



KANDİLLİ
OBSERVATORY AND
EARTHQUAKE RESEARCH
INSTITUTE
1868

BELBAŞI

NUCLEAR TESTS MONITORING CENTER

INFORMATION BOOKLET

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THE MISSION OF BELBASI

We can briefly explain the goals of the Belbasi Nuclear Tests Monitoring Center as follows,

- * To ensure 24/7 operation of 14 seismic stations (6 SP, 6MP, 2BB) of Belbasi Center,
- * To carry out the maintenance and repair of these stations and their equipments in accordance with the annual plans,
- * Sending data simultaneously to the International Data Center in Vienna, AFTAC and KOERI in accordance with international norms,
- * To participate in the technical meetings of the CTBTO and to initiate strategic researches on relevant subjects.

HISTORY OF BELBASI



Figure 1: A view from the old Belbasi Center

The Belbasi array has a long history in both its technical evolution and mission. In 1951, it was established as a four-element seismic array as part of the international agreements (NATO and DECA). At that time the station code (name) was BSRS (Belbasi Seismic Research Station).

The station was upgraded to a sixteen-element short-period array in 1966. The seismometers were replaced with 23900 instruments in 1972. A three-component Teledyne Geotech 18300 instrument added to array in 1978. A KS3600 system installed in 1984, enabled recording of short period and broad band data.

The city of Ankara has expanded since this system became operational. Due to the noise created by new housing, industrial facilities, and nearby quarries, data quality has been drastically reduced. Due to the high seismic noise, the number of instruments was reduced from sixteen short-period seismometers to just seven between the years of 1983 and 1993. Since continued expansion of the city was further degrading seismic operations, new array locations throughout central Anatolia were surveyed and an array location near the town of Keskin, approximately 120 km away from the original Belbasi seismic station, was selected because of its geological setting and low noise.

In 1995 the construction of the new array was started in Keskin. This site was selected as a primary seismic array for the International Monitoring System and given (reserved) the name BRTR for the Comprehensive Nuclear Test Ban Treaty. In July 2000 the Keskin array installation was completed, composed of six short-period stations.

COMPREHENSIVE TEST BAN TREATY ORGANISATION

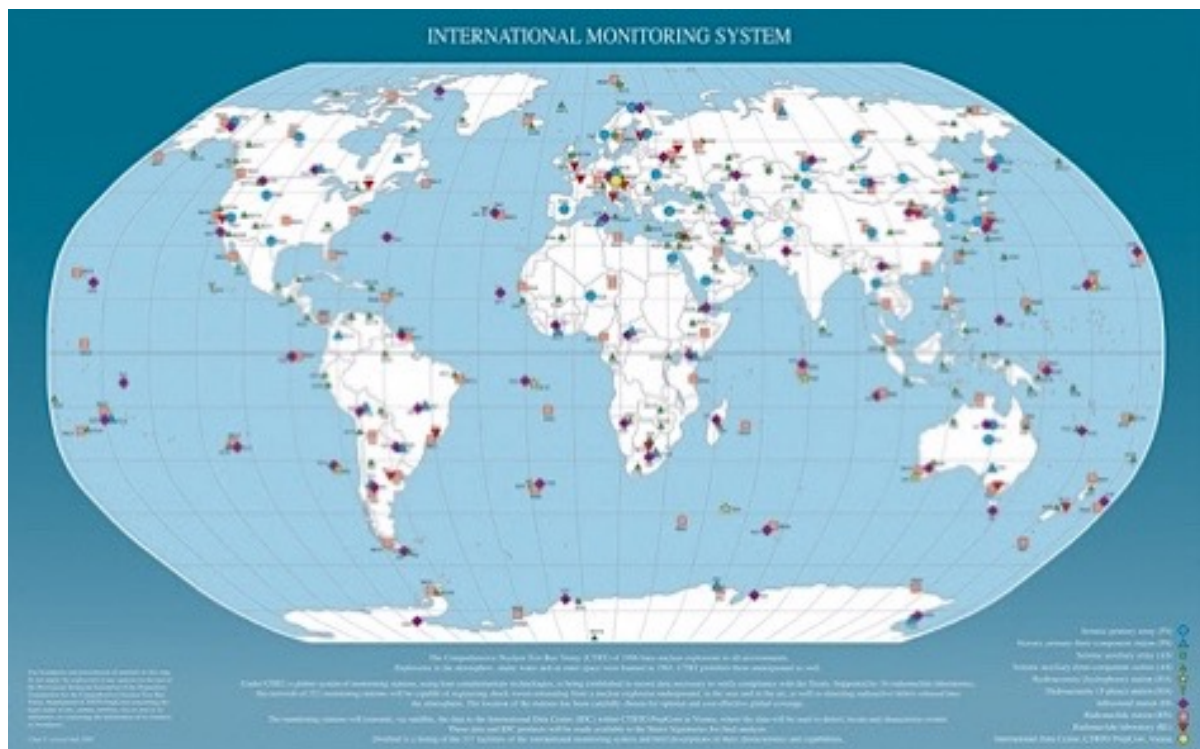


Figure 2: Global distribution of IMS stations and laboratories

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) bans nuclear weapon test explosions and constrains the development and qualitative improvement of nuclear weapons and end the development of advanced new types of these weapons. The organization is established in Vienna, Austria, which houses International Monitoring System (IMS) and International Data Centre (IDC). IMS uses four verification methods: Seismic, hydroacoustic, infrasound and radionuclide. IMS comprises a network of 337 monitoring stations and 40 noble gas laboratories that monitor the earth for evidence of nuclear explosions on earth. Once established and certified as meeting all technical requirements, monitoring stations are provisionally operated by local institutions under contracts with the PTS.

