HOLOCENE SEA LEVEL CHANGES OF HISARONU GULF, SOUTHEASTERN AEGEAN SEA

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Abstract
The relative sea level change during the Holocene geologic times for the Hisaronu Gulf (SE Aegean Sea) and surroundings were investigated performing high resolution seismic and bathymetric survey. Hisaronu Gulf is affected by sea level rising in the last glacial period (20.000 BP) and local tectonic movements. Comparing with the eustatic sea-level curve and our seismic stratigraphic interpretations considered paleo-shoreline positions, it can be said that the relative sea level change for the Holocene period is result of the tectonic subsidence of the coastal plain.
Keywords: Sea Level, Sedimentation, Tectonics

Introduction
The global eustatic sea level in the Aegean Sea and surroundings in the Late Pleistocene-Holocene time (20.000 yr BP) rose from -120m below present sea level to its modern position because of melting ice sheets since the last glacial period ([1], [2]). The aims of this paper are to describe the seismic units that formed the Hisaronu shelf during the Holocene period from high resolution seismic data and reveal the model of sequence stratigraphic analysis to seismic profiles to interpret the relative sea level change controlled by eustatic rise and local tectonic movements comparing with similar studies performed on Mediterranean coasts.

Study area
The Hisaronu Gulf is bordered by the Datça Peninsula to the north, the Simi Island to the south, and the Bozburun Peninsula to the east (Fig. 1). The Gulf is a part of the western Anatolia – southeastern Aegean Sea regions, which are currently under an N–S regional extensional tectonic framework dominated by the westward escape of the Anatolian plate as a result of collision of the Arabian and African plates with Eurasia ([3]).

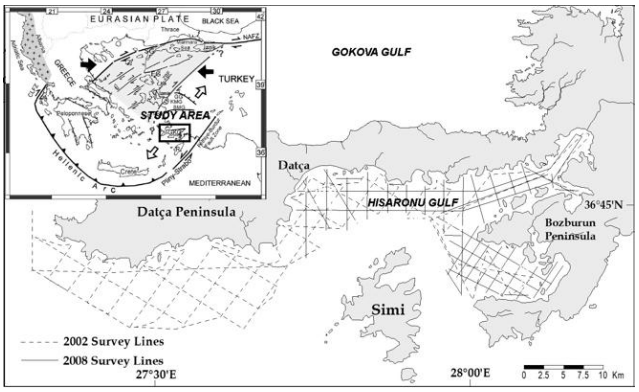

Fig. 1. Bathymetric and seismic line map of the Hisaronu Gulf

Materials and Methods
This study is mainly based on high-resolution seismic reflection profiles using ORE Subbottom Profiler System and using Bathy 2010 Chirp System in 2002 and 2008 with 3.5 kHz frequency collected during a cruise of R/V K. Piri Reis of Institute of Marine Science and Technology (Fig. 1).

Results
The relative sea level changes are the result of eustatic sea level fluctuations and tectonic movements. The seismic sedimentary chronology suggests that the average rate of vertical tectonic movement in Aegean Sea for the last 120.000 years has been around 0.5 mm/yr in Gokova Gulf ([4], [5]). During the Holocene geological times, glacio-eustatic sea level changes formed two major depositional units in the Hisaronu Gulf and surroundings: transgressive systems tract (TST) related to the last post-glacial transgression (20-8 ka); and highstand systems tract (HST), related to the Holocene higher sea level (8 ka to present) ([2]) with maximum 25 ms thickness. The conceptual model of sequence stratigraphy, has been applied to our high resolution seismic data which allows the study of the youngest depositional sequence during the last sea level rise in the Holocene (Fig. 2). By considering the global sea-level curve and paleo-shoreline positions, we found out the relative changing in sea level result from local tectonic movements. Besides eustatic reasons, tectonic subsidence due to the half graben structure of the area is the main trigger of the relative rise in sea level.

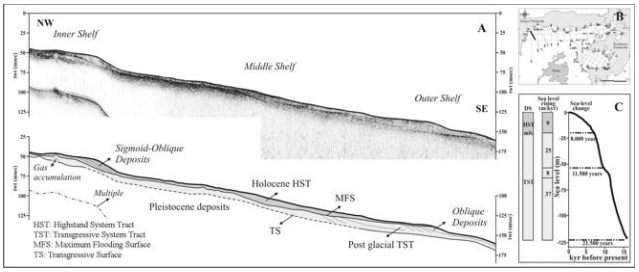

Fig. 2. Seismic reflection profile from Datça Shelf (A) and the chronology of depositional sequences suggested from [2] sea level curve (C).

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