The Mediterranean is in many ways a miniature ocean. Like the global ocean, it is experiencing a changing climate, it has deep water formation varying on interannual time scales and a well-defined overturning circulation. What makes the Mediterranean particularly useful for climate change studies is that its time scale is much shorter than for the global ocean, and changes can happen faster. Thus the Mediterranean is a laboratory for documenting changes and understanding the role of key processes involved in climate change.

Recently, intense deep water formation events in the western Mediterranean have produced high volumes of a new deep water, significantly warmer, saltier and denser than previously, which has substituted the resident deep water. This new deep water has been formed during massive convection events, that took place during winters 04/05 and 05/06, linked to extreme atmospheric forcing and lateral advection of anomalously warm, salty water to the convection region.

On the longer term, the order of magnitude of the changes observed in the western Mediterranean deep water over the past 50 years are substantial: between 1961 and 2004, the deep water has progressively increased its temperature and salinity by 0.13°C and 0.06‰. Now in 6 years since 2004, we have witnessed increases in deep water temperature of 0.06°C and salinity of 0.03‰. In 2010 a new deep water formed in 2009 has been observed, that is even saltier and the layer occupied by the thermohaline anomaly reached a thickness of more than 1200 m.