

MESOSCALE CIRCULATION CONTROL ON RIVER PLUME DISPERSAL OFFSHORE CATALONIA, NW MEDITERRANEAN SEA

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Abstract

AVHRR, SeaWiFS, MODIS and ASTER satellite images collected during the last ten years have been examined to investigate the mesoscale circulation control on coastal currents and their influence over fluvial plume dispersal. The study focused on the Northwestern Mediterranean Sea, and the Catalan Margin in particular. The observed seasonal patterns have been compiled into a Geographical Information System which is inclusive of watershed properties, fine sediment sinks and interactions with coastal infrastructures.

Keywords: Satellite imagery, mesoscale, circulation, plume dispersal, Catalan margin.

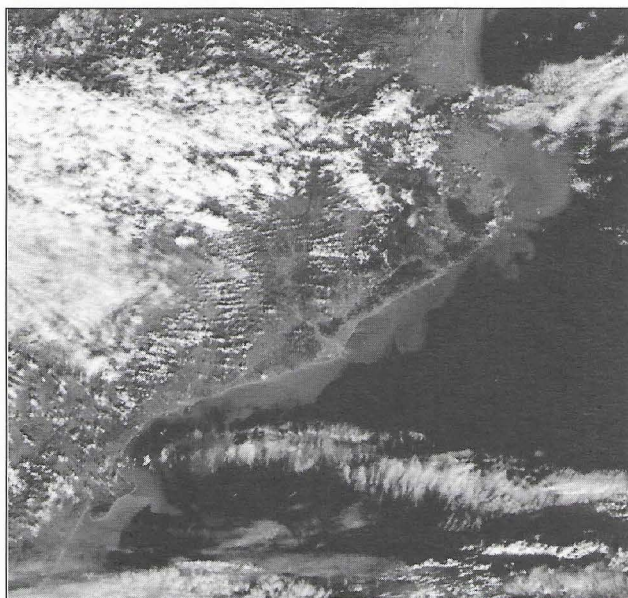


Fig.1. Coalescing plumes along the Catalan coast, October 2003.

The study area includes the Ebro shelf and the Catalan continental shelf north of the Ebro delta. The Ebro river basin is the largest (85362 km²) of the Iberian Peninsula draining into the Mediterranean Sea. Rivers to the north are much shorter and carry much less water and sediment load. While the Ebro river receives tributaries from the western and central Pyrenees and the Iberian Massif, the rivers to the north originate either in the eastern Pyrenees or in the shoreline-

parallel Catalan Coastal Ranges. The marine area offshore Catalonia is dominated by the permanent mesoscale Liguro Provençal Current (LPC) flowing southwestwards. Associated to the LPC, gyres form and propagate from north to south over the continental shelf throughout the year, thus influencing river plume spreading and transport. Satellite imagery along a 10 year period allows tracking and forecast recurrent coastal currents able to redirect river plumes. The same principle could be applied to sewage or pollutant releases. The wider the continental shelf is, the more difficult for the mesoscale-related gyres is to penetrate over the shelf. As in the Ebro shelf, this keeps the gyres further offshore and favors the development of a coastal circulation dominated by local factors.



Fig. 2. Plume dispersal off the Ebro mouth, February 2003.