

Título: Protección Ambiental del Río de la Plata y su Frente Marítimo: Prevención y Control de la Contaminación y Restauración de Hábitats (extensión)

Objetivo principal del proyecto: Estudio y modelación de la hidrodinámica y el transporte de sedimentos en el estuario del Río de la Plata

Entidades patrocinantes: PNUD/GEF RLA/99/G31 - PNUD (Programa de las Naciones Unidas para el Desarrollo), GEF, Fondo Francés para el Medioambiente (FFEM)

Institución beneficiaria: Centro de Investigaciones del Mar y la Atmósfera (CIMA/CONICET-UBA).

Otras Unidades de Investigación participantes: Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP), Argentina; Servicio de Hidrografía Naval (SHN), Argentina) Instituto Nacional del Agua (INA), Argentina; Instituto Nacional de Pesca (INAPE), Uruguay; Servicio de Oceanografía e Hidrografía de la Armada (SOHMA), Uruguay; Universidad de la República (Uruguay).

Período: 2008-2010

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Abstract:

The environmental state of the Río de la Plata has been investigated within FREPLATA from different approaches in the past few years. Numerical modeling of the estuary's hydrodynamics has been carried out by several teams, and the total number of such models applied to the Río de la Plata may reach a dozen. These models have aimed at correctly reproducing tidal levels and currents, at studying the position of the saline front and the influence of the wind on variations of the water level.

However, even though environmental issues in estuaries cannot be tackled without investigating sediment related issues, not much has been done in this field in the region. Sediments are important for several reasons such as:

- Contamination, which can be "fixed" to sediments before being released in the water column during resuspension events;
- Fisheries: the saline front is known to coincide with a very productive area of plankton, what means that the front is an area where abundant nourishment is available to fish. This high rate of productivity results from the combined effects of high discharge of nutrients (from the river) and decreased turbidity (which is related to the amount of suspended sediments in the water column);
- Dredging concerns: the continuous dredging of the channels leading to Montevideo and Buenos Aires harbors illustrates the management burden linked to fine sediment transport. A better knowledge of the sediments' overall pathways and areas of consolidation or resuspension would help understand how to optimize dredging operations at the scale of the whole estuary.

For these reasons, we propose to carry out an investigation of the movements of fine sediments throughout the