithosperic forces, seismicity, seismic hazard and risk; landslide and avalanche studies; industrial raw material; mine, underground water, oil and natural gas prospection studies; soil investigations for various sizes of engineering structures; the composition of the Earth's interior and crust and their physical properties are among the department's fields of interest.

PROJECTS

Name of the Project	Advisor	Start Time
Mikro Depremler ile Fay Direncinin Araştırılması	Prof. Dr. Mustafa AKTAR	2009 (BAP)
PIRESS	Prof. Dr. Mustafa AKTAR	2007 (GFZ, Potsdam)
Kıbrıs yayının yapısı ve Dinamiği	Prof. Dr. Cemil GÜRBÜZ	2009 (GFZ, Potsdam)
Doğu Marmara Bölgesinin Sismik Hız Yapısının Yerel Tomografi Yöntemi İle Araştırılması	Prof. Dr. Cemil GÜRBÜZ	2007 (BAP)
Aydın İli, Köşk İlçesi , Salâvatlı Jeotermal Sahası Mikro-Deprem Aktivitesi	Prof. Dr. Cemil GÜRBÜZ	2010
Installation of Seabottom Observatories in the Marmara Sea	Prof. Dr. Cemil GÜRBÜZ	2010 (TurkTelekom)
SIMBAAD (Seismic Imaging of the Mantle Across the Aegean-Anatolian Domain)	Prof. Dr. Hayrullah KARABULUT	2008 (LGIT-Fransa)
Türkiye ve Çevresinin Hız Yapısının Pasif	Prof. Dr. Hayrullah	2010 (Tübitak)

Name of the Project	Advisor	Start Time
Görüntüleme Yöntemi ile Belirlenmesi	KARABULUT	
Monitoring the seismicity in the Çınarcık Basin	Prof. Dr. Hayrullah KARABULUT	2008 (LGIT-Fransa)
Seismotectonics and crustal structure of Antalya Bay and Cyprian Arc	Prof. Dr. Hayrullah KARABULUT	2010
KuzeyAnadolu Fay Zonu'nun Kuzeybatı Ucu (GanosFayı) Kabuk ve Üst Manto Yapısının Lokal Tomografi ve Receiver Function Yöntemleriyle Saptanması	Prof. Dr. Niyazi TÜRKELLİ	2010
Gübeybatı Anadolu ve Çevresindeki Üç Boyutlu Litosferik Yapının "Yüzey Dalgaları Tomografisi" ve "Ambient Noise Correlation" Yöntemleriyle Saptanması	Prof. Dr. Niyazi TÜRKELLİ	2010 (BAP)
Caucasus Seismic Emergency Respons	Prof. Dr. Niyazi TÜRKELLİ	2008 (NATO)
Sismik İzlerin Vektörleştirilerek Sayısallaştırılması	Doç. Dr. Nurcan Meral ÖZEL	2009
Türkiye'nin Deprem Riski Yüksek Jeo-Stratejik – Ancak Tektonik Rejimleri Farklı-Bölgelerinde Deprem Davranışlarının Çok Disiplinli Yaklaşımlarla Araştırılması	Doç. Dr. Nurcan Meral ÖZEL	2006 (Tübitak)
EUROSEİSMOS Project, Saving and Studying the Seismograms of the Strongest Euro-Mediterranean Earthquakes	Doç. Dr. Nurcan Meral ÖZEL	2005
Bölgesel Tsunami İzleme ve Değerlendirme Merkezi Projesi	Doç. Dr. Nurcan Meral ÖZEL	2009 (DPT)
Collaborative, Complex and Critical Decision-support in Evolving Crises (TRIDEC)	Doç. Dr. Nurcan Meral	2010 (NATO)

Name of the Project	Advisor	Start Time
	ÖZEL	

PUBLICATIONS

A Bayesian Deconvolution Approach for Receiver Function Analysis
Author(s): Yildirim S, Cemgil AT, Aktar M, et al. Source: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING Volume: 48 Issue: 12 Pages: 4151-4163 Published: DEC 2010

Faulting characteristics of supershear earthquakes
Author(s): Bouchon M, Karabulut H, Bouin MP, et al. Source: TECTONOPHYSICS Volume: 493 Issue: 3-4 Special Issue: Sp. Iss. SI Pages: 244-253 Published: OCT 18 2010

Stress interactions of three moderate size earthquakes in Afyon, southwestern Turkey
Author(s):AksariD,KarabulutH,OzalaybeyS Source: TECTONOPHYSICS Volume: 485 Issue: 1-4 Pages: 141-153 Published: APR 1 2010

Love-wave group velocity maps of Turkey and surrounding regions
Author(s): Cambaz MD, Karabulut H Source: GEOPHYSICAL JOURNAL INTERNATIONAL Volume: 181 Issue: 1 Pages: 502-520 Published: APR 2010

Bala (Ankara) Earthquakes: Implications for Shallow Crustal Deformation in Central Anatolian Section of the Anatolian Platelet (Turkey)
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(2) THE EARTHQUAKE ENGINEERING DEPARTMENT (EED)

The Earthquake Engineering Department (EED) is a department in Kandilli Observatory and Earthquake Research Institute (KOERI) at Bogazici University (BU) in İstanbul.

Being established in 1868, KOERI (then, Imperial Observatory) has a tradition of science that encompasses the initiation of the formal meteorological observations in 1911 and also the start of the systematic seismological measurements in 1926 in the country. After annexation to Bogazici University (originally founded in 1863 in Istanbul as Robert College), KOERI has evolved into a multidisciplinary earthquake research organization providing graduate education under the Earthquake Engineering, Geophysics and Geodesy departments and encompassing earthquake observation, research and application services within a single, integrated body. The National Earthquake Observation Center of KOERI provides seismological observation services with its continuously expanding network distributed throughout Turkey. Currently, the 102-station network is operational with on-line connections. For the observation of seismicity in Northeast Turkey (Marmara) region

43 stations are used in several network configurations. Other stations, including 13 broadband stations are distributed throughout the country.

EED has started its activities in 1989 as a graduate department under KOERI of BU. The overall mandate of the department is to conduct graduate level training, research and implementation that will contribute to seismically safer structures, systems and environment. The department is the first and only academic unit in Turkey that can provide graduate level training on Earthquake Engineering leading to M.Sc. and Ph.D. degrees in Earthquake Engineering.

Earthquake Engineering can be viewed as a multi-phased process that ranges from the description of earthquake source process to seismic disaster mitigation procedures. Earthquake response analysis of site and structures and the assessment of the strong ground motion that will emanate from an earthquake constitute the two main ingredients of the discipline. The emphasis of our academic activities are placed on: Earthquake hazard and risk analysis; Development of urban earthquake damage scenarios; Characteristics of strong earthquake ground motion; Site and soil response analysis; Earthquake response of buildings, historical monuments, industrial facilities, bridges and dams; Soil-structure interaction; Dynamic testing of small-scale model and prototype structures; Retrofitting and post earthquake strengthening of structures; Damage evaluation and earthquake insurance; and the Development of earthquake resistant design codes.

KOERI-EED has played a leading role in Turkey for the advancement of the earthquake risk mitigation by taking part in the various National Committees (i.e. Turkish National Earthquake Council in the preparation of the report on National Strategies for Mitigating Earthquake Damage) in the nationally funded projects (i.e. Istanbul Metropolitan Municipality Earthquake Master Plan).

The Department of Earthquake Engineering enjoys close ties and exchange of students and faculty with relevant institutions throughout the world. These include several international organisations, university research centers and government establishments.

EED has done pioneering work on many aspects of earthquake engineering, in seismic hazard and risk analysis, earthquake occurrence and ground motion modeling, component and system reliability, experimental research on structures and components, evaluation of damage potential of ground motions, and development of seismic design methodologies.

Following is a list of the main research areas at EED:

- Strong Ground Motion
- Earthquake Hazard
- Urban Earthquake Loss
- Seismic Microzonation
- Performance Based Seismic Evaluation and Design
- Earthquake Protection of Cultural Heritage

RESEARCH

Istanbul Early Warning and Rapid Response System

Especially after Kocaeli (1999) earthquake, by taking into consideration the vital importance of Early Warning and (Emergency) Rapid Reponse, the project prepared by Bogazici University Kandilli Observatory and Earthquake Research Institute, has been realized. The agreement involving Turkish republic and Credit Suisse First Boston in relation to Istanbul Earthquake Early Warning System and Rapid (Emergency) Response project, will be carried on by by Bogazici University Kandilli Observatory and Earthquake Research Institute, has become valid after decree of Council of Minister on 2001 Fiscal Year.

The system is designed and operated by Bogazici University with logistic support of the Governorate of Istanbul, First Army Headquarters and Istanbul Metropolitan Municipality. The construction of the system is realized by the GeoSIG and EWE (Switzerland) consortium. Communications, related only to Rapid Response System, are provided by IS-TIM ARIA GSM service provider.

Early Warning System

Turkey is confronted with the problem of earthquakes. The role of shaking table test is increasingly important in assuring the performance of structures during earthquake. The Department of Earthquake Engineering at Kandilli observatory earthquake engineering research institute of Bogazici University has recently acquired two shake table facilities to conduct experimentation in structural dynamics and particularly how to monitor and actively control structures subjected to earthquake ground motions or other force excitations. The central feature of the new established Shaking laboratory is an advanced, closed-loop, servo-controlled electro-hydraulic seismic simulator or shake table. This high performance seismic simulator can accurately reproduce earthquake ground motions and a variety of other input wave forms, and can configured for wide range of testing appLications.It can be used for seismic research and qualification testing of equipment, structural components and scale models. Since the experimental research is an important factor in the developing of the construction industry of Turkey the shaking table Laboratory has been equipped with the most contemporary devices and has become a laboratory of research in order to improve technology in every field of structural and earthquake engineering.

