

The Morpho-Acoustic Structure of Sakarya Canyon, Southwestern Black Sea

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In this study, Black Sea outlet of Sakarya River in the western Black Sea continental margin is analyzed using a total of 1400 km multichannel seismics, Chirp sub-bottom profiler and multibeam bathymetric datasets. Three scientific cruises between 2012 and 2016 have been conducted in the area to map and reveal the morphological structure of the Sakarya Canyon along the southwestern Black Sea margin. The Western Black Sea Turkey coastal area is also home to many active canyons. These canyons extend from deep shallow shelf areas of about 100 m to deep water depths of 1800-2000 m. The largest and most active of the Western Black Sea canyons is the Sakarya Canyon, which is located at the exit of the Sakarya River.

Research on submarine canyons are important for military submarine operations, positioning of marine engineering structures and understanding the sedimentology, ecological and oceanographic functions of canyons. The canyon systems observed on continental slopes lead to the most convenient sedimentary transportation from the shelf platform.

The dataset from study area was analyzed to identify the acoustic structure of Sakarya Canyon, the morphology of which is not widely known. Bathymetric data shows that the canyon consists of two separate canyon heads in the shallow continental shelf to the south, both of which coalesce at 867 m water depth. This meandering canyon then deepens along the continental slope towards to north. Another wide canyon from west, named as Kefken Canyon, then conjoins this main canyon at approximately 1000 m water depths to form the deeper structure of the modern Sakarya Canyon. In the distal parts, canyon gets wider and wider, and its thalweg becomes significantly flat eroded by the present day activity of small scale turbidity channels.

Multichannel seismic data indicate that the Sakarya Canyon was formed by the activity of hyperphycnal flows and also clearly show the extensive sediment erosion along the canyon.