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Structural evolution of Erdek Bay and its surroundings, Turkey

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The marine area covering Erdek Bay and the Marmara Islands on the southern shelf of the Sea of Marmara, Turkey is placed in a tectonic basin created by the development of the North Anatolian fault zone controlling the Sea of Marmara and its paleogeographic evolution totally depends on the tectonics and climatic sea level changes.

Many historical earthquakes accompanied by numerous landslides on the Marmara Islands and underwater failures on the slopes of the western Marmara trough were located between the two branches of the North Anatolian Fault zone, and known as Marmara Island earthquakes. While the northern branch of the North Anatolian fault zone forms the complex bottom morphologies through the deep Marmara trough, consisted of basin and ridge chains, the southern branch goes through the southern shelf. Since the southern branch is much less active than the northern one, the southern shelf which is characterized by smoother morphology has not been studied sufficiently. But some recent geophysical studies show that this branch is still active at present. Beyond its position between two active fault branches cut through by many secondary faults, the study area is also bordered to the east by the Kapı dağ Peninsula which displays N-S oriented parallel features such as deep valleys, mountain ridges, and an isthmus connecting the peninsula to the continent. To the west, the Dardanelles strait forms a shallow water passage between the Sea of Marmara and the Aegean which is established about 12k years ago. The seismic sedimentary records of this connection were defined in a NW-SE directional semi-enclosed basin between the Marmara Islands and Erdek Bay depending on their unconformities, lap outs and varying internal

reflections. The topmost seismic unit formed during the last transgression period is characterized by strong and internally parallel reflectors, the second as sub-parallel and chaotic complex internal reflections, and the third as sub-parallel and wavy internal reflections. An unconformity between the upper units was delineated along the study area representing the erosional surface during the last glacial period above the sea level.