Long-term changes in the Sicily Channel: insights into climate-driven variability

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Climate change remains a crucial focus in scientific research, necessitating the examination of its impacts across various oceanic regions. The Sicily Channel, a key passage separating the Eastern and Western Mediterranean basins, provides a unique environment for studying long-term changes in response to climate variability. We present an updated analysis of more than 30 years of deep-sea observations in the Sicily Channel, extending our understanding of climate-induced transformations in the region.

The Mediterranean Sea, highly susceptible to climate change, undergoes distinct changes in its sub-basins, evident in the thermohaline properties of the Intermediate Water (IW). Our study focuses on the long-term time series of physical data collected in the Sicily Channel (sill at 400 m) since 1993, within the framework of the OceanSITES network (one of the components of the Global Ocean Observing System, or GOOS).

The channel allows us to monitor the evolution of IW properties and our investigation reveals notable trends, with increasing temperature and salinity observed in the IW over the past decades. These trends, exceeding global averages by at least one order of magnitude, emphasize the rapid response of the Mediterranean Sea to climate change. We explore the causative factors behind these observed trends, with a particular emphasis on the role of a changing climate, especially in the eastern basin where the IW is formed.

By presenting the latest updates on the Sicily Channel, this research underscores the urgency of sustained, long-term observations in marginal seas and their essential role in advancing our understanding of climate-driven impacts on oceanic systems.