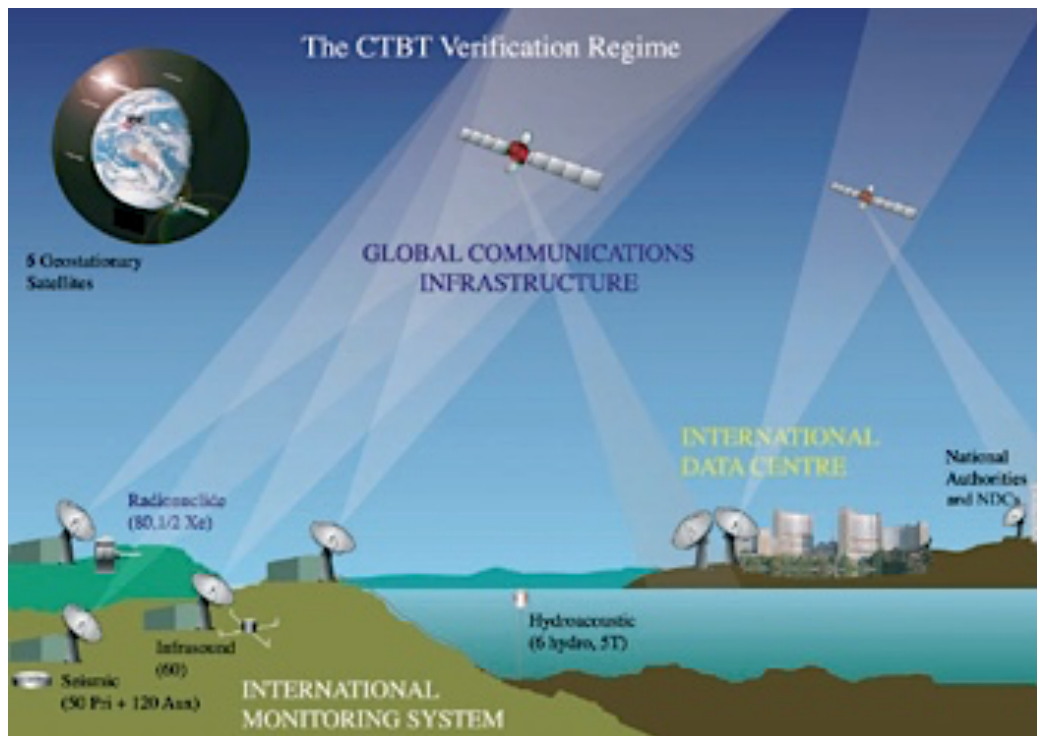


Figure 3: The CTBTO verification regime depicting the four technologies used by IMS

The CTBTO seismic network is composed of 50 primary stations, which send their data in real time to the International Data Centre (IDC) in Vienna, and 120 auxiliary stations that make their data available upon request from the IDC. The principal use of the seismic data in the verification system is to locate seismic events and to distinguish between an underground nuclear explosion and the numerous earthquakes that occur around the globe. The IMS is supported by the International Data Centre. IDC uses IMS data to detect, locate and analyse events, and the first automated products are released within two hours. The products comprise lists of seismoacoustic events and radionuclides that have been detected by the stations. Analysts subsequently review these lists in order to prepare quality-controlled bulletins. Global coverage is being ensured through the Global Communications Infrastructure (GCI), which receives and distributes data and reporting products relevant to Treaty verification. Data are received and distributed through a network of satellites. *(Figures are produced by CTBTO)*

BELBASI ARRAYS

Station Features



Figure 4: Panoramic view from the site BR101 of Keskin array.

Belbasi Arrays (Treaty code: PS-43) is composed of two sub-arrays (Ankara and Keskin) is shown in the below Figure the medium-period array with 40 km radius located in Ankara and the short-period array with 3 km radius located in Keskin. Each array has a broadband element located at the middle of the circular geometry. Short period instruments are installed at depth 30 meters from the surface while medium and broadband instruments are installed at depth 60 meters from surface. Freewave Wireless Data Transceivers which form the basis of RDL provide intra-site communications from all instrument sites. The data from both arrays comes to CRB (Central recording Building) and data is sent to IDC via satellite (VSAT) whereas KOERI (Kandilli Observatory and Earthquake Research Institute) and AFTAC (American Air Force Technical Application Center) receive the data via telephone lines.

