



Source Mechanisms of Recent Earthquakes occurred in the Fethiye-Rhodes Basin and Anaximander Seamounts (SW Turkey)

Seda Yolsal-Çevikbilen and Tuncay Taymaz

Istanbul Technical University, the Faculty of Mines, Geophysical Engineering Department, Maslak, TR-34469, Istanbul, Turkey (yolsalse@itu.edu.tr; taymaz@itu.edu.tr)

Understanding the active tectonics of southern Turkey involves integrating earthquake source parameters with the regional tectonics. In this respect, seismological studies have played important roles in deciphering tectonic deformations and existing stress accumulations in the region. This study is concerned with the source mechanism parameters and spatio-temporal finite-fault slip distributions of recent earthquakes occurred along the Pliny-Strabo Trench (PST), which constitutes the eastern part of the Hellenic subduction zone in the Eastern Mediterranean Sea Region, and along the Fethiye-Burdur Fault Zone (SW Turkey). The study area is located at the junction of the Hellenic and Cyprus arcs along which the African plate plunges northwards beneath the Aegean Sea and the Anatolian block. Bathymetry and topography including large-scale tectonic structures such as the Rhodes Basin, Anaximander Seamounts, the Florence Rise, the Isparta Angle, the Taurus Mountains, and Kyrenia Range also reflect the tectonic complexities in the region. In this study, we performed point-source inversions by using teleseismic long-period P- and SH- and broad-band P-waveforms recorded by the Federation of Digital Seismograph Networks (FDSN) and the Global Digital Seismograph Network (GDSN) stations. We obtained source mechanism parameters and finite-fault slip distributions of recent Fethiye-Rhodes earthquakes ($M_w \geq 5.0$) by comparing the shapes and amplitudes of long period P- and SH-waveforms, recorded in the distance range of 30 – 90 degrees, with synthetic waveforms. We further obtained rupture histories of the earthquakes to determine the fault area (fault length and width), maximum displacement, rupture duration and stress drop. Inversion results exhibit that recent earthquakes show left-lateral strike-slip faulting mechanisms with relatively deeper focal depths ($h > 40$ km) consistent with tectonic characteristics of the region, for example, the June 10, 2012 Fethiye earthquake ($M_w: 5.9$) can clearly be correlated with the left-lateral Fethiye-Burdur Fault Zone in SW Turkey.