PROJECTS

European Union (EU) Project

EU- FP5 LESSLOSS

(2004 - 2007)

(http://www.lessloss.org/main/index.php?option=com_frontpage&Itemid=52),

EU – FP6 PREVIEW – Prevention, Information and Early Warning

(2005 - 2008)

(http://www.preview-risk.com/site/FO/scripts/myFO_accueil.php?lang=EN),

EU – FP6 NERIES – Network of Research Infrastructures for European Seismology

(2006 – 2010)

(http://www.neries-eu.org/),

EU – FP6 TRIPOD – Training Civil Engineers in post –earthquake assessemnt of damaged buildings

(2006 – 2008)

(http://tripod.cti.gr/),

EU – FP6 TRANSFER-Tsunami Risk And Srategies For The European Region

(2006 – 2009)

(http://labtinti4.df.unibo.it/transfer)

EU – FP6 SAFER – Seismic Early Warning for Europe

(2006 – 2009)

(http://www.saferproject.net/doc/workpackages.htm),

EU – FP7 SHARE – Seismic Hazard Harmonization in Europe

(2009 – 2012)

(http://www.share-eu.org/)

EU – FP7 NERA – Network of European Research Infrastructures for Earthquake Risk Assessment and Mitigation

(2010 – 2014)

EU – FP7 TRICDEC – Colloborative, Complex and Critical Decision- Support in Evolving Crises

(2010 - 2013)

(http://tridec.gfz-potsdam.de/),

EU- FP7 SERIES – Seismic Engineering Research Infrastructures for European Synergies (2010 - 2014)

(http://www.series.upatras.gr/),

NATO Project

Seismic Hazard and Risk Assesment for Southern Caucasus-Eastern Turkey Energy Corridors(SHRAP). SFP 983038

Global Earthquake Model (GEM)

- Global Earthquake Model (GEM) http://www.globalearthquakemodel.org

- EMME- Earthquake Model of the Middle East region (http://www.emme-gem.org/)

Tubitak and BAP Projects

Simulation of Design Basis Ground Motion for Istanbul

Prediction of the Missed Component of the 17 August 1999 Kocaeli Earthquake

Assesment of Strong Ground Motion in İstanbul and Code Based Provisions for Near Field Earthquakes

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c. ANKARA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSIC

http://geop.eng.ankara.edu.tr

ANKARA UNIVERSITY

ANKARA UNIVERSITY EARTHQUAKE RESEARCH AND APPLICATION CENTRE (ADAUM)

Earthquake Research and Application Centre (ADAUM) were founded in 2003 to establish and expand seismological networks for earthquake observation, re-processing of national data, and detailed research on Seismology, Engineering Geology and Geophysics, regulate related scientific, educational and practical activities. The management and advisory board of the Centre were organized from

different branches of science such as Geophysics, Geology, Agriculture, Law and Education departments of Ankara University. The Centre completed two national projects; the total budget of the projects was about five million dollars and has been started two new projects in 6-years period. Centre has published a number of international and national scientific papers and reports in the last two years. In addition to scientific activities within the scope of the earthquake, the centre gives special attention to issues directly related to human life such as measurement and calculation of earthquake resistant design parameters, modelling the dynamic behaviour of soils especially in urban sites. For this purpose, the Centre organises the ongoing independent researches on earthquakes and related fields to make them certain projects under directing the scientific and societal goals.

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3. Dikmen U., Başokur A.T., Akkaya İ., Arısoy M.Ö., 2010 Selection of optimum shot distance in multi-channel analysis of the surface wave method, Journal of the Earth Sciences Application and Research Centre of Hacettepe University, 31(1), 23-32

4. Dikmen Ü., 2009 Statistical correlations of shear wave velocity and penetration resistance for soils, Journal of Geophysics and Engineering 6(1), 61–72

International Congress/Conference

1. Ozener H., Aktug B., Dikmen Ü., Slip Rates Near Karliova Triple Junction by GPS Observations, WEGENER 2010-15th General Assembly of WEGENER, 14-17 Sept. 2010, Istanbul-Turkey

2. Ekinci B., Dikmen Ü., Okyar M., 2010 Seismic risk analysis of Kumluca/Antalya Region, The 19th International Geophysical Congress & Exhibition of Turkey, Extended Abstract Book-CD, Ankara-Turkey

3. Dikmen Ü., Arısoy M.Ö., Akkaya I., 2010 Linear spread configuration in the MASW method, EAGE Near Surface 2010, Extended Abstract Book-CD, Zurich – Switzerland

Book/Book Chapter

Ahmet Tuğrul Başokur, Ergün Gökten, Baki Varol, Begüm Cıvgın, Recep Kılıç, Koray Ulamış, Ünal Dikmen, İrfan Akca, N.Yıldırım Gündoğdu 2010, Ankara

Kenti Batısındaki Zeminlerin Jeolojik-Jeofizik-Jeoteknik özellikleri ve Dinamik Davranışı, Ankara Üniversitesi Yayınları, 143s, ISBN 978-975-482-886-3

PROJECTS

Survey Reports and Projects

Completed projects:

1. A new Technique in prediction of dynamic soil behaviour under an Earthquake: Application to aluvial plains in western part of Ankara-Turkey (BAP, 2005-07-45-029)

2. Inversigation the Crust structure of North Anatolia by Geophysical Survey Methods (TUBITAK, 105G145)

Ongoing projects:

3. Water Content Determination and Geotechnical Applications by means of multi-parameter dataset (BAP, No: 11B6055001)

4. What is an Earthquake? Raising awareness of elementary and high school students (BAP, 2011)

d. ANADOLU UNIVERSITY SPACE AND SATELLITE RESEARCH INSTITUTE

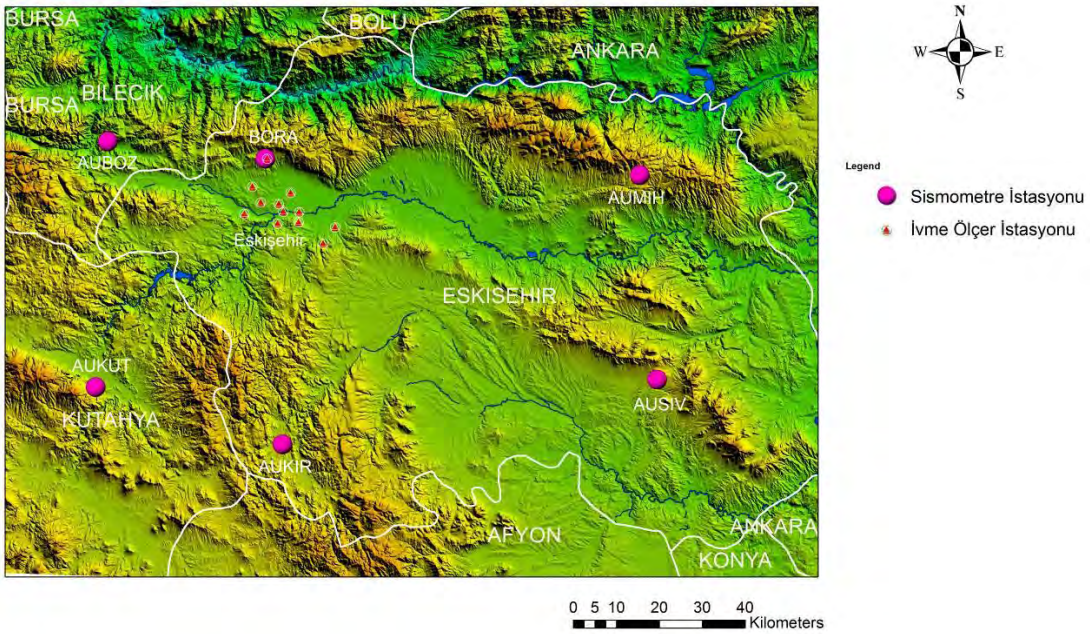
http://www.uube.anadolu.edu.tr

Remote sensing and Geographical Information Systems studies in Anadolu University were started in 1989 in the Computer Center of Anadolu University and formally continued their studies in Space and Satellite Research Institute in 1993. At the end of 1996, Institute was moved to a new campus of Anadolu University called İki Eylul Campus. Recently, Remote Sensing and Geographical Information Technologies, Disaster Management, Space Researches, Distant Education, Earth

System Sciences and Documentation of Cultural Assets Groups' were established in the Institute. These groups carry out several research projects in collaboration with the academic units of Anadolu University, other universities, and several public foundations like Governor of Eskişehir, Disaster and Emergency Management Department, Municipalities, besides their own projects.

Tasks on the Construction and Operation of a Local Seismic Network

Purpose:
Solution to earthquake locations and production of tremor maps, providing of local earthquake solving capability to the City Disaster and Emergency Management Directorate.
Context:
Building, operating and real time data transferring infrastructure of 12 accelerometer and 6 seismometer stations.



Map showing locations of the earthquake recording stations of Anadolu University.

Seismic Studies

Purpose:

One of the main topics of earthquake researches is the use of seismic reflection studies to determine the fault locations. While researching the faults, studies based on surface geology fails in alluvial area. Although trench digging may provide some solutions, it is time consuming, tedious and difficult. Under this circumstances, geophysical methods are implemented. Among various geophysical technics, the best method to image the faults is the seismic reflection method. To determine the faults, multi- channel seismic reflection technics are widely used.

Context:

Presently, an important fault, threatening Eskisehir City, and cannot be observed by surface geological researches, is determined via seismic reflection method, and trench digging stage is reached. The knowledge and experiences obtained in Eskisehir City are transferred to Bolu City. Similar studies will be implemented to Zonguldak City. Besides earthquake researches, tasks to explore subsurface resources (geothermal and coal) are about to begin.

The Study Of Determining Structural Properties

Purpose:

Developing the method of inventory information collection and building scoring for existing building stock and new buildings that are appropriate to Turkish Construction Specifications utilizing technologies of Information System.

Context:

Pilot study area that has dense housing and high vulnerability risk due to the structural defects and soil defects.

In order to generate the information of building inventory, a new building assessment form was developed imitating the DUR-TES Method that were conducted by Department of Civil Engineering of İstanbul University in Bakirkoy region. Eight district in Tepebasi region that has alluvial soil properties, densely populated and a large part of total building stock was determined as a pilot region of the study. 1100 multi-storey (four and above) buildings were examined by the rapid assessment methodology.

There are various queries such as general, load bearing system and material properties of the building in the assessment form. In the first phase of the study, project drawing of the buildings were examined and buildings were examined on-site in the second phase.

Tasks on the Determination of the Soil Proporties

Purpose:

Determination of the soil sturucture (soil type and soil parameters) in densely populated areas and researches on the risks related local soil conditions .

Context:

Under the scope of the research projects previously completed by the State Water Works Local Directorate, re-evaluation of drilling data, in case it is needed, 30 m and 100 m depth drilling, cone penetration taste (CPT), microtermor measurements will be achieved by the local municipalities in the center of the Eskisehir City.

Microtremor measurements in 286 different stations were obtained during 45 minutes in average with single-station microtremor. Tasks were conducted to determine horizontal to vertical amplitude amplification ratio of the soil dominant tremor frequency.

Tasks on the Geographical Information Systems:

Purpose:

In disaster management, to build the coordination among institutions, an understanding of coordination comprising the priorities, the cooperated work principles, performance evaluations and development of coordination rules must be achived.

Context:

An information system should be developed to produce a reliable an updated fast data flow to the coordination center, means to start tasks for developing basic information system to start implementations.

