

# Datça Strong Motion Network, Muğla, Turkey

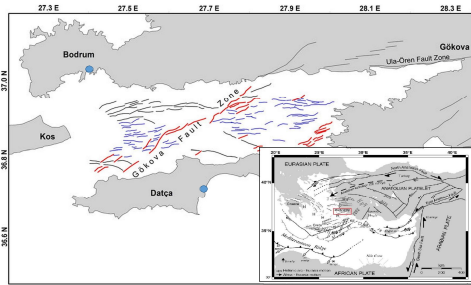
Hakan Alcik\*, Ali Pinar, Ahmet Korkmaz

Boğaziçi University, Kandilli Observatory and Earthquake Research Institute, Earthquake Engineering Department

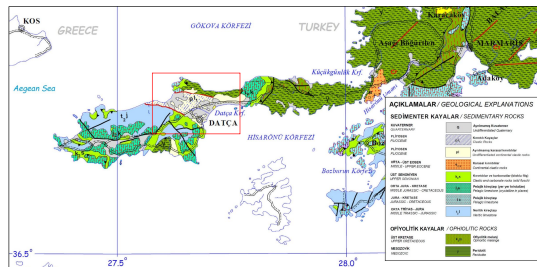
\* contact person: alcik@boun.edu.tr

**ABSTRACT:** Datça peninsula situated on the southwest coast of Turkey is one of the seismically active regions of the southeast Aegean Sea. The Gökova Graben, the Datça faults, and the SE part of the Hellenic Volcanic Arc and Trench system are important seismic sources. Historical documents and instrumental period earthquake records demonstrate high seismic activity and potential seismic hazard in Datça and its surrounding area. It is stated that the ancient city of Cnidus (Knidos) at the far end of Datça Peninsula was affected by the Rhodes earthquake of AD 344. In the instrumental period two strong earthquakes: the 23 April 1933 (Mw=6.5) Kos and the 20 July 1917 (Mw=6.6) Bodrum-Kos, caused damages throughout the Datça peninsula. With the aim of monitoring of regional earthquakes, collecting accurate and reliable data for engineering/scientific research purposes in particular to provide input for future earthquake early warning implementation project on urban environments, a seismic network was set up in the Datça Peninsula on August-September 2018. The network consists of four accelerographs installed in dense settlements: Datça downtown, Reşadiye, Karaköy and Kızlan village. In this presentation, the Datça strong motion network is introduced and future plans for further developments are discussed.

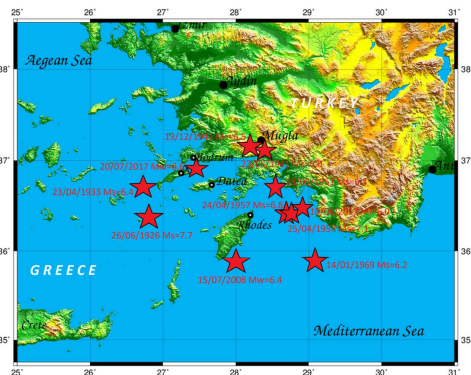
## THE DATÇA PENINSULA - SEISMICITY



- Active fault map of the Gulf of Gökova (red and black lines: strike-slip and normal faults respectively; blue lines are reverse faults and folds. Inset The geodynamic framework of the eastern Mediterranean.



- Geological map of the region



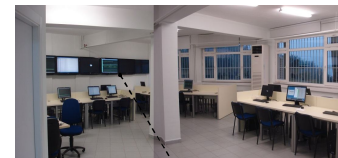
- Instrumental seismicity of the region (M≥2.0)

## RESEARCH OBJECTIVE

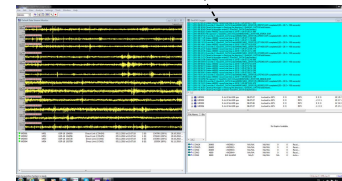
- Reliable information for accurate, effective characterization of the shaking and damage maps for rapid response
- Empirical basis for long-term improvements in seismic micro-zonation
- Seismological data to improve the understanding of earthquake generation at the source and seismic wave propagation
- Determination of *Cumulative Absolute Velocity* threshold levels for an earthquake early warning system
- Applications of state of art technologies for earthquake early warning and rapid reporting systems