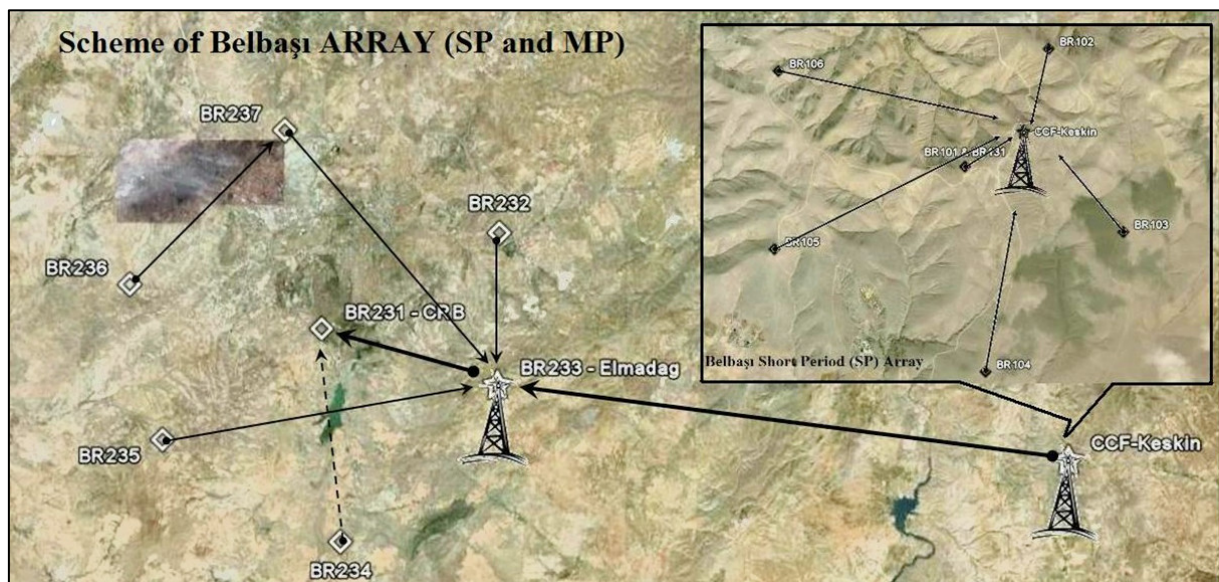


Figure 5: Schematic representation of Belbasi medium and short period seismic arrays

SEISMIC INSTRUMENTS

Three types of instruments are in use at Ankara and Keskin seismic arrays. The KS54000 borehole seismometers produced by the company Teledyne Geotech USA are installed at Medium period array as medium, and broadband instrument, and as a broadband seismometer at the center of Keskin array. Short period 23900A seismometers are installed at the Keskin array. 23900A seismometers are also produced by the Geotech company. In 2014, the KS54000 at site BR131 (Keskin) was replaced by Guralp CMG-3TB borehole broadband seismometer.

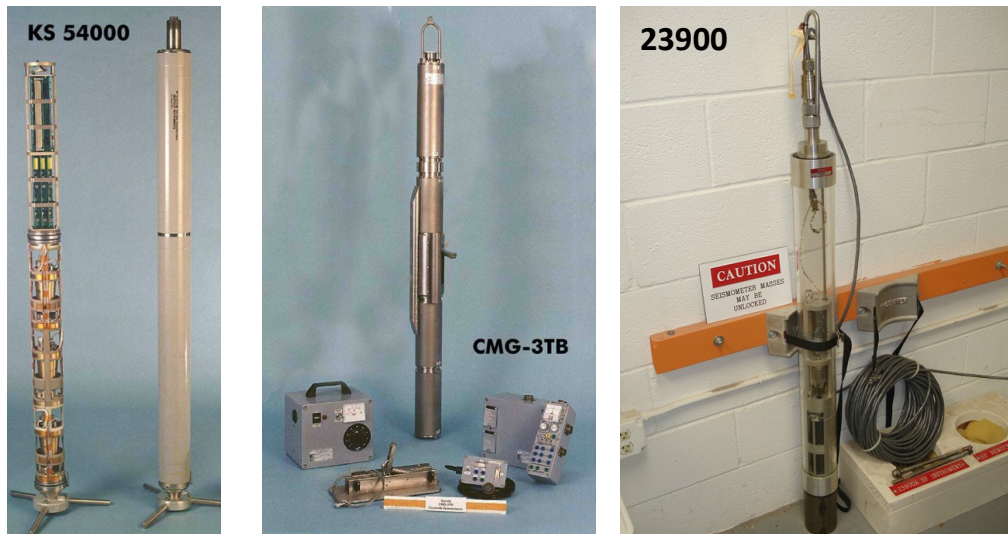


Figure 6: The seismic instruments that are being used at Belbasi arrays.