Contrubution to Public Activities:

Purpose:

Recently recruited personnel of City Disaster and Emergency Management Directorate were trained.

Context:

The protocol signed between Anadolu University and City Disaster and Emergency Management Directorate provides both institutes a join work area to determine the disaster risks and disaster management plans.

e. DOKUZ EYLUL UNIVERSITY DEPARTMENT OF GEOPHYSICAL ENGINEERING

http://www.eng.deu.edu.tr

Department of Geophysical Engineering founded in Science Faculty of Ege University in 1974, has been continued to its education under the frame of Dokuz Eylul University (DEU) on July 20, 1982. Today, it has been going on its education and research facilities as one of the 11th departments belonging to the Engineering Faculty. It is unique department of Izmir which is 3rd biggest city in the country with its more than 3.5 million inhabitants, and cultural/industrial capital of the Aegean region of Turkey. In addition, our students can be able to find close cooperation with other departments across Tinaztepe Kaynaklar Campus in Buca to develop interdisciplinary approaches for solving engineering and geosciences problems.

Targets of the department are to educate engineers and academicians in applied geophysics, seismology and earth physics by using present instrumental and scientific technologies, to train human resources who investigate underground resources to support national economy, and providing additional support to design structures by detecting site properties especially in the region.

Many graduates of our department are employed in the applied geophysics industry, primarily in exploration of underground resources such as groundwater, geothermal, valuable mines, marine geophysics, hydrocarbons such as petroleum, gas hydrats and natural gas. A significant percentage of our graduates go on to pursue MSc or PhD study before seeking either petroleum or seismology employment. Others working fields are site investigations, environmental problems, earthquake analysis, disaster and hazard mitigation studies. Undergraduate section of the department has MUDEK and EUR-ACE (EURopean ACcredited Engineer) accreditation labels till September 30, 2013.

Education members of our departments have been leading two research centers belonging to the Dokuz Eylul University. These are Earthquake Research and Implementation Center (DAUM), and Center for Near Surface Geophysics and Archaeological Prospection (SAMER). The DAUM aims observing seismic activity in Aegean Region of Turkey while SAMER promotes to seek buried underground

structures close to the surface. Both centers conduct variety of research projects and scientific organizations within the department.

Departmental instrument park, examples of projects for each institution, and of scientific publications in the last 6 years can be found at below table.

DEPARTMENTAL INSTRUMENT PARK

24-channel seismic equipments, resistivity, VLF, GPR, SP amd micro-gravity instruments

PROJECTS

Duration : 3 years (2008-2011) Institution : Department of Geophysics of the DEU Name : Investigation of underground structure of South of Izmir by using micro-gravity and GPS methods Support : TUBITAK-CAYDAG (108Y285) Aim : Basement topography of Izmir will be investigated by using micro-gravity and GPS campaign measurements. Deformation field and earthquake prone area will be revealed after analyzing and joint-interpreting the data.
Duration : 3 years (2008-2011) Institution : DAUM-Izmir, AFAD-Ankara Name : Modeling of Seismic Site Response for Earthquake Resistant Structural Design in Izmir Metropolitan Area and Aliaga-Menemen Districts Support : TUBITAK-KAMAG (106G159) Aim : Acquiring strong ground motion characteristics of geological structures by installing local accelerometer network in Metropolitan Izmir, determining of the basement topography using micro-gravity measurements, revealing site characteristics by using applied geophysics and ambient noise measurements.
Duration : 3 days (April 30 - May 2, 2008) Institution : SAMER-Izmir, Department of Geophysics of DEU, Izmir Branch of the UCTEA Chambers of Geophysical Engineers Name : Symposium on Geophysics and Remote Sensing in Determination of Near-Surface Structures Support : DEU, UCTEA Aim : Bringing to practitioners the applying geophysical and remote

sensing techniques, usage extensively in determination of near-surface objects, and contributing the development of communication and transmission of information among researchers working on shallow structures using a multi-disciplinary approach.

PUBLICATIONS

2010: Cifci, G., Pamukcu, O., Coruh, C., Copur, S. and Sozbilir, H., Shallow and Deep Structure of a Supradetachment Basin Based on Geological, Conventional Deep Seismic Reflection Sections and Gravity Data in the Buyuk Menderes Graben, Western Anatolia, *Surv Geophys*, doi 10.1007/s10712-010-9109-8.

2009 : Polat, O., Ceken, U., Uran, T., Gok, E., Yilmaz, N., Beyhan, M., Koc, N., Arslan, B., Yilmaz, D. and Utku, M., IzmirNet: A Strong-Motion Network in Metropolitan Izmir, Western Anatolia, Turkey, *Seism Res Lett.* 80 (5), 831-838.

2008: Sindirgi, P., Pamukcu, O., Ozyalin, S., Application of Normalized Full Gradient Method to Self Potential (SP) Data, *Pure and Applied Geophysics* 165, 409-427.

2008: Gokturkler, G., Balkaya, C. and Erhan, Z., Geophysical investigation a landslide: The Altindag landslide site, Izmir (western Turkey), *J Appl Geophys* 65, 84-96.

2007: Drahor, M.G., Kurtulmus, T.O., Berge, M.A., Hartmann, M., Speidel, M.A., Magnetic imaging and electrical resistivity tomography studies in a Roman military installation found in Satala archaeological site from northeastern of Anatolia, Turkey, *J Archaeo Sci* 35, 259-271.

f. ÇANAKKALE ONSEKIZ MART UNIVERSITY DEPARTMENT OF GEOPHYSICAL ENGINEERING

http://jeofizik.comu.edu.tr/

The department was founded in 2001 and developing rapidly. The mission of the Department of Geophysics Engineering to provide an environment in which students can improve themselves according to their interest area and to graduate as geophysical engineers whom are highly regarded by both companies and academic institutions.

Our curriculum is based on the applications related to mining, geological, civil, and environmental engineering and seismology disciplines and on the developing software for geophysical methods. Our undergraduate and graduate programs have been updated in response to developments in geophysics engineering. Our department is in continuous development of its educational and research programs and infrastructure. The department, currently, offers B.Sc. and MSc degrees in geophysics engineering. First graduate and undergraduate degrees were offered in 2001 and 2002, respectively.

The faculty has a dynamic and young structure from diverse fields including mining, civil and environmental geophysics, and seismology. The Department of Geophysics Engineering has run various projects for engineering and environmental problems that have been vital for municipalities. In addition, our staffs participate in international projects.

PROJECTS

(ÇOMÜ-BAP) / *Geophysical Characterization of Lapseki-Adatepe Landslide Area By Electrical Resistivity and Seismic Refraction Methods*

(TÜBİTAK) / *Neotectonic and Seismotectonic Characteristics between Simav Fault and Kütahya Fault (Emet-Middle-Western Anatolia)*

(TÜBİTAK) / *Paleoseismology of Troia Fault*

Türkiye'nin Meteorit Çarpma Kraterleri Envanteri: Kraterlerin Morfolojik Özellikleri ve Uydu Görüntüleriyle Bulunması (TÜBİTAK)

COMPLETED PROJECTS

(ÇOMÜ BAP) ----- *Site Geotechnical Characterization of Çanakkale City Based on A Single-Station Microtremor Data* ***2009***

Geophysicsal and Geological Investigation of Intepe Groundwater Sources ***2007***

Geophysical Investigation of Aşağıokçular Metalic Ore Field ***2007***

(Hacettepe Üniversitesi BAP) ***-----*** *Archaeogeophysical Investigation in Gökçeada Yeni Bademli Mound* ***2007***

Menekşe Çatağında Arkeojeofizik Araştırma, Tekirdağ, (ÇOMÜ BAP) ***----*** *Archaeogeophysical Investigation in Menekşe* ***2007***

g. GAZİ UNIVERSITY EARTHQUAKE ENGINEERING APPLICATION AND RESEARCH CENTER

http://www.mf.gazi.edu.tr

Gazi University Earthquake Engineering Application and Research Center (DEMAR) was established in April 22, 2005 as a center under Gazi University Rectorate.

Aims of the Center:

a) To conduct, promote and coordinate theoretical and applied researches on the sources of earthquakes, their occurrences, their effects on engineered structures and people and the mitigation of seismic risks, to provide

consultancy service and organize scientific meetings, courses and seminars on those subjects,

b) To communicate, cooperate with similar centers in the country and abroad, to assist in the development of courses and programs for graduate studies, to provide and spread the knowledge.

Fields of Studies in the Center:

a) To conduct studies aiming to inform the local authorities and the public about the precautions before earthquakes and raise the awareness on those topics,
b) To make researches regarding the planning and conducting of emergency and rescue operations after earthquakes,
c) To develop plans on the probable damages and corresponding precautions in the regions with high earthquake risk,
d) To conduct applied researches on the retrofitting of inadequately engineered problematic buildings prior to the occurrence of earthquakes and on the repair of damaged buildings after the occurrence,
e) To provide consultancy service on the implementation of the retrofitting and repair methods developed by the support of the center,
f) To provide knowledge sharing settings by organizing scientific meetings, courses and seminars regarding studies and researches supported by the center on earthquakes and earthquake engineering
g) To assist in the development of undergraduate and graduate courses and programs for civil engineering departments of the universities and to contribute to the informing of students.

Mission of the Center

To carry out multidisciplinary research and development (RD) studies on the earthquake threat, the determination of risk and the mitigation of hazardous effects of earthquakes,

To present the results of these studies and the past experiences for the information and the benefit of researchers, central and local authorities and the public,

To support local authorities on prevention and damage mitigation (risk management), intervention and rehabilitation (emergency management),

preparation and implementation of plans and to carry out the studies on training and informing of the public in a way increasing the awareness.

Vision of the Center

The vision of the center is to become the most efficient and most qualified Earthquake Engineering Application and Research Center at national scale as well as to be reputable, well known center with continuous improvement in the cooperation potentials at international arena.

Some Examples of the Works Carried Out

1- Seismic Hazard Map of Turkey and Development of Earthquake Regulations

The first act on the mitigation of earthquake damages was issued in July 22, 1944 under the name of "*Law Regarding Precautions Before and After Earthquakes*". As required by this law, 4623, there prepared "*Seismic Hazard Map*" and "*Earthquake Specification*" in relation to the map for the first time in Turkey by Ministries of Public Works and National Education.

The developments in engineering seismology, the increase in tectonic and sismotectonic findings as well as the increase in earthquake recordings, Seismic Hazard Maps (1945, 1947, 1963, 1972 and 1996) and Specifications for Structures to be Built in Disaster Areas (1947, 1953, 1962, 1968, 1975, 1996 and 2007) were changed several times. With this study, there compiled the information about the Seismic Hazard Maps and Specifications for structures to be built in disaster areas that were approved by Cabinet Decree and inured. Moreover, there prepared a reference guide for the ones that will work on the upcoming seismic hazard maps and specifications for structures to be built in disaster areas including the basis that the older versions considered during the preparation of maps.

