Earthquake Generation along the Western part of the North Anatolian Fault: Research Activities of the Department of Geophysics

Mustafa Aktar

Department of Geophysics Kandilli Observatory and Earthquake Research Institute

E-mail : aktar@boun.edu.tr

Abstract

A brief summary of the recent activities of the Department of Geophysics (BU Kandilli Observatory and Earthquake Research Institute) on the Western part of the North Anatolian Fault will be presented. Wide range of research topics were investigated by the members of the Department of Geophysics both before and after the 1999 earthquake sequence of Izmit and Duzce. The study of aftershock sequences was one of the primary concern in that context: accurate location of the events (double difference method, etc), study of source properties (moment tensor inversion), and their correlation to fault geometry and stress evolution were investigated in details. Statistical properties of aftershocks clusters (b-value distributions) were also determined in relation to the co-seismic slip distribution. Kinematic properties of rupture were studied and evidence for supershear velocity were investigated. The source parameters for the largest Izmit aftershock have been estimated using the near-field, rock-site strong motion records (IZT-SKR) and site amplification were estimated for 19 provinces in Istanbul. Studies concerning velocity structural on and around the fault zone were also carried out at various scales. Trapped waves were used to study the width of the fault zone. Tomographic methods along refraction profiles were applied to reveal the distribution of deeper structural units. Data from aftershocks sources were used to investigate the S-wave anisotropy at the Almacik block south of Duzce segment. Presently research activities are continuing with a more emphasis on the western continuation of the 1999 rupture, which means the segments located in Marmara Sea. High resolution array techniques are applied to study the very low seismicity at the Cinarcik Basin. A regional 3-D velocity model is also developed for the Marmara Sea and surroundings. Finite difference codes running on parallel computers are used to generate accurate synthetic seismograms for the region.