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Water masses in the Eastern Mediterranean Sea: an analysis of measured isotopic oxygen

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The water masses of the Adriatic and Ionian Sea and their interdecadal variability have been investigated through statistical analyses focused on $\delta 18$ measurements carried out in 1985, 1990, and 2011. In particular, the $\delta 18$ 2011 measurements constitute, to the best of our knowledge, the largest synoptic dataset encompassing different sub-basins of the Mediterranean. Statistical linkages between Temperature, Salinity, Dissolved Oxygen and $\delta 18$ have been analyzed and $\delta 18$ concentration has been used to trace major water masses that are typically found in the basin, including the Adriatic Dense Water, the Levantine Intermediate Water, and the Cretan Intermediate and Dense Waters. We find that $\delta 18$ is largely independent of classical oceanographic physical parameters, hence it can be considered as an additional source of information about the local ocean state and variability. Finally, we explore the possibility of using $\delta 18$ concentration as a proxy for dominant modes of large-scale ocean variability in the Eastern Mediterranean Sea.