

Influence of large scale atmospheric forcing (2002/2003) to the Adriatic sea

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Abstract

In 2002-2003 unusual weather conditions occurred over the Adriatic Sea, which significantly impacted thermohaline and biological properties. Departures from the normal climate were calculated to demonstrate the size of these changes both in the atmosphere and sea. Response of the sea was remarkable, especially in summer salinity. Analysis of thermohaline conditions at three oceanographic stations showed the importance of phenomena responsible for the occurrence of exceptionally high salinity in the middle Adriatic coastal area: (1) enhanced inflow of highly saline Levantine Intermediate Water (LIW) in the Adriatic, and (2) extremely low precipitation and rivers runoff, accompanied with strong evaporation, which increased heat and salt content in the surface layer.

Changes of thermohaline properties in 2002-2003 were related to two global scale indexes (NAOi-North Atlantic Oscillation index and MOi-Mediterranean Oscillation index). Simultaneously increased influence of both large-scale processes resulted in extreme conditions over the Adriatic in summer 2003.

Warming trend, accompanied with decreasing precipitation in the region and enhanced inflow of the Mediterranean water exerted strong deviation in the thermohaline properties and coincided with tripled increase in the number of warm water species in the Adriatic. The number of findings of warm water species has an increasing trend through the last decade, indicating that climatic changes already influenced marine ecosystem.