



## **Modelling the intrusions of the Northern Current on the eastern part of the Gulf of Lion's continental shelf**

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The Mediterranean Northern Current (NC) flows along the Gulf of Lion (GoL) continental slope southwestward from the Ligurian Sea to the Catalan Sea. The NC sometimes intrudes on the continental shelf. A branch of the NC entering the gulf is considered an intrusion when it flows across the 200m-deep isobath. This study focuses on the intrusions of the NC occurring at the eastern edge of the GoL. The presence of NC's intrusions in this region has been demonstrated with the GOLTS cruises current and hydrological data (2002-2004). Despite the good coverage of the zone of interest during the cruises, the measured data are not sufficient to understand the generating process of these eastern intrusions. Thus, modelling with the 3D circulation model *Symphonie* has been chosen to study these shelf-edge processes. The modelling of the circulation in the GOLTS region (4.4°E-6°E and 42.2°N-43.5°N) requires a high-resolution grid to accurately define the canyons of the GoL's slope. The influence of the general circulation is taken into account through a classic downscaling method using one level of grid nesting. The outputs of a realistic large coarse-grid (3km×3km) model are used to initialize and to force a high-resolution (1km×1km) model of the GOLTS region at its open boundaries, on selected periods. These selected periods are chosen to coincide with the GOLTS cruises of 2002 in order to compare the modelled intrusions to the observed intrusions. Good agreement is obtained with ADCP measurements. The higher resolution of the fine grid bathymetry improves quantitatively the calculations of the intrusions' fluxes. Besides the interaction of the bathymetry with the NC (position and instabilities), the wind forcing also influences these shelf-edge processes. Sensitivity tests help to understand the forcings of these intrusions.