

**'SEAS OF THE OLD WORLD': INTERCONNECTED BASINS
IN A REGION OF HIGH CONTRASTS AND SENSITIVITY TO CLIMATE**

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ABSTRACT

The 'Seas of the Old World' (Mediterranean, Black and Caspian Seas) are a series of interior basins, extending into the heart of the Eurasian continent, and becoming progressively isolated from the world ocean, going from west to east. The Euro-Mediterranean and Middle Eastern regions together form an interconnected climatic unit influenced by the climates of the adjoining continents of Europe, Africa and Asia, which in turn are affected by the climates of the adjoining Atlantic and Indian Oceans. Despite their isolated appearance, the internal machinery of each individual marine basin is both a significant driver and participant of regional climate.

The mean residence time varies considerably from 7 years for the Marmara, to 25 years for the Caspian, 100 years for the Mediterranean, and up to about 2000 years for the deeper part of Black Sea, resulting in widely differing characteristics of these basins. The Mediterranean 'conveyor belt' has undergone recent abrupt changes, with previously unforeseen deep water renewal of the entire eastern basin from the Aegean Sea in the 1990's, and recurrent deep water formation at the Rhodes Gyre core observed in 1987 and 1992. Abrupt changes in the surface circulation and water masses have been repeatedly recognized on decadal time scales in the Eastern Mediterranean. Shelf processes lead to episodic renewal of the deep waters of the north Aegean Sea. The Black Sea in comparison, is considerably less well-mixed, and its stratification is controlled by wind and boundary mixing processes. Its sediments reveal major Holocene fluctuations of climate. Both the Black Sea and the Caspian Sea are influenced by fresh water from large rivers, and consequently the sea-level is a sensitive indicator of climate changes, having gone through major abrupt changes both recently and in the distant past. The two-layer stratified Turkish Straits System, acts as buffer between the Black and Aegean Seas. Mixing and entrainment processes at their junction regions dominate the evolution of water properties. Waters originating from the Straits, as well as fresh water from large rivers act as buoyancy sources for the adjacent Aegean, Marmara and Black Seas.

The complexity of climate processes, and the scarcity of resources in the region calls for integrated scientific investigations, based on networks of observing systems, shared data bases and models.