DATA AVAILABILITY

Data availability of BRTR-PS43 since 2004. Microwave Systems were available for 2004 and late 2005. RDL (Radio Data Link) Systems cover the rest that availability shows variety but increasing trend to year 2016 due to improvements on the data acquisition related to RDL equipments. Green line indicates IMS requirement limit (98%) for data availability. IMS stations are expected to satisfy this limit in order to be considered as mission capable.

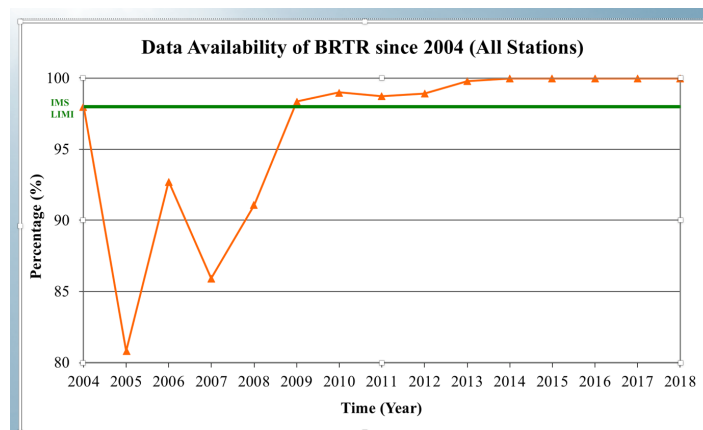


Figure 7: Data availability since 2004 to 2018 April

DATA ACQUISITION

There are 4 types (6dB,15dB,21dB and 24 dB) of antennas are currently used in the communication system of BRTR. 6 and 15dB antennas for short, such as SP Array (~2 km radius), 21 and 24dB antennas for long such as MP Array (~20 km radius). The distance between SP an MP array is approximately 60 kilometers line.

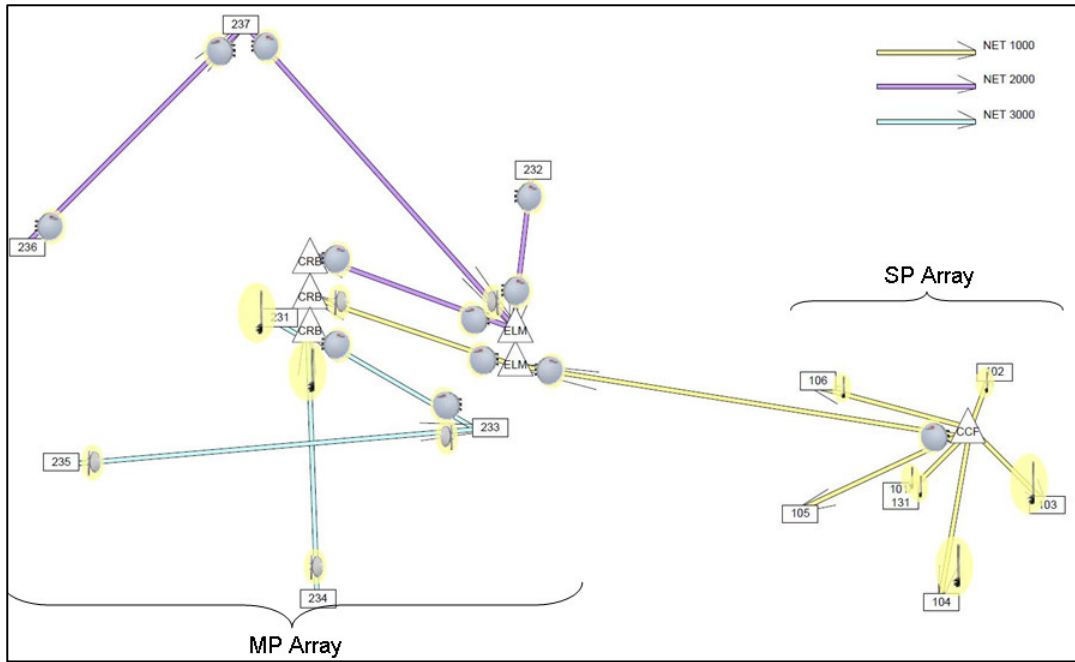


Figure 8: Communication and Antenna Schema Of Belbasi Seismic Array

SCIENTIFIC AND TECHNICAL MEETINGS

Working Group B Meetings

The Preparatory Commission is composed of a plenary body and the Provisional Technical Secretariat (PTS), which assists the Commission in carrying out its activities. The Plenary body is assisted by three groups:

i) Working Group A, which deals with budgetary and administrative matters, such as the annual budget, financial and staff regulations and rules and legal issues.

ii) Working Group B, which deals with the examination of verification issues.

Both Working Groups make proposals and recommendations for consideration and adoption by the Preparatory Commission.

