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Chemical Signature of the Water Masses Flowing through the Sicily Strait

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The Mediterranean Sea is characterized by many straits and passages, which are key areas for the characterisation of the water exchange between sub-basins. The physical properties of the water masses flowing through the Sicily Strait have been monitored since 80's. Less frequently, the monitoring at the Sicily Strait was extended to nutrients, in order to identify the chemical signature of the water crossing the area.

We present here the results of an oceanographic campaign carried out in the Sicily Strait in November 1999. In particular the distributions of nitrates, orthosilicates and orthophosphates are discussed in relation to the physical properties of the water masses. The biogeochemical features appear to be strongly associated with the hydrodynamical patterns, showing a strict relation between the chemical parameter and water masses. Nutrients distribution confirms that the Sicily Strait, besides to be an exchange region, can be considered an intermediate basin, between the western and the eastern Mediterranean. The chemical properties of the water masses are modified during their passage, being exposed to different processes. While boundaries are advective regions, characterized by mixing, in the central area biological activity has a significant role. Beside an increase of oligotrophy moving from the western towards the Ionian basin, a surface nutrient maximum is found in the central basin, associated to upwelling phenomena. Furthermore, part of the intermediate and deep water recirculates in the central area and their residence time becomes long enough to allow respiration processes, which lead to remineralization of organic matter. As a result,

there is an increase in nutrients and a reduction in the dissolved oxygen concentration. The N:P ratio is significantly higher than the classical Redfield ratio, hence phosphorous acts as the most limiting factor for the phytoplankton growth. The deep nutrient content through the Strait appears to be higher than in the past, envisaging a greater export toward the western basin. A possible explanation may be the nutrient maxima uplifting observed in the Ionian basin under the influence of the Eastern Mediterranean Transient.