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Monthly variability of water masses parameters and mixing in the western side of the strait of Sicily during 2003.

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Six hydrological cruises were carried out in the Tunisian side of the strait of Sicily, starting from March to October 2003. Temperature and salinity profiles were collected on 12 stations, along a repetitive section with a spatial resolution of 2.5 nautical miles.

This dataset allows us, first to quantify the high frequency variability of T, S, and π (spiciness) and, second, to shed light on some aspects of water masses mixing in this area.

The highest T/S variability level corresponds to the Atlantic Tunisian Current, that is the dominant dynamical signal in the area. Leaving aside the surface layer, the variability is rather marked in salinity than in temperature and salinity anomalies are more obvious during spring than summer and fall, due to water masses intrusion. Furthermore, the link between dynamic, hydrology and bathymetry appears clearly. Indeed, there is a clear contrast between structures encountered above the Tunisian continental slope (in the western half of the section), and those encountered above the sill (in the eastern part of the section). This contrast appears also clearly in terms of spiciness that is showing, on the one hand, a relatively high and homogeneous value east of the sill, but on the other hand, relatively lower and spatially variable values above the continental slope. This behaviour can be partially explained by vertical mixing that occurs mainly in the eastern part of the section, through diffusive instabilities processes that are rather involving the “spicy” Levantine Intermediate Water, and also through “salt fingers” processes that are occurring in the transition layer.