2- Network of Weak and Strong Ground Motion Records in Ankara Region (ANKARA-NET)

With this project, there installed seismic stations to record the weak and strong ground motions in Ankara and its surroundings. It is aimed to contribute to the development of earthquake resistant building techniques by using the ground accelerations during earthquakes and determining the forces that come with earthquake and cause damage in any type of building. Besides, the parameters like

the location of earthquake, magnitude, depth etc are determined to investigate the seismicity/seismic activity of Ankara and its surroundings in a detailed way.

3-Earthquake Hazard and Risk of Ankara Workshop

To put forth the seismic risk state of Ankara with scientific studies, in March 19, 2008 at Gazi University Rectorate Mimar Kemaleddin Hall there organized "*Earthquake Hazard and Risk of Ankara Workshop*". Besides, at the panel called " Is Ankara ready for an earthquake?" after the workshop, the current state of Ankara in terms of earthquake, necessary studies to be done and suggestions for the solutions were discussed in a detailed way.

4- Disaster Management and Earthquake Trainings

Our country is a country that is located on one of the most active faults and always had, have and will have the risk of earthquakes. Education occupies an important role in the risk mitigation activities. With the collaboration of related Public Agencies and Institutions, Governorships, Municipalities, Nongovernmental organizations, Private Companies, there carried out training studies on Earthquake and Disaster Management to mitigate the effects of earthquakes, decrease the losses to minimum, to train the informed, conscious and responsible individuals, managers and personals.

5- Disaster and Emergency Plans

"Special Provincial Administration Law" enumerated as 5302, "Municipality Law" as 5393 and "Metropolitan Municipality Law" as 5216 entails special provincial administrations and municipalities to be protected from the natural disasters or to make disaster and emergency plans to mitigate the hazardous effects, to carry out the public education actions, to prepare the necessary equipment and equipages. Our center provides consultancy service for the preparation of Disaster and Emergency Plans that Special Provincial Administrations, Metropolitan Municipalities and other municipalities are obliged to prepare.

6- Repair and Retrofitting Studies

For the repair/retrofitting of many public and private buildings there conducted several studies and produced as-built projects after Dinar (1995), Adana-Ceyhan (1998), Marmara (1999) earthquakes.

PUBLICATIONS

Pampal, S., Özmen, B., 2007, *Türkiye Deprem Bölgeleri Haritalarının Gelişimi*, Altıncı Ulusal Deprem Mühendisliği Konferansı, 16-20 Ekim, İstanbul-Türkiye

Koçkar, M.K., 2007, Evaluation of Site Characterization and Site Effects of the Ankara Basin, Geotechnical Engineering Conference, Kyriazis D.Pitilakis (Eds.), June 25-28, Thessaloniki, Greece, pp. 1-10, paper ID:1241, Springer ISBN 978-1 4020-5892-9.

Pampal, S., Özmen, B., 2007, Türkiye'nin Deprem Gerçeği, Deprem Bölgeleri Haritaları ve Deprem Yönetmeliklerinin Tarihsel Gelişimi, 1028 sayfa, Ankara

Özmen, B., 2007, Afet Yönetimi ve Afet İşleri Genel Müdürlüğü, Kapsamlı Doğal Afet Risk Yönetimi Programı, Dünya Bankası Uzaktan Öğrenim Enstitüsü.

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Akgün, H., Koçkar, M.K., Eker, A.M., 2008, Ankara'nın Kuzeyindeki Plio-Kuvaterner Zeminlerin Dinamik Karakterlerinin ve Yerel Zemin Koşullarının Yüzey Dalgası Yöntemleri ile Belirlenmesi, TMMOB 61.Türkiye Jeoloji Kurultayı, MTA Kültür Sitesi, 24-28 Mart, Ankara

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Eker, A.M., Akgün, H., Koçkar, M.K., 2010, A Comparison of Local Site Conditions with Passive and Active Surface Wave Methods, The Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics Abstract Book, 24-29 Mayıs, Sandiego, California

Özmen, B., 2010, Gazi Üniversitesi Deprem Mühendisliği Uygulama ve Araştırma Merkezince Yapılan Çalışmalar, Türkiye'nin Afet Yönetimi Onikinci Yuvarlak Masa Toplantısı, 15 Ocak, ODTÜ Kültür ve Kongre Merkezi, Ankara

Özmen, B., 2010, Deprem Senaryoları ve İstanbul Örneği, e-belediye dergisi, Ocak-Şubat sayısı, sayfa 34-36, ISSN 1306-5343

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h. SÜLEYMAN DEMİREL UNIVERSITY EARTHQUAKE & GEOTECHNICAL RESEARCH CENTER

http://mmf.sdu.edu.tr/bolumler/jeofizik

Earthquake and Geotechnical Research Centre was established in 1996, fort he purpose of observing earthquakes, by SDU and Potsdam University. The center has supports in a multidisciplinary earthquake research center providing graduate education in three departments Geophysics, Geology and Civil engineering.

The center has provides seismological observation in lakes region and also has four seismological station with on-line connection in same area.

Equipment

- Micro Gravity -Scintrex CG-5
- Elektro Magnetic - Geonics-EM34
- Magnetometer - Scintrex SM5 Cesium NAVMAG
- Multi – electrode Resiztivity- GF Instrument (48 elektrot)
- GPR - MALA
- Ultrasonic P-S - NDT Instruments
- TotalStation - Leica TPS 400
- Spectrometer - Gf Instrument

PROJECTS

- Bakırlıtepe TUBITAK National Observatory Station Investigations
- Geotechnical Study of the Municipality of Antalya Storey Car Park
- Geotechnical Study of the Municipality of Isparta Storey Car Park
- Elmalı, Eşen Hydroelectric Power Plant Geotechnical Investigations
- Golcuk Naval Base Residential Area Geotechnical Investigations
- Burdur City Centre and the nearby settlement of Conformity Assessment of Environment
- Geotechnical Study of Denizli Province
- Gravity Investigation of Crustal Structure Study on the Aegean Region (Project owner:Dokuz Eylul University).

i. İSTANBUL UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICAL ENGINEERING

http://www.istanbul.edu.tr/eng/jfm

PROJECTS

*Prof.Dr.Yıldız Altınok
"Tsunami Risk ANd Strategies For the Europen Region" (TRANSFER) , Project Coordinator: Prof.Dr.S.Tinti , (01.10.2006- 01.10.2009. European Unıon 6., İstanbul Universty

*Prof.Dr. Oguz Özel
İstanbulda Avrupa Yakası altında Anakaya Derinlik Dağılımını ve S-dalga Hız Yapısını belirleyerek Deprem Yer Tepkisini incelemek
Temmuz-2007 –Temmuz-2010. İ.Ü. BAP Project (Project N: 568), Executive

3 Bileşen Sayısal Deprem Kayıt Sistemi Geliştirilmesi
Temmuz-2008–Temmuz-2009. 108Y109 (TÜBİTAK -1002-Projesi), Executive

İzmir Metropolü ile Menemen ilçelerinde Güvenli Yapı Tasarımı için Zeminin Sismik Davranışlarının İncelenmesi. 15 Ocak 2008 - …. TÜBİTAK

İstanbul Deprem Acil Müdahale ve Erken Uyarı Sistemi'nin Kalibrasyonu ve İstasyon Yerlerinin Depreme karşı Yerel Tepkilerinin Belirlenmesi. 2005 – 2007 DPT

*Doç.Dr.Eşref Yalçınkaya
1999 İzmit-Gölcük Depreminin Yalova ve çevresinde neden olduğu kuvvetli yer hareketlerinin tahmin edilmesi, TÜBİTAK Project, Project N: 109M317, 2009-2010. Executive

*Doç.Dr.Naşide Özer
Marmara Denizi ve civarinda olusmus depremlerin kaotik ozellikleri, Istanbul Universty Araştırma Fonu projesi, 585/14082006, 2006 –2007. Executive

PUBLICATIONS

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j. YILDIZ TECHNICAL UNIVERSITY NATURAL SCIENCES RESEARCH CENTER

http://www.dogabilimleri.yildiz.edu.tr

VISION :

a- To study multidisciplinary for earthsciences
b- Geological and geophysical geodesyc approaching to internal issues of dynamic earth such as crustal deformations and earthquake, tsunami, subsidence, vulcanoes etc.
c- Geologic and geomorphologic approaching to external issues of dynamic earth such as mass movements, flood, erosion, hydrologic issues, coastal and environmental issues
d- Coastal management

e- Disaster management

MISSION :

a- To establish data bank for studies mentioned above
b- to give a scientific support and contribution to younger scientsits
c- to give a contribution to global science
d- presentation of data to international scienctific communities with publications, presentations, conferences etc. for critism, discussion
e- to find domestic and aboard partnership for earthscience projects

k. SAKARYA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://www.jfm.sakarya.edu.tr

Department of Geophysics of the Sakarya University was established in 1997 under the Faculty of Engineering. Following the acceptance of students to the department, teaching for the BSc and MSc degrees in Geophysics commenced in 2001-2002 academic year. Besides the daytime teaching program, the night-time teaching program started in the 2004-2005 academic year and the first graduate degrees were given in the same academic year. PhD degree program in the department was activated in the 2008-2009 academic year.

Presently, academic staff of the department comprises 10 lecturer (as Professor, Asistant Professor and Associate Assistant Professor) and 7 research assistants. In the 2010-2011 academic year 600 undergraduate students (334 in the day-time and 266 in the night-time teaching programs) and 30 graduate students (25 in MSc and 5 in PhD programs) are taught in the department.

The academic activities of the department in the last 4 years are given below.

