



## **Rapid response to climate change in a marginal sea**

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The Mediterranean Sea is a mid-latitude marginal sea, particularly responsive to climate change as reported by recent studies. The Sicily Channel is a choke point separating the sea in two main basins, the Eastern Mediterranean Sea and the Western Mediterranean Sea. Here, we report and analyse a long-term record (25 years, from 1993 to 2018) of the thermohaline properties of the Intermediate Water that crosses the Sicily Channel: since the mid '90s its temperature and salinity have increased by  $0.28\text{ }^{\circ}\text{C}/\text{decade}$  and  $0.08\text{ }/\text{decade}$  in the Sicily Channel, where the intermediate water flowing from east to west may be intercepted. Such trends are at least one order of magnitude higher than those reported for the global ocean intermediate layer (Schroeder et al., 2017). We investigate the causes of the observed trends and in particular determine the role of a changing climate over the Eastern Mediterranean, where the Intermediate Water is formed: warmer and drier regional climatic condition over the eastern basin are favouring the formation of increasingly warmer and saltier intermediate water. Indeed, the Levantine region in particular is undergoing a dramatic drought since the late '90s (Cook et al., 2016), the driest period in the past 500 years. The long-term Sicily record reveals how fast the response to climate change can be in a marginal sea like the Mediterranean Sea compared to the global ocean, and demonstrates the essential role of long time series in the ocean.