Regular participation to the Working Group B meetings is ensured at the managerial level. Our current NDC Manager, Dr. Necmioğlu, is also co-Task Leader on Testing, Provisional Operation and Performance Assessment since 2016 mainly dealing with the progress in installation and certification of IMS facilities, integration of these facilities into IDC processing, and certification of radionuclide laboratories, PTE results for radionuclide laboratories, IMS station failure analysis, new requests for reduced assessments as appropriate, station operator performance, progress of GCI commissioning achieved and plans for future, data availability statistics, IDC performance (including infrastructure, product timeliness and quality), progress in executing the IDC Progressive Commissioning Plan, status and plans for PTS developments in ATM and cooperation with the WMO, status of application software for waveform and radionuclide analysis, consideration of guidelines for testing and provisional operation of the IMS, IDC and GCI and the review of progress in implementation of the evaluation programme of work. He served as Task Leader for Performance Assessment from 2011 to 2016.

National Data Center Workshops

National Data Center (NDC) Workshops are organized to obtain feedback from experts of NDCs, as customers of the Provisional Technical Secretariat (PTS), on the performance of the verification system in order to foster its continual improvement and on the set of Key Performance Indicators (KPIs) which would best represent and measure such performance. These workshops provide also a venue to evaluate NDC participations at the National Preparedness Exercises (NPEs).

Science & Technology Conferences

Our technical experts participate the CTBTO Science & Technology Conferences every two years organized by the PTS in order to gain valuable insights about the technical and scientific advancements in the field as well as to present their scientific studies related to CTBT.

AFTAC-KOERI Joint Scientific Commission Meetings

AFTAC representatives and KOERI staff come together once a year to discuss the developments and problems of the previous year and the improvements to be made in the years to come.

BELBASI TEAM

MANAGER:

Dr. Öcal Necmioğlu



Dr. Necmioğlu has a BSc degree in Geophysical Engineering (Istanbul Technical University – 1997) and PhD in Geophysics (Boğaziçi University, Kandilli Observatory and Earthquake Research Institute (BU-KOERI) – 2014). He started his career as Field Geophysicist (Processing Geophysicist and Seismic Analyst) at Western Geophysical, Global Offshore Operations during 1997-2001. During 2001-2008, he worked for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) as Seismic, Hydroacoustic and Infrasonic Analyst. He joined Belbasi Nuclear Tests Monitoring Center of BU-KOERI in 2008 and has been appointed as the Vice-Manager of Belbasi Nuclear Tests Monitoring Center in 2014. He was the deputy manager during October 2014 – July 2015 and was appointed as the Manager of the Center in July 2015.

Dr. Necmioğlu has been acting as a national delegate for the Technical Working Group (WGB) Meetings of the Preparatory Commission for the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) since 2009 and was a WGB Task Leader on Performance Assessment during 2011-2015. Starting 2016, Dr. Necmioğlu is a WGB Task Leader on Testing, Provisional Operation and Performance Assessment mainly dealing with the progress in installation and certification of IMS facilities, integration of these facilities into IDC processing, and certification of radionuclide laboratories, PTE results for radionuclide laboratories, IMS station failure analysis, new requests for reduced assessments as appropriate, station operator performance, progress of GCI commissioning achieved and plans for future, data availability statistics, IDC performance (including infrastructure, product timeliness and quality), progress in executing the IDC Progressive Commissioning Plan, status and plans for PTS developments in ATM and cooperation with the WMO, status of application software for waveform and radionuclide analysis, consideration of guidelines for testing and provisional operation of the IMS, IDC and GCI and the review of progress in implementation of the evaluation programme of work.

VICE MANAGER:

Dr. Serdar Koçak



Dr. Kocak has a BSc degree in Astronomy and Space Sciences in common with Mathematics (Ankara University – 1997), MSc and PhD in Astronomy and Space Sciences (Ankara University Graduate School of Natural And Applied Sciences completed in 2000 and 2007, respectively). He started his career as a station operator at Belbasi Nuclear Tests Monitoring Center in 1998. He attended AFTAC (American Air Force Technical Application Center) Field Maintenance Seismic Field Site Maintenance and Subsurface Systems Maintenance training course, in 2000 and 2009 respectively, in Texas, USA. He became station manager of maintenance at Belbasi Nuclear Tests Monitoring Center in 2007. He is responsible of all operation and maintenance activities related to Belbasi Nuclear Tests Monitoring Center

and coordinating all necessary maintenance actions with IMS (International Monitoring Systems, Vienna-Austria) and AFTAC.

STATION OPERATORS

Korhan U. Şemin (M.Sc)



Graduated from Istanbul University, Geophysical Engineering program (BSc) in 2001, later that year he was accepted to graduate program in Geophysics at Boğaziçi University, Kandilli Observatory & Earthquake Research Institute. Having earned his MSc degree in Geophysics in 2006, he is now pursuing a PhD degree in the same department. He has started to work for Belbasi Nuclear Tests Monitoring Center during his graduate education as a research assistant (2004 – 2007). Currently, he is working at Belbaşı NTMC as a geophysical engineer and station operator.

T. Cem Destici



He graduated from the Geophysical Engineering of Süleyman Demirel University in 2001. He started to work as a Research assistant in the University Earthquake Research Institute and worked on several different projects of applied geophysics in the Geophysics department between 2003 and 2007. Joined to Belbasi Nuclear Tests Monitoring Center of Boğaziçi University in 2007 and continues his career at the center as a geophysical engineer.