PROJECTS

RESEARCH PROJECTS (DPT – TÜBİTAK)

1	"Sapanca gölünün ayrıntılı batimetrisi, genç çökel istifi, aktif yapısal unsurları vasıtasıyla yakın bölgesinin sismojenik davranışının incelenmesi", Turkish National Geodetic and Geophysical Union, Project Coordinator: Prof. Dr. Levent GÜLEN Araştırmacı: All of the academic staff and research assistants of the Department of Geophysics, Sakarya University
2	Kıbrıs ve Civar Bölgelerindeki Deprem Tehlikesinin Tespit Edilmesi TÜBITAK-109Y346 Supervisor: Prof. Dr. Levent GÜLEN, Researcher: Research Assistant Hilal DOMAÇ
3	Türkiye'nin deprem riski yüksek jeo-stratejik "ancak tektonik rejimleri farklı–bölgelerinde deprem davranışının çok disiplinli yaklaşımlarla araştırılması projesi". TÜBİTAK-TARAL-1007 (Prof.Dr.Ruhi SAATÇILAR)
4	Soma Tersiyer Havzası'nda Organik Jeokimyasal, Organik Petrografik ve Entegre Sismik Yöntemlerle Kömür ve Kömür Kökenli Doğal Gaz Potansiyeli Araştırılması ve Modellenmesi(GAZPRO). TÜBİTAK-TARAL-1007 (Prof.Dr.Ruhi SAATÇILAR)

RESEARCH PROJECTS (FUNDED BY THE SAKARYA UNIVERSITY)

1	Project No: 2007-01-14-001 Jeolojik ve tektonik süreçlerin fiziksel modellenmesinde oprik tarayıcılar ile ilk denemelerin yapılması"Project Coordinator: Dr. Mehmet Dinçer Köksal, Completed.
2	Proje Türü: BAP, Proje No: 2010-01-14-002. "Arazi Deneyleri ile Yüksek Frekanslı Titreşimleri Azaltıcı Bariyer Sistemlerine Yönelik Uygulamalar" Coordinator: Dr. Günay BEYHAN, Researchers: Seyhan FIRAT, Erkan ÇELEBİ, İlyas ÇANKAYA, İsa VURAL, Osman KIRTEL, Emrah BUDAKOĞLU, Continues.
3	Proje Türü: BAP, Proje No: 2002-20. "Marmara Denizi-nin Yapısal ve Tektonik Özellikleri ile Petrol Kapanlarının Araştırılması" Coordinator: Dr. Günay BEYHAN, Researchers: Can KARAVUL, Burhan ÖZÇİÇEK, Completed.
4	Proje Türü: BAP, Proje No: 2010-05-08-006. "Alüvyonlu Zemin Ortamında Deprem Yükleri Altında Doğalgaz Boru Hatlarının Performans Analizi" Coordinator: Dr. Seyhan FIRAT, Researchers: Erkan ÇELEBİ, Günay BEYHAN, İlyas ÇANKAYA, Nihat S. IŞIK, İsa VURAL, Osman KIRTEL, Continues.

5	Proje Türü: BAP, Proje No: 2010-01-04-008. "Dinamik Yüklerin Ürettiği Kuvvetli Zemin Titreşimlerinin Azaltılması için Yenilikçi Çözümlerin Geliştirilmesi" Coordinator: Dr. Erkan ÇELEBİ, Researchers: Seyhan FIRAT, Günay BEYHAN, İlyas ÇANKAYA, Osman KIRTEL, Fatih GÖKTEPE, İsa VURAL, Continues.
6	Project No: 2010-01-14-003. Sakarya Nehri ile Çark Deresi Arasındaki Bölgenin Sel ve Taşkın Tehlikesinin Belirlenmesi ve Risk Azaltma Sürecinin Tasarlanması, Coordinator: Dr. Mehmet Dinçer KÖKSAL, Researchers: Oktay GÖKÇE, Turgut ÖZTAŞ, Oya ARAPOĞLU, Continues.

PUBLICATIONS

(INTERNATIONAL JOURNALS – SCI / SSCI)

1	Horasan, G., Boztepe-Güney, A., Küsmezer, A., Bekler, F., Öğütçü, Z., Musaoğlu, N., 2009. Contamination of seismicity catalogs by quarry basts: An example from Istanbul and its vicinty, northwestern Turkey, Journal of Asian Earth Sciences, doi:10.1016/j.jseaes.2008.03.012, 34, 90-99.
2	Çelebi, E., Fırat, S., Beyhan, G., Çankaya, I., Vural, I., Kırtel., O., 2009. Field experiments on wave propagation and vibration isolation by using wave barriers, Soil Dynamics and Earthquake Engineering, Volume 29, Issue 5, May 2009, Pages 824-833.
3	Utkucu, M., Kanbur, Z., Alptekin, Ö., and Sünbül, F., 2009. Seismic behaviour of the North Anatolian Fault beneath the Sea of Marmara (NW Turkey): Implications for earthquake recurrence times and future seismic hazard, Natural Hazards, 50(1), 45-71, DOI 10.1007/s11069-008-9317-4.
4	Işık, M., and Şenel, H., 2009. 3D gravity modeling of Büyük Menderes basin in Western Anatolia using parabolic density function, Journal of Asian Earth Sciences 34, 317-325.
5	Oruç, B., and Keskinsezer, A., 2008. Structural Setting of the Northeastern Biga Peninsula (Turkey) from Tilt Derivatives of Gravity Gradient Tensors and Magnitude of Horizontal Gravity Components, Pure and Applied Geophysics, 165, 9-10, 1913–1927.
6	İnan, S., Akgül, T., Seyis, C., Saatçılar, R., Baykut, S., Ergintav, S., Baş, M., 2008. Geochemical Monitoring in the Marmara Region (NW Turkey): A search for precursors of seismic activity, Journal of Geophysical Research, V.113, No 3, 1-15.

7	Oruç, B., Keskinsezer, A., 2008. Detection of Causative Bodies by Normalized Full Gradient of Aeromagnetic Anomalies from East Marmara Region, NW Turkey, Journal of Applied Geophysics, 65, 1, 39-49.
8	İnan, S., Akgül, T., Seyis, C., Saatçılar, R., Baykut, S., Ergintav, S., Baş, M., 2008. Geochemical Monitoring in the Marmara Region (NW Turkey): A search for precursors of seismic activity, Journal of Geophysical Research, V.113, No 3, 1-15.
9	Horasan, G., Boztepe-Güney, A., 2007. Observations and analysis of low-frequency crustal earthquakes in Lake Van and its vicinity, eastern Turkey, Journal of Seismology, 11, DOI 10.1007/s 10950-006-9022-2, 1-13.
10	İnan, S., Ergintav, S., Saatçılar, R., Tüzel, B., İravul, Y., 2007. Turkey Makes Major Investment in Earthquake Research, EOS, Transactions, Amer. Geoph. Union, v 88, no 34, 33-34.
11	Arman, H., Ramazanoğlu, Ş., Akıncı, A., 2007. Mechanical and physical properties of the Kandira stone, Kandira, Turkey, Bulletin of Engineering Geology and the Environment,Volume 66, Number 3 / August, 2007, p 331-333.

(INTERNATIONAL JOURNALS – OTHER)

1	Martin, R. J., Gülen, L., Sun, Y., Toksöz, M.N., 2010. The crustal and mantle velocity structure in central Asia from 3D travel time tomography, Monitoring Research Review: Ground-Based Nuclear Monitoring Technologies, LA-UR-10-05578, 118-127.
2	Martin, R. J., Gülen, L., Sun, Y., Toksöz, M.N., 2009. Extension of the Caucasus seismic information network into central Asia, Monitoring Research Review: Ground-Based Nuclear Monitoring Technologies, LA-UR-09-05276, 140-149.
3	Toksöz, M. N., Hilst, R. V. D., Sun, Y., Gülen, L., Kalafat, D., Kuleli, S. H., Li, C., Zhang, H., 2008, Seismic tomography of the Arabian-Eurasian collision zone and surrounding areas, Proceedings of the 30th Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies, Portsmouth, Virginia, Volume I, 504-513.
4	Yıldırım, E., Sertkaya, C. and Karavul, C., 2007. Estimation of Shear Wave Velocity using Sugeno Fuzzy Logic and Artificial Neural Networks Modeli, Electronic Letters on Science and Engineering Vol. 3(1) 2007 page: 1-9.

(NATIONAL JOURNALS)

Sünbül, F., 2007. Nuclear Magnetic Resonance properties of synthetic and sandy samples, SAÜ. Fen Bilimleri Dergisi, 11. Cilt, 1. Sayı, s.33-37.

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Utkucu M., Kanbur, Z., Alptekin Ö. And Sünbül F, 2007. Mapping *b* value in the Marmara region (NW Turkey): Implications for local recurrence times and seismic hazard, International Earthquake Syposium, p1-9**,** Kocaeli 2007, Kocaeli.

NATIONAL PRESENTATIONS WITH PUBLISHED PAPERS

1	Öğütçü, Z., P. Deniz, G. Horasan, D. Kalafat, A., Boztepe-Güney, E., Yıldırım, 2008, Türiyedeki doğal ve yapay sismik kaynakların ayırt edilmesi, 1. Doğal Afetler ve Yerbilimleri Sempozyumu, DAYK 2008, 19-22 Mart, 21-30, Adapazarı.
2	Kalafat, D., K., Kekovalı, P., Deniz, Y., Güneş, A. Pınar, G. Horasan, 2008, 31 Temmuz-1 Ağustos 2005 ve 20-27 Aralık 2007 Afar-BALA (ANKARA) deprem dizisi, 1. Doğal Afetler ve Yerbilimleri Sempozyumu, DAYK 2008, 19-22 Mart, 92-95, Adapazarı.
3	Köksal, M.D., 2007, "Underground Engineering Structures of the World and Turkey for Transpostation Purposes – A Historical Look", Proceedings of the 2nd Symposium on Underground Excavations for Transportation – UYAK 2, İTU, İstanbul, Turkey, pp. 237-247.
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POPULAR PAPERS

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2	Köksal, M. D., 2008, "Preservation awareness of the archaelogical values during construction" 1st National Symposium of Natural Disasters and Earthsciences, DAYK 2008 Proceedings Book, Sakarya University, Rosem Hall, Adapazarı, Turkey, pp.320-326 (in Turkish).
3	Utkucu, M, 2008. Deprem Bilgi Akış Sistemleri, Sakarya Üniversitesi DAYK (Doğal Afetler ve Yerbilimleri Kulübü) Dergisi, 2, 29-31
4	Köksal, M.,D., 2008, "Preface to DAYK Year 1 Meeting" Bulletin of Natural Disasters and Earthsciences Club, Sakarya University, No 3, ISSN 1307-9727 pp 61, (in Turkish).

5	Köksal, M.D., 2008, "Charles Lyell", Bulletin of Natural Disasters and Earthsciences Club, DAYK, Sakarya University, No 3, ISSN 1307-9727, pp62-66, (in Turkish).