## INSTRUMENTATION

- **Installation:** 28 October – 3 November 2018
- **Stations:** Datça downtown, Reşadiye, Karaköy and Kızlan village
- **Recorders:** GSR 18-bit digitizers and acquisition modules, CMG-5T accelerometers, 12Volt DC batteries and GPSs
- **Data transfer:** Real-time data with 3G GSM modems
- **Data acquisition center:** Earthquake Engineering Department (EED)



- Lab. of the EED



- Screenshot of the GeoSIG Data Acquisition Software (GeoDAS)

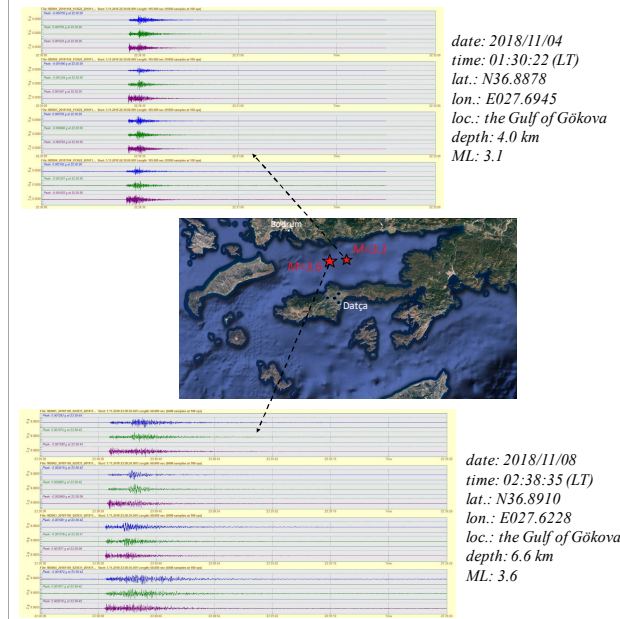


- Strong ground motion recorder: (a) digitizer & recorder, (b) accelerometer, (c) battery



- Distribution of the D-network stations (1=Datça, 2=Reşadiye, 3=Karaköy, 4=Kızlan village)

## SAMPLE RECORDS



## ACKNOWLEDGEMENT

This study is supported by Boğaziçi University Research Fund Grant Number #14509.

## REFERENCES

- <https://maps.google.com/>
- Işcan Y. et al. [2013] "Morphologic and seismic features of the Gulf of Gökova, SW Anatolia: evidence of strike-slip faulting with compression in the Aegean extensional regime", *Geo-Marine Letters*, **33**, 31-48
- Kalafat D. et al. [2005] "Mavi ağ projesi ve Muğla bölgesi'nin depremselliğinin eş-zamanlı takibi", *Kocaeli Deprem Sempozyumu*, 23-25 Mart, Kocaeli, Türkiye (in Turkish)
- MTA [2002], "1:500.000 scale Geological Inventory map series of Turkey, DENİZLİ", Maden Tetkik Arama Genel Müdürlüğü, Ankara, Turkey
- Stucchi M. et al. [2012], "The SHARE European Earthquake Catalogue (SHEEC) 1000-1899", *Journal of Seismology*, **17**, 523-544, <http://www.emidius.eu/SHEEC/>
- TenVeen J.H. et al. [2009], "From palaeotectonics to neotectonics in the Neotethys realm: The importance of kinematic decoupling and inherited structural grain in SW Anatolia (Turkey)", *Tectonophysics*, **473**, 261-281
- Wessel P. & Smith W.H.F. [1995], "New version of the generic mapping tools (GMT) version 3.0 released", *Transactions of the American Geophysical Union*, *EOS* **76**, p.329
- Yolsal S. & Taymaz T. [2010], "Gökova Körfezi Depremlerinin Kaynak Parametreleri ve Rodos-Dalaman Bölgesinde Tsunami Riski", *İTÜ dergisi/dmuhendislik*, **9** (3), 53-65 (in Turkish)