M. Uğur Teoman (PhD.)



After receiving his BSc degree at Physics Engineering from Istanbul Technical University (ITU-Department of Science and Letters) in 2002, Mr. Teoman started his academic career as a graduate student and a research assistant at Boğaziçi University-Kandilli Observatory and Earthquake Research Institute, Department of Geophysics. He earned his MSc degree in 2006 and has finished his PhD in 2016 at the same department. He is currently working for Belbaşı Nuclear Tests Monitoring Center-Turkish National Data Center (NDC) as a geophysical engineer-data analyst.

SUPPORT PERSONNEL

Civil Servant - Ramazan Tüzüner

He started working at Belbasi Nuclear Tests Monitoring Center in 2004 as a civil servant. He graduated from Department of International Relations of Anadolu University in 2013.

Electrician - Ramazan Kurnaz

He started working at Belbasi Nuclear Tests Monitoring Center in 2016 as a electric technican. He is responsible for maintenance of electrical components at Belbaşı Center and all seismic stations. In addition to 20 year of experince in the field. He has successfully finished EKAT (Permission to work with high voltage equipment) training and earned EKAT certificate.

PREVIOUS MANAGERS

Prof. Nurcan Meral Özel (2006-2014)



Prof. Özel was the Manager of the Belbasi Nuclear Test Monitoring Center during 2006-2014 (October). During her tenure, she regularly participated in the Technical Working Group (WGB) Meetings of the Preparatory Commission for the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO).

Özel completed her higher education in Turkey and Japan, obtaining a PhD degree in Seismology from Hokkaido University (Japan) in 1995. She was the Vice-Director of the Bogazici University-Kandilli Observatory and Earthquake Research Institute (BU-KOERI) in Istanbul-Turkey during 2009-2014 (October), also responsible of all seismological operations in BU-KOERI which hosts the 24/7 National Earthquake Monitoring Centre and Istanbul Earthquake Early Warning and Rapid Response System. She was the Head of the Geophysics Department at BU-KOERI during 2013-2014 (October). Previously, she worked at the International Seismological Centre in the United Kingdom during 2002-2004.

Prof. Özel is also the founding coordinator of the National Tsunami Warning Centre operational as of 2012 providing also services to Eastern Mediterranean, Aegean and Black Seas as a regional (Candidate) Tsunami Watch Provider (CTWP) under the framework of Intergovernmental Oceanographic Commission/ Intergovernmental Coordination Group/Tsunami Warning System in the North-eastern Atlantic, the Mediterranean and connected seas region (UNESCO/IOC/ICG/NEAMTWS).

During her professional career which has spanned nearly 30 years, Özel has developed expertise in earthquake source mechanism, global seismology, deep earthquakes in subduction zones, strong ground motion, historical earthquakes, seismic methods of monitoring nuclear tests, tsunami hazard and early warning systems. Özel has led teams and organizations in developing, implementing and operating advanced systems for earthquake monitoring. She has been the coordinator and participant of many international projects funded by the European Union and Japan Government.

Prof. Nurcan Meral Özel has been appointed as the Director of the International Monitoring System (IMS) Division at the CTBTO in Vienna since October 2014. As the Director of the IMS Division at the CTBTO, she is directly responsible to the Executive Secretary for the installation and certification of the network's stations, systems and facilities, as well as the engineering and development of the network and its continuous sustainment. The IMS Division is also responsible for all logistics and shipments associated with the network, as well as the storage and accessibility of all data received from the stations. The complete network consists of 337 facilities, supplemented by 40 noble gas systems, around the globe.

Prof. Niyazi Türkelli (2003-2006)



Prof. Türkelli participated as the national delegate at the Conference on Disarmament for the Ad Hoc Group of Scientific Experts meetings in the United Nations in Geneva (1994-1997) and is the founding Manager of Belbasi NTMC during 2003-2006. He was a Professor in the Department of Geophysics (retired in December 2015) and was the Deputy Director of KOERI during 2004-2006. He was a Member of the IRIS-International Development Seismology Committee (2010-2013.) Prof. Türkelli was the Head of the Seismological Observatory at KOERI during 1992-1999 and was responsible for establishment online/dial-up Broad Band Seismic Networks in Turkey and establishment of the Data and Information Center for KOERI. During 1985-1991, he was Assistant Professor at the Seismological- Geophysical Observatory of the King Saud University in Riyadh-Saudi Arabia responsible for the planning, installation and operation studies of the Saudi Arabian National Seismic Network.