1. KOCAELI UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://jeofizik.kocaeli.edu.tr

The department of geophysical engineering was founded in 1979 under the Kocaeli State architecture-engineering academy. Education started in 1980 in our department. In 1982, the department joined the engineering faculty of Yıldız University. The first student group graduated from the department in 1984. With the establishment of Kocaeli University in 1992, the department became a part of the engineering faculty. Evening program (night schedule) started in 1992. Totally 582 undergraduate students are currently going on their education in our department. The department has greatly been developed with respect to the quality of our academic staff, education, and research facilities since 1979. In Earth and Space Sciences Research Center (YUBAM), our academic personnel successfully continue their research in an effective manner about earthquake, seismology etc. The total number of academic staff working in our department is now 20, including 4 professors, 8 assistant professors, 8 research assistants, and 1 specialist.

Seismic risk of Istanbul and its surrounding area has increased right after the 1999 earthquakes and many speculations have been published in the media about forthcoming events. In order to have enough information about forthcoming earthquakes, a seismic network should be installed and operated continuously via online communication. Researchers at the Research Center of Earth and Space Sciences of Kocaeli University (YUBAM), in cooperation with the scientists from GFZ (GeoForschungZentrum), installed a local seismic network consisting of 25 seismic stations to monitor micro-earthquake activities of the mid-Marmara region and collect information for the next probable large earthquake in this region.

The network which is called ARNET is the densest local network with the highest number of seismic stations in Turkey and covers the districts Yalova-Armutlu-Gemlik and its surrounding areas. It is also the biggest seismic network operated by universities in Turkey with its 25 seismic stations. The map below shows the distribution of ARNET seismic stations. This network was initially set up as a 10-station local network in September 2005 and the number of the stations reached 25 during the years 2006 and 2007. Recently, 15 stations of this network have been connected to the data centre on Umuttepe Campus of Kocaeli University via online communication systems and micro-earthquake activities occurring in the Marmara Region have started to be recorded at our data centre.

The network has many specifications with the most dense and largest number of seismic stations, and one of the stations located in 25 different sites has a borehole seismometer at 100 m depth, 15 broadband seismometers and 10 short period seismometers. In addition, six accelerometers have been installed nearby faults and densely-populated areas in order to monitor acceleration of mid-size and large earthquakes. Since the region being monitored is characterized by geothermal activity and higher tectonic deformation, we have also installed geochemical sensors to the cold and hot water well stations for pressure changes, conductivity, temperature changes and leveling in order to understand the relation between micro-earthquake activities with hydrothermal potential. This observation will enable us to catch some geochemical precursory phenomena noticed prior to some large earthquakes during earthquake prediction studies. These observations will enable us to study possible interactions between earthquakes and the fluids with special focus on earthquake-related pore-pressure variations in geothermal systems. These observations are conducted at 22 different locations of the study area and Bursa city. At each site, different kinds of geochemical parameters are being monitored. Geochemical observations are conducted together with the Kandilli Observatory and Earthquake Research Institute.

Offline and online data is recorded with the updated software at our center (YUBAM), and data processing is automatically and manually realized by our researchers and students. The data obtained by ARNET is used for education and research purposes and conducting different kinds of researches on Seismology. The information and some of the results obtained from ARNET data has been submitted and shared in several international symposiums, workshops and conferences. At present, the data of the network is under process in different scientific studies. Among some of these studies are 3-dimensional seismic tomography, local stress distribution analysis, recognition of seismicity patterns, moment tensor analysis and accurate seismic event location techniques.

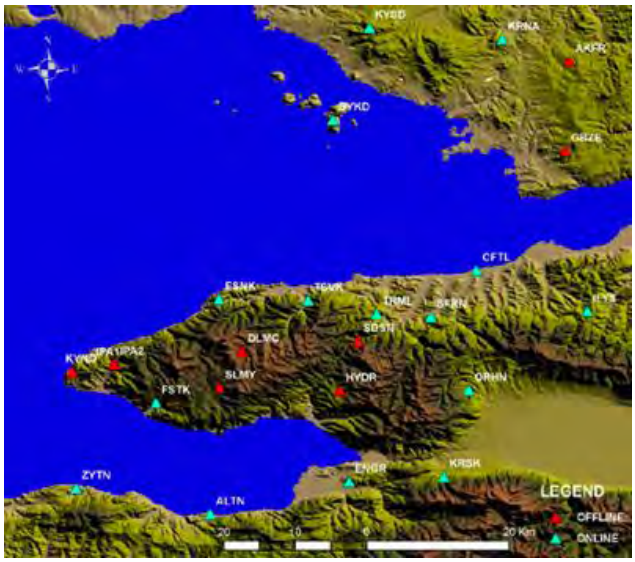

Figure 1. Seismic Network of Kocaeli universty.

Working Groups

- Earthquake Working Group
- Disaster Working Group
- Applied Geophysics and Soil Working Group
- Remote Sensing and Geographical Information System Working Group

PROJECTS

- Seismic Microzonation of İzmit and Surrounding of İzmit based on Global Information System(GIS)...
- Determining the Fault and Lineament Structure of İzmit and Surrounding of İzmit by Using Satellite Data...
- Earthquake activity of Yalova and Armutlu Region...

m. KARADENIZ TECNIC UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://www.muhfak.ktu.edu.tr/jeofizik

Department of Geophysics of the Karadeniz Tecnic University was established in 1970 under the Faculty of Engineering. Presently, academic staff of the department comprises 15 lecturer (as Professor, Asistant Professor and Associate Assistant Professor) and 6 research assistants.

Working Groups

- Applied Geophysics
- Seismology
- Physıcs Of The Earth's Interıor

PUBLICATIONS

1. Karslı, H., 2011, An application of the autoregressive extrapolation technique to enhance deconvolution results :a 2D marine data example, Geophysical Prospecting, 59,56-65.
2. Sayıl, N., 2011, An Investigation of Seismicity for the Aegean and Mediterranean Region, Int. Journal of Geology, 2, 3, 44-47.
3. Gelişli, K., Şeren, A., Babacan, A.E., Çataklı, A., Ersoy,H., and Kandemir, R., 2010, The Sumela Monastery Slope in Maçka, Northeast Turkey: Rock Mass Properties and Stability Assessment, Bulletin of Engineering Geology and the Environment Springer, DOI: 10.1007/s10064-010-0343-6
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6. Bayrak, Y. Öztürk, S., Çınar, H., Kalafat, D., Tsapanos, T.M., Koravos, G. Ch. and Leventakis, G.A., 2009, Estimating earthquake hazard parameters from

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8. Maden, N., Gelisli, K., Eyüpoğlu, Y. and Bektas, O., 2009, Two- and-Three Dimensional Crustal Thickness of the Eastern Pontides (NE Turkey), Turkish Journal of Earth Sciences 4, 652-663.
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10. Karslı, H. and Bayrak, Y., 2008, Ground roll attenuation based on Wiener filtering and benefits of time-frequency imaging, Leading Edge, Special Section, 206-209.
11. S. Öztürk, Çınar, H., Bayrak, Y., Karslı, H., ve Daniel, G., 2008, Properties of the Aftershock Sequences of the 2003 Bingöl, M_D=6.4, (Turkey) Earthquake, Pure and Applied Geophysics, 165, 349-371.
12. Sayıl, N, and Osmanşahin, İ., 2008, An Investigation of Seismicity for Western Anatolia, Natural Hazards, 44, 1, 51-64.
13. Öztürk, S., Bayrak, Y., Çınar, H., Koravos, G.Ch. and Tsapanos, T.M., 2008, A quantitative appraisal of earthquake hazard parameters computed from Gumbel I method for different regions in and around Turkey, Natural Hazards, 47, 471–495.
14. Çavşak, H., 2008, Gravity Effect of Spreading Ridges - Comparison of 2D and Spherical Models, Marine Geophysical Researches, 29, 161-165.
15. Seren, A., Gelisli, K. and Çatakli, A., 2008, A Geophysical Investigation of the Late Roman Underground Settlement at Aydıntepe, Northeast Turkey, Geoarchaeology: An International Journal, Vol.23, No.6, 842-860.
16. Gökalp, H., 2007, Local Earthquake Tomography of the Erzincan Basin and the Surrounding Area in Turkey. Annals of Geophysics, Vol. 50, N.6, 707-724.
17. Gökalp, H. and Chiarabba, C., 2007, Different Approaches in the Local Earthquakes Tomography: An application on the Alban Hills Volcano (Central Italy). Annals of Geophysics, Vol. 50, N. 2, 149-163.
18. Bayrak, Y., Öztürk, S., Çınar, H., Koravos ,G.Ch., and Tsapanos, T.M., 2008, Regional Variation of the ω-Upper Bound Magnitude of GIII Distribution in and around Turkey: Tectonic Implications for Earthquake Hazards, Pure and Applied Geophysics, 165, 1367-1390.

Conference/Symposium

1. Karslı, H. and Dondurur, D., 2010, Wiener Kestirim Süzgeci ile Deniz Dalgası Gürültüsünün Süzülmesi, The 19th International Geophysical Congress and Exhibition of Turkey, Extended Abstract CD, No.100, November 23-26, Ankara.
2. Karslı, H., High Amplitude Noise Attenuation Based on Wiener Estimation Filter, 72nd EGAE Congress and Exhibitions, Abstract CD, May 5-8, 2010, Abstract CD, No. P209, Saint Petersburg, Russia.
3. Şenkaya, M. and Karslı, H., 2010, Determination of First Arrival Times in Seismic Refraction Data Using Correlation Technique, The 19th International Geophysical Congress and Exhibition of Turkey, Extended Abstract CD, No.120, November 23-26, Ankara.

