

Workshop on Active Tectonics and Seismicity of the Aegean Region with Special Emphasis on the 30 October 2020 Samos Earthquake (ASASE2021)

20-21 May 2021

CONCLUDING REMARKS

The earthquake of Mw 6.9 magnitude that occurred in Kuşadası Bay near Samos Island is among the few major earthquakes that have occurred in this geography in the last century. Unfortunately, it has caused great loss of lives and damages in the city of İzmir, and in some residential areas in Samos Island. It's known that there occurred many devastating earthquakes in the countries that have a coast on the Aegean Sea, causing loss of life and property in instrumental and historical periods. Therefore, a number of studies have been carried out for many years on the seismic sources of these earthquakes occurring in the Aegean region between the Hellenic subduction zone and the North Anatolian Fault.

Considering the damages of the Samos earthquake both in İzmir on the Turkish side and on the Samos Island on the Greek side, we decided to organize a Workshop on "Active Tectonics and Seismicity of the Aegean Region with special emphasis on the 30 October 2020 Samos Earthquake (ASASE2021)" under the leadership of TÜBİTAK and with the contributions of Dokuz Eylül University, Sivas Cumhuriyet University, University of Ferrara, and the Aristotle University of Thessaloniki, in order to share and discuss the information we have obtained so far as scientists and inform the public. We know that based on the earthquake-oriented earth sciences research field, our most important strength against earthquakes is the production of scientific data, a collaborative approach focused on common goals, and our power to evaluate scientific data together.

Based on this idea, the ASASE2021 was held on May 20–21, 2021 and was organized online due to the COVID-19 pandemic. It was aimed to discuss the earthquake phenomena considering the effects of the Samos Earthquake that struck on the 30th of October 2020 and to shed light on the active tectonics and seismicity of the Aegean region. A total of thirty oral and five poster presentations were presented by scientists from Turkey, Greece, Italy, Germany, Japan, Canada, and the United States of America for two days at the workshop. In these presentations, the latest scientific studies on the earthquake geology and seismicity of the Aegean region, earthquake (or seismic) hazard sources, and tsunami hazards were presented and discussed among the scientists participating in the workshop. Updated data obtained on both the land side and the sea side by the scientists were presented under a wide range of topics related to earthquake studies, such as active tectonics, geodynamics, seismic, tsunami, Global Positioning System (GPS), and Interferometric Synthetic Aperture Radar (InSAR) applications.

The aforementioned issues reveal the importance of multidisciplinary research for better understanding and modeling of active tectonics based on data obtained by field studies, Interferometric Synthetic Aperture Radar (InSAR), and the Global Positioning System (GPS).

During the two days of the workshop, several innovative papers, which can be a great help to solve the potential dangers we may face in the future regarding the earthquakes, were shared with the participants. Yet we still have a long way to go. After all, nature likes to be unpredictable.

At the workshop, useful insights were gained, and important action plans were discussed, which are all summarized below.

- 1- The developments regarding earthquake geology in the last hundred years were presented, and it was underlined how crucial these developments' role in seismic hazard assessment analyses.
- 2- The 3-dimensional geometry of the Hellenic subduction zone, which is responsible for a large part of the Aegean seismicity, has been revealed.
- 3- It has been stated that the extensional tectonics in the Aegean region has been progressively affected by a more transcurrent regime when the North Anatolian Fault reached the region ca. 5 million years ago, and the seismicity in this region has increased since then.
- 4- In particular, the faults that caused earthquakes in the region in historical periods were defined, and the submarine faults in Kuşadası Bay, which lies between Samos Island and Gümüldür, were mapped with the contribution of marine geologists and geophysics. In addition, the triggering effects of the submarine faults due to the Samos earthquake were evaluated.
- 5- It has been suggested to produce rapid damage assessment maps with the help of satellite imageries (images) produced immediately after the earthquake and to carry out damage assessment studies accordingly.
- 6- It was stated that, before and after the earthquake, changes occurred in groundwater levels and geothermal fields; therefore, it was suggested to monitor groundwater changes consistently.
- 7- It was stated that landslides and rockfalls were triggered by the main shock that occurred in Samos Island, and attention was drawn to multiple disaster risk management.
- 8- The Samos earthquake, which occurred during the Covid epidemic, highlights the multi-hazard approach in disaster risk.
- 9- It is suggested that an inventory of building stock in the İzmir province is required to estimate the seismic resistance of the existing building stock before an earthquake occurs, and that the urban transformation roadmap should be based on natural disasters.
- 10- An important takeaway from the Samos earthquake is that the place where the most severe damage was observed is not necessarily the epicenter of the earthquake. Hence, faults assigned to the current earthquakes and intensity distribution of earthquakes that occurred in historical periods should be reviewed.
- 11- The other important lesson taken is about the behavior of local soil conditions during the Samos earthquake. The soil under the collapsed building amplified the seismic wave more than 2 times. Also, soil behavior during the earthquake changed its linear behavior and showed nonlinear characteristics at an average depth of 55-60 m.

We would like to emphasize that every new scientific knowledge becomes more valuable when shared, and new opportunities are obtained to create an impact within a collaborative approach in the field of earthquake research. We would also like to thank all the scientists who contributed to the workshop and wish them success in their impact-oriented research.

This workshop created a scientific bridge between scientists for dealing with natural disasters and especially the seismic phenomenon that affects a wide region of the Eastern Mediterranean, and this bridge that we constructed must be strengthened with future collaborations.

In this context, we have decided to publish a special issue of the Turkish Journal of Earth Sciences in order to make the latest studies on earthquake research in the Aegean region permanent. Participants at the international workshop on "Active Tectonics and Seismicity of the Aegean Region with special emphasis on the 30 October 2020 Samos Earthquake" are warmly invited to contribute. Any original study on the seismic hazard and risk assessment of the Aegean region is also welcome. This special issue will be dedicated to the people we lost during the earthquake that struck on the 30th of October 2020.

We would like to express special thanks to TÜBİTAK, Dokuz Eylül University, Sivas Cumhuriyet University, Aristotle University of Thessaloniki, and Ferrara University for their cooperation in the organization and contribution to this international workshop.

ASASE Organizing Committee