TECHNICAL TRAININGS

Technical courses that our personnel attended since 2000 are as follows;

- Seismic Field Site Maintenance, AFTAC (2000) Participant: Serdar Koçak
- IMS Technical Training Programme for Station Operators, CTBTO (2003) Participant: Korhan U. Şemin
- Global Seismological Observation Course, Japan, (2006) Participant: Korhan U. Şemin
- Advanced Training Course for NDC Technical Staff, CTBTO (2008) Participant: T. Cem Destici
- Subsurface Systems Maintenance, AFTAC (2009) Participants: Serdar Koçak, T. Cem Destici
- Technical Training Programme for Waveform Station Operators, CTBTO (2010) Participant: Serdar Koçak
- NDC Capacity Building: NDC Analyst Training, CTBTO (2012) Participant: Korhan U. Şemin
- The ARISE training School at the Observatoire de Haute Provence, (2013) Participant: T. Cem Destici
Regional Training Course on NDC Capacity Building: Access and Analysis of IMS Waveform Data and IDC Products for countries in Latin America and the Caribbean (LAC), Eastern Europe (EE), and South-East Asia, the Pacific and the Far East (SEAPFE), CTBTO (2013) Participant: T. Cem Destici
- Technical Training for PKI Operators on Public Key Infrastructure and Data Surety (2014), Participants: Serdar Koçak
- NDC Capacity Building: NDC Waveform Analyst Training Course (2015) Participants: Serdar Koçak
- NDC Capacity Building: NDC Waveform Training Course using SeisComp3 from 19 to 23 October 2015 Potsdam, Germany: Korhan U Şemin
- Seismic Field Site Maintenance, AFTAC (2017) Participant: Serdar Koçak, Korhan Şemin

PUBLICATIONS & PRESENTATIONS

Scientific Papers

- Detection and Identification of Low-magnitude Seismic Events near Bala, Central Turkey, Using Array-based Waveform Correlation; Semin, K.U., Meral Ozel, N., Necmioglu, O., Seismological Research Letters Volume 82, Number 1, January/February 2011
- Kuleli S., E. Zor, N. Türkelli, E. Sandvol, D. Seber, and M. Barazangi, "The IMS Belbasi Seismic Array (BRAR) in Central Turkey", Seismological Research Letters, V.72, N:1, 60-69, January/February 2001

Oral and Poster Presentations

2017

- Shear-wave Attenuation Structure of Central Anatolia Using Full Seismogram Envelope; K. Semin, N.M. Özel
- Selected Research Activities of Turkish NDC; O. Necmioglu, K. Semin, M.U. Teoman, S. Altuncu Poyraz, S. Kocak, C.T. Destici

2016

- Seismic Analysis of Three Bomb Explosions in Turkey; Poster Presentation; K. Semin, O. Necmioglu, S. Kocak, C. Destici, U. Teoman, N. Ozel, 2016 AGU Fall Meeting, San Francisco, CA, U.S.A.

2015

- Ground Motion Scaling Study in Central Anatolia Region, Turkey; Poster Presentation; K. Semin, N. Ozel, O. Necmioglu, C. Destici, S. Kocak, U. Teoman, CTBTO Science & Technology Conference 2015, Vienna, Austria 22-26 June 2015

2014

- NPE 2013 event analysis and results by Turkish NDC, NDC Evaluation Workshop 2014, 12 – 16 May 2014 Vienna, Austria (Poster); Semin K.U., N.M. Ozel, C. Destici, O. Necmioglu, S. Kocak, U. Teoman (2014).

2013

- Analysis of infrasound event of NPE 2012 at Turkish NDC using WinPMCC, ARISE Training School 3-5 June 2013, Observatoire de Haute-Provence, St.Michel l'Observatoire, France (Poster); Ozel N. M., S. Kocak, K. U. Semin, O. Necmioglu, T. Cem Destici, U. Teoman (2013).
- Investigation of P-Wave Backazimuth and Slowness Residuals at Small-Aperture Keskin Seismic Array (BRTR), Turkey, CTBTO: Science & Technology Conference, Vienna, Austria (Oral Presentation); Semin K.U., N. Ozel, T. Destici, O. Necmioglu, S. Kocak, (2013).
- The Analysis of DPRK Nuclear Test of February 12, 2013 by Belbasi Nuclear Tests Monitoring Center-KOERI, CTBTO: Science & Technology Conference, Vienna, Austria (Poster);
- The Analysis of North Korea's Nuclear Tests by Turkish National Data Center, 2013 AGU Fall Meeting, San Francisco, CA, U.S.A.; Özel N.M., K. U. Şemin, T. Cem Destici, Ö. Necmioglu, S. Koçak, M. Uğur Teoman (2013).