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5. Bayrak Y., Kalafat D., Çınar H., 2010, Aletsel Ve Tarihsel Dönem Verileri Kullanılarak Kuzey Anadolu Fayı Ve Civarındaki Farklı Bölgeler İçin Deprem Tehlikesinin Belirlenmesi, The 19th International Geophysical Congress and Exhibition of Turkey, November 23-26, Ankara.
6. Beker, Y. and Sayıl N., 2010, Determining Parameters of Foundation with Microtremor Survey at KTU Campus, 18th Int. Geophysical Congress and Exhibition of Turkey, 23-26 November 2010, Sheraton Hotel & Convention Center, Ankara, Turkey, 1-4.
7. Altunışık V. and Sayıl N., 2010, Examining Anatolian Crust with Surface Wave Data Sets, 18th Int. Geophysical Congress and Exhibition of Turkey, 23-26 November 2010, Sheraton Hotel & Convention Center, Ankara, Turkey, 1-4.
8. Gelisli, K. and Babacan, A.E., 2009, Stability Investigations of Rock Slopes in the Sumela Monastery (Maçka-Trabzon, Northeastern Turkey), 5th Congress of Balkan Geophysical Society, 6508, 10-16 May, 2009, Belgrade, Serbia.
9. Karslı, H., 2009, Application of Autoregressive (AR) Extrapolation Technique to Enhance the Deconvolution of Seismic Data, 5th Balkan Geophysical Congress and Exhibition, Abstract CD, No. 6297, Belgrad, Serbia.
10. Sayıl, N., 2009, Determination of the Crust and Upper Mantle Structure in Anatolia by Surface Wave Data Applied Discrimination Filter, Int. Earthquake Symposium Kocaeli 2009, 17-19 August 2009, Kocaeli University, Izmit, p.66-67.
11. Öztürk, S., Bayrak, Y., 2009, Aftershock probability evaluation for recent Turkey earthquakes based on Gutenberg-Richter and Modified Omori Formulae, 5th Congress of Balkan Geophysical Society, 6505, 10-16 May, 2009, Belgrade, Serbia.

n. KAHRAMANMARAŞ SÜTÇÜ İMAM UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOLOGY

http://www.ksu.edu.tr

Kahramanmaraş region, North and East Anatolian fault system which were formed as simply described above are the principal resources of Turkey's seismic

activity. Therefore, in between 2005-2008 years, an individual project supported by TÜBİTAK was carried out at Kahramanmaraş Sütçü İmam University. In this project, it is aimed to monitor geochemical parameters of spring waters as well as soil radon gas concentrations continuously in Gölbaşı-Türkoğlu and Türkoğlu-Antakya segments of Eastern Anatolian Fault Zone which are serious earthquake sources of Kahramanmaraş city and its surrounding areas. In this purpose, three stations for soil radon gas and three stations for spring water in total six stations were installed to collect some measurable data to examine the relationship between those measured data and the regional seismicity.

After 2007, a micro-seismology network that continuously monitor seismic activity along all the East Anatolian Fault System (DAFS) including Kahramanmaraş and its surroundings has been installed under the scope of TURDEP Project by the Scientific and Technological Research Council of Turkey-Marmara Research Centre (TÜBİTAK-MAM) and the TR Ministry of Public Works and Settlements General Directorate of Disaster Affairs (GDDA). With this network all of the quakes greater than 1 (M_L) can be recorded in the region. Also, a large number of radon gas, GPS and the borehole tilt/strain measurement stations was established along the East Anatolian Fault in this project. All stations located in the area between Sürgü (Malatya) and Reyhanlı (Antakya) districts, has been monitoring under the responsibility of Kahramanmaraş Sütçü İmam University.

o. GENERAL DIRECTORATE OF MINERAL RESEARCH AND EXPLORATION (MTA)

http://www.mta.gov.tr

. General Directorate of MTA

General Directorate of Mineral Research and Exploration (MTA), which established in 22 June 1935 (Law No 2804), is a Public Corporation with the aim of conducting scientific and technological research on geology and mineral exploration. MTA corresponds to geological survey corporations in the Developed Countries with its task and properties of the researches. MTA, which is an institution tasked with making geological maps and solving the geological problems of Turkey, engages in scientific research related to earthquake and other natural disasters with geological origin since its establishment. MTA constitutes the basic data source for both reduce disaster losses before the earthquake and post-disaster planning and practices in the country with 76 years experience and knowledge of the archive is based on the geological data base and knowledge on active faults.

2. Ongoing Studies by the MTA Today

After the 1999 earthquakes, new projects have been implemented by the General Directorate of MTA with the aim of overcoming deficiencies of geological information infrastructure and active fault, also reducing the damage of the earthquake.

- **Project of Updating the Active Fault Map of Turkey and the Active Fault Data Base Establishment:** The aim of the project, which launched in 2004 and scheduled to be completed in 2011, is updating the Active Fault Map of Turkey, which was published in 1992 with the purpose of more detailed earthquake hazard analysis in the light of present-day knowledge. Active faults on the lands of Turkey are mapped in scale of 1:25.000 and created active fault data base under the project. Active fault maps produced in the project planned to 1:250.000 and 1:1.000.000 scale map with explanatory book for users and publication of 1:250.000 scale maps have started .
- **Projects of Geological Atlas of the Large Fault Zones:** These projects have been enacted by MTA in order to produce the geological maps of the major fault systems in Turkey. Within the scope of this research Geological Atlas of the North Anatolian Fault and East Anatolian Fault , which are the country's two largest strike-slip fault systems, were completed and published. Preparation of geological atlas of the Ecemiş fault is being carried out between the years 2009 and 2011.
- **Landslide Inventory Maps of Turkey:** In our country, after the earthquake landslide is a natural disaster causes the most life and property lose. Landslide areas also characterized as most effected weak grounds by earthquakes. Project of Landslide Inventory Maps of Turkey, which

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***** This report has been prepared in accordance with the decisions of TUSA-KDK 1 of 2011 meeting.

initiated to determine landslides across the country and to demonstrate the potential risk of it for use in planning and applications, was completed in 2007. Landslide survey was carried out on the 5547 pieces of 1/25.000 scale sheets and digitized map of landslide units in 2923 sheets under the projects. 1:500.000 scale 18 pieces Landslide Inventory Map of Turkey were published and offered to users at the end of 2009.

- **Determining Potential Land Use Studies:** In these studies, basic earth science data and properties of natural disaster are investigated to take advantage of regional land use planning. For this purpose, in the region researches are being carried out on topics such as geology, hydrogeology-hydrology, geomorphology, general engineering geology, seismicity, mass movements, determination of flood areas to benefit from planning of land use In this context, these studies have been completed for 49 cities in Turkey.
- **Marine Geology and Geophysics Researches:** MTA Sismik-1 Research Vessel, assumed an important role, was made earth science studies for different purposes in all the seas and territorial waters. In this context, projects are prepared with local and foreign universities. Thus, recognition of the seas surrounding the three sides of our country, determination of features and to determine the economically important natural resources are intended. MTA Sismik-1 Research Vessel, to be completed lifetime in 2003, was donated to Istanbul Technical University Faculty of Maritime for use maritime training activities. Under the General Directorate of MTA, the marine seismic surveys carried out in rented boats, and small vessels between the years 2003-2010. Marine research will continue with the MTA-Selen Boats, construction was completed in 2011. By 2015, planned to give a new seismic research vessel, MTA will continue to do research on the shallow and deep seas.
- **Investigation of Crustal Structure of Anatolia Northwest with Geophysical Methods:** Between 2006-2010, with MTA's proposal and support of Ankara University and Cumhuriyet University, "Investigation of Crustal Structure of Northwest Anatolia with Geophysical Methods" project was carried out. With this aim 1) from gravity studies which done simultaneously together with MT (magneto telluric) measurements studies, adding detailed density distribution map of the region 2) with this data, creating geoelectric models and geodensity models, 3) carried out by the MTA, increase information in the working area of Turkey Regional Gravity Maps project, 4) providing information about geometry of deep faults at the updating "Updating the Active Fault Map of Turkey project" conducted by MTA Department of Geology, 5) by providing lacking information of deep crust structure at the earthquake studies for the researcher, in the international science area increase the competition.

PUBLICATIONS

Kuşçu, İ. ve Okamura, M., 2008. 17 Ağustos 1999 Depremi Sonrası İzmit Körfezi Kıyı Ötesi Araştırmaları. MTA, 4 , 263 s., Ankara.

Herece, E., 2008, Atlas of the East Anatolian Fault (DAF). MTA 13, 359 s., Ankara

Duman, T.Y., Ş. Olgun, T. Çan, H.A. Nefeslioğlu, S. Hamzaçebi, S. Durmaz ve Ş. Çörekçioğlu, 2009, Landslide Inventory Map of the Turkey -1/500000 Ankara Section, MTA - 19, 17 s. Ankara.

Kuşçu, İ., Okamura, M., Matsuoka, H., Yamamori, K., Awata, Y. and Özalp, S., 2009, Recognition of Active Faults and Stepover Geometry in Gemlik Bay, Sea of Marmara, NW Turkey. Marine Geology, 260, 90-101, doi: 10.1016/j.margeo.2009.02.003

Özaksoy, V., Emre, Ö., Yıldırım, C., Doğan, A., Özalp, S. and Tokay, F., 2010, Sedimentary record of Late Holocene seismicity and uplift of Hersek restraining-bend along the North Anatolian Fault in the Gulf of İzmit. Tectonophysics, 487, 33-45, doi: 10.1016/j.tecto.2010.03.006

Emre. Ö., 2010, Active Fault Map of Turkey. 1:250.000 scale Çanakkale (NK 35-10b) Section. MTA 1:250.000, N: 1, 40 s., Ankara, Turkey.

Emre. Ö. ve Doğan, A., 2010, Active Fault Map of Turkey 1:250.000 Scale Ayvalık (NJ 35-2) section. MTA 1:250.000 , N: 2, 32 s., Ankara, Turkey.

Emre. Ö., Doğan, A., Özalp, S. ve Yıldırım, C., 2011, Active Fault Map of Turkey 1:250.000 Scale Bandırma (NK 35-11b) Paftası. MTA 1:250.000 ,N: 3, Ankara, (press).

Emre. Ö., Doğan, A. ve Özalp, S., 2011, Active Fault Map of Turkey 1:250.000 Scale Balıkesir (NJ 35-3) Paftası. MTA 1:250.000, N: 4, Ankara, Türkiye (press).

p. TÜBİTAK MAM EARTH AND MARINE SCIENCES INSTITUTE

http://www.mam.gov.tr/english/YDBE

Earth and Marine Sciences Institute were first established in the year 1983 as Earth Sciences Division of Basic Sciences Research Institute. During the period from its foundation until 1996, it acquired experience and know-how in Earth Sciences and a strong infrastructure was built for measurement and evaluation. From 1996 until today, when it was directly connected to TUBITAK MRC Directorate, it defined its mission and vision in parallel to reorganization of Marmara Research Institute and carried out its studies. In the year 1998, it acquired the status of being a research institute connected to TUBITAK MRC Directorate.

Having the vision of being a Center of Excellence in research on active tectonics and underground resources areas countrywide and in our region and the mission of carrying out applied research in active tectonics and underground resources focusing on social benefit by multidisciplinary approaches based on modeling and measurement and dissemination of information acquired by these researches. It inclined on the earth sciences problems awaiting solutions in the light of the progress in earth sciences in the world.

Emphasizing on being a customer oriented institute, its studies were concentrated on three different areas, namely Earthquake Processes, Geophysical Processes and Geochemical Processes. Its name was simplified to become Earth and Marine Sciences Institute at the start of year 2005.