2012

- Analysis and results of NDC Preparedness Exercise (NPE 2012) by Turkish NDC, NDC Evaluation Workshop 2012, 1 October 2012, Asuncion-Paraguay; Semin, K.U., C. Destici, O. Necmioglu, S. Kocak, N.M. Ozel (2012)

2011

- Scientific Activities of Turkish National Data Center (CTBTO); oral presentation at the International Workshop on Seismicity and Earthquake Engineering in the Extended Mediterranean Region (RELEMR 2011); Nicosia, Cyprus 28 February – 3 March 2011
- Kocak, N.M. Ozel, K. Semin, C. Destici, O. Necmioglu and U. Teoman (2011). Operations and Maintenance of BRTR (PS43), Oral Presentation.
- Ozel, N. M., Kemerait, R., Kocak, S., Semin, K. U., Necmioglu, O., Destici, T. C., and Teoman, M. U., (2011). Long Term – Real time Background Noise monitoring Around BR235, 8-10 June 2011 CTBTO: Science & technology Conference, Viyana (Poster)
- Semin, K. U., Ozel, N. M., (2011). Scattering and intrinsic attenuation structure in Central Anatolia, Turkey using BRTR (PS-43) array data, 8-10 June 2011 CTBTO: Science & technology Conference, Viyana (Oral presentation)
- Semin, K. U., Ozel, N. M., and Necmioglu, O., (2011). Detection and Identification of low-magnitude Seismic Events Near Bala, Central Turkey, 8-10 June 2011 CTBTO: Science & technology Conference, Viyana (Poster)
- Ozel, N. M., Necmioglu, O., Semin, K. U., Kocak, S., Destici, T. C., and Teoman, M. U., (2011). CTBT Related Activities of Turkish National Data Center, 8-10 June 2011 CTBTO: Science & technology Conference, Viyana (Poster)
- Semin, K. U., Ozel, N. M., and Necmioglu, O., (2011). Assessment of BRTR Array's Detection Capability Using Array-based Waveform Correlation Method, 2011 NDC Evaluation Workshop, 3 – 7 Ekim 2011, Bükreş/Romanya
- Ozel, N. M., Kocak, S., Semin, K. U., Necmioglu, O., Destici, T. C., and Teoman, M. U., Kemerait, R., (2011). Background Noise Analysis of Quarry Activities Around BRTR-PS43 Arrays, 2011 NDC Evaluation Workshop, 3 – 7 Ekim 2011, Bükreş/Romanya
- Semin, K. U., Ozel, N. M., (2011). Study of attenuation structure for Central Anatolia region, Turkey based on Keskin seismic array data, 2011 AGU Fall Meeting, San Francisco, CA, U.S.A.

2010

- Korhan U. Şemin, N.M.Özel, O.Necmioglu, Bala Turkey Earthquake and its Aftershocks Analysis Using Array-based Waveform Correlation and Standard Array Processing (STA/LTA) Methods, ESC 32nd General Assembly, Sept.6-10, Montpellier, France
- M. Ozel, S. Kocak, K.U. Semin, U. Necmioglu, T.C. Destici, and U. Teoman, Improvement of Data Acquisition of the BRTR (PS-43) Seismic Array, Geophysical Research Abstracts, Vol. 12, EGU2010-11427, 2010, EGU General Assembly 2010

2009

- Necmioğlu, Ö., Şemin, K., Meral Özel, N., Koçak, S., Destici, C., Teoman, U; An Evaluation of North Korea's Nuclear Test by Belbaşı Nuclear Tests Monitoring Center-KOERI, International Earthquake Simpozyum, Kocaeli Üniv. 17-19 August, 2009.Nurcan Meral Özel,
- Earthquake Observation and Data Management Systems used at KOERI, Turkish-Japanese Earthquake Workshop, Tussie, Tubitak, 23-24 November, 2009.

- Necmioglu, O., Meral Ozel, N., Semin, K., An Evaluation of North Korea's Nuclear Test by Belbaşı Nuclear Tests Monitoring Center-KOERI, AGU 2009 December, San Francisco, USA.
- Nurcan M. Özel, Korhan U. Semin, Ocal Necmioğlu, Serdar Koçak, T. Cem Destici, Uğur Teoman; Seismic Monitoring of the Quarry Activities and Earthquake Data Analysis using BRTR-PS43 Seismic Array; NDC Evaluation Workshop 2009; 18-23 May 2009, Beijing, P.R. China
- Nurcan Meral Özel, Nükleer Denemelerin Sismik Dizimlerle İzlenmesi, Dizilim Veri İşlem Metodu (Array Processing) , Deprem Patlatma Ayrımı, Nisan 2009, İstanbul Üniversitesi Seminer Etkinlikleri.

2008

- M.Özel "Capacity Building From a National Perspective, Turkish NDC" "Cross-Regional Workshop on CTBTO International Cooperation "Twelve Years of CTBT: Achievements and Perspectives" 1-2 July, 2008, İstanbul Kalyon Hotel.
- Semin K U, Ozel N M, Kocak S., Destici T.C., Teoman U, Necmioglu O., (POSTER) Observation Evaluation of Turkish NDC for Further Development, NDC Evaluation Workshop, 5-9 May, 2008, Baden, Austria
- Semin K.U., Ozel N. M., Detection Capabilities of the BRTR (PS-43) Seismic Array European seismological Commission (ESC), 31. General Assembly, 7-12 Sept. 2008, Crete, Greece.
- Semin K.U., Ozel N. M., Kocak S., Destici T.C., Teoman U, Necmioglu O., Observation Evaluation of Turkish NDC for Further Development, European seismological Commission (ESC), 31. General Assembly, 7-12 Sept. 2008, Crete, Greece.