VISION

To become "A Center of Excellence" carrying out researches in the areas of active tectonics and the underground resources in Turkey and in the Region

MISSION

To accomplish social benefit focused applied researches by multidisciplinary approaches based on measurement, monitoring and modeling in the areas of active tectonics and the underground resources and to provide dissemination of acquired know-how

TARGETS

•To let information acquired through researches oriented toward geologic originating disasters to be used as a basis for disaster preparation planning in order to increase social welfare

•To raise public awareness and authorities on the geological processes related to Medical Geology by conducting multi-disciplinary pioneering researches

•To carry out researches in cooperation with the implementing organizations, on reevaluation of the petroleum and natural gas regions; in order to develop the limited hydrocarbon resources in Turkey

•To increase the number of experienced researchers in Earth Sciences areas where the Institute determines an R&D gap in order to accomplish social benefit focused studies at minimum financial cost to the public

QUALITY POLICY

EMSI conforms to TUBITAK-MRC' s quality and environment policy, as formalized in its EN ISO 9001-2000 Quality Management System and 14000:2004 Environment Management certifications. As a consequence, EMSI ensures maximum benefit to all its stakeholders within Turkey and abroad, competing in the international arena as a pioneer research and technology institute performing applied research based on measurement, computer aided modeling and remote sensing with the target of sustainable progress at information, science and technology with its human resources.

Earthquake Processes:
•Earthquake seismology
•Seismic micro-zonation
•Crustal deformation and structure
•Earthquake risk studies
•Active tectonics

Geophysical Processes
•Seismic, gravity-magnetic, electric-electromagnetic data acquisition and processing
•Marine geophysics and sea bottom characterization techniques
•Geodetic applications

Geologic and Geochemical Processes
•Bio-geochemical and organic geochemical studies oriented towards environment and petroleum studies
•Petroleum, earth gas and coal gas research
•Hydro-geochemical studies
•Quantitative sedimentary basin analysis and modeling
•Medical geology application

Techniques Applied
•Space Geodesy - (GPS, InSAR)
•Remote Sensing
•Geographic Information Systems (GIS) Applications
•Inner earth Imaging Systems
•Deformation Monitoring Methods
•Seismic Modeling
•Tectonic and Geologic Mapping
•Well logs
•Organic Geochemistry and Organic Petrology
•Basin Modeling

LABORATORIES

•Environmental and Petroleum Geochemistry Laboratory (EPGL)
•Active Tectonics Research Laboratory

COOPERATIONS

International
MIT, USA
Univ. of California, Berkeley, USA
Darmstad University, Germany
CNRS, IPGP, France
Forschungszentrum Jülich, Germany
GEOMAR (Kiel Univ.), Germany
NATO, SACLANTCEN, Italy
Academy of Sciences of Ukraine
GeoEcomar (Romania)

National
General Directorate of Disasters Affairs
General Directorate of Mineral Research & Exploration
Turkish Coal Enterprises
Turkish Petroleum Corporation
Istanbul Metropolitan Municipality
Kocaeli Metropolitan Municipality
Turkish Navy
General Commander of Mapping
Boğaziçi University
Cumhuriyet University
Çukurova University
Dicle University
Dokuz Eylül University
Ege University
Eskişehir Osmangazi University
Fırat University
Hacettepe University
İnönü University
İstanbul Technical University
Süleyman Demirel University
Kahramanmaraş Sütçü İmam University
Yıldız Technical Universit

PROJECTS

•European Plate Observing System (EPOS)

Duration: 08.11.2010 – 31.12.2014

•Site Classification and Risk Evaluation for The Bursa Province
Duration: 01.01.2011 – 31.12.2013

•Processing Russian and European Earth Observations for Earthquake Precursors Studies (PRE-EARTHQUAKES)
Duration: 01.01.2011 – 31.12.2012

•SCHOOL SEISMOLOGY PROJECT (SİSMOKUL)
Duration: 18.08.2010 – 17.08.2012

•Multi-Disciplinary Earthquake Researches in High Risk Regions of Turkey Representing Different Tectonic Regimes (TURDEP)
Duration: 01.11.2005 - 31.11.2010

•Determination of Underground Coal By Applying Integrated Seismic Methods And Investigation of Coalbed Gas Potential of Soma Tertiary Basin
Duration: 01.03.2009 – 31.08.2012

•Investigation of Possible Active Faults in Istanbul Land Area and Development of Landslide Determination and Monitoring Methodologies by Multidisciplinary Researches in Istanbul Metropolitan Area
Duration: 01.06.2009-30.05.2012

•National 1MV Accelerated Mass Spectroscopy (AMS) Laboratory
Duration: 01.01.2009 - 31.12.2012

•Upgrading Seismicity Monitoring Infrastructure Capacity in the Sea of Marmara
Duration: 15.05.2006 - 20.10.2009

•Scenarios For Hazard-Induced Emergencies Management (SCHEMA)
Duration: 11.11.2007 - 01.07.2010

ACTIVITIES

•23-24 November 2009, Turkish- Japanese Earthquake Workshop, TUBITAK, Gebze, TURKEY

•12 October 2009, TURDEP Project 8. Workshop

•22-23 May 2009, TURDEP Project 7. Workshop

•9-11 March 2009, International Geo-Hazards Research Symposium, Istanbul

•21 November 2008, TURDEP Project 6. Workshop

•20 June 2008, TURDEP Project 5. Workshop

•08-09 November 2007, Active Tectonic Research Group - 11. Workshop

•07 November 2007, TURDEP Project 4. Workshop

•15 June 2007, TURDEP Project 3. Workshop

•25-26 January 2007, OECD- GSF Workshop On Earthquake Science and Its Contribution To Society

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r. SİVAS CUMHURİYET UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://www.cumhuriyet.edu.tr

s. HACETTEPE UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOLOGY

http://www.hacettepe.edu.tr/

t. İSTANBUL TECNIC UNIVERSTY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://www.geop.itu.edu.tr

Research Labs

Prof.Dr. Nezihi CANITEZ Geophysical Data Processing Laboratory
Applied Geophysics Laboratory
Palaeomagnetism Laboratory
Seismology Laboratory
Computational Geophysics Laboratory

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u. MIDDLE EAST TECHNICAL UNIVERSITY DISASTER MANAGEMENT IMPLEMENTATION AND RESEARCH CENTER

http://www.dmc.metu.edu.tr

The Center was created in November 1997 under the UNDP cost-sharing project "Improvement of Turkey's Disaster Management System".

Objectives:

To provide consultancy and project support to domestic and international institutions with a multidisciplinary approach for mitigation of natural and manmade disasters.

To organise seminars, training courses, in-service training to officials or to community within the framework of disaster management.

Arrange research, implementation and improvement activities about disaster management.

Organise or assist to organise scientific and professional meetings about disaster management.

NATO Science for Peace Programme, Seismic Arrays in Turkey SfP977484 Science for Peace Programme, SfP977484: National Seismic Arrays in Turkey and

TUBITAK ICTAG1578: Construction of Strong Ground Motion Recording Arrays in Local Areas

Our Center has constructed three strong ground motion arrays in cooperation with General Directorate of Disaster Affairs Earthquake Research Department. A total of 38 ETNA type devices were installed with the support of NATO and TUBITAK.

In this Internet site, site properties and up-to-date earthquake records of stations registered by BYT-NET, DAT-NET, MAT-NET, arrays can be found.

RESEARCH

Current :

- "Strengthening citizen participation in disaster management. Pilot project in Bursa".
- "A feasibility assessment of the amendments required in the existing disaster legislation concerning necessary changes.".
- "Prepare pilot regional plans for disaster management."

Completed :

- A round table meeting in December 1998 and December 1999.
- Turkish-Japanese international workshop on "Recent Erathquakes and Disaster Management in March 1999."
- Training of GDDA personnel in data management and access application.
- A seminar for the instuctors in Civil Defence College about "Training of fire brigades in light search and rescue operation" by Joe Bishop.
- A seminar on citizen participation and social awareness by Joe Bishop.
- A seminar to the related agency personel about the GIS Applications in Disaster Management in June 1999.
- Earthquake Symposium in March 2000.
- The Third Global Disaster Information Network Conference in April 2000.

v. FIRAT UNIVERSITY FACULTY OF ENGINEERING GEOLOGICAL ENGINEERING

http://portal.firat.edu.tr

Our department was founded in 1977. There are 25 Academic Staff within the department.

w. ATATÜRK UNIVERSITY

http://www.atauni.edu.tr

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR COMMISSION OF TURKEY FOR 2008 – 2011

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS 28 JUNE – 7 JULY, 2011

VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR COMMISSION OF TURKEY

(www.mta.gov.tr)

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CONTENTS

1- INTRODUCTION

The Turkish National Commission for Volcanology and Chemistry of the Earth's Interior (TAVCEI) had continued his work in the period between 2007-2010 on the coordination of the scientific studies on magmatology and geochemistry in Turkey.

The commission is sponsored and supported by the General Directorate of Mineral Research and Exploration (MTA), which corresponds to the Geological Survey in many countries. MTA not only provides the secretarial support but also the web-page of the Commission. The scientific efforts of the Commission are flanked by a considerable number of scientists from the Geology Departments of the leading Universities such as İstanbul Univ., İstanbul Technical Univ., Black Sea Univ., Selçuk Univ., Middle East Technical Univ., Hacettepe Univ., 9 Eylül Univ., Çukurova Univ. etc. From these about 100 scientists are actively involved in the sub-commissions and committees. A group of graduate students and young scientists are also implicated in the activities.

The main goal of the Commission is to coordinate the studies and realize databases on the geochemical analyses and geochronological age data on igneous rocks. Moreover it systematically collects the published documents on related topics and transfers information on IAVCEI-related topics via its mail-group and web-page.

Further goals of the Commission are

1- to organize courses, summer-schools, work-shops, symposia and congresses on related topics,
2- to inform the public on the volcanogenic hazards
3- to provide basic knowledge on the igneous processes in the Earths interior within the framework of popular science.
4- to coordinate the multi-disciplinal studies

The Sub-Commissions and Working Groups of TAVCEI are structured according to the popular issues in the country and include:

1- SC of Volcanology and Geothermal Energy
2- SC of Geochemistry
    a- WG on Granitoids
    b- WG on Ophiolites
    c- WG on Alkaline magmatism
3- Isotope Geochemistry and Geochronology
    a- WG for Data Bank of radiometric ages of plutonic rocks
    b- WG for Data Bank of radiometric ages of volcanic rocks
4- Pyroclastic Deposits
5- Igneous Mineral Deposits
6- Data Bank on Geochemistry

7- Geological Heritage and Natural Monuments of igneous origin

8- Igneous Terminology in Turkish

9- WG for TAVCEI-Bulleten

10- WG for Documentation

In the following the Commission reports its activities and a list of related publications in the 2007-2010 interval.

Further activities of the TAVCEI can be seen on the following web-address of the Commission: **http://www.mta.gov.tr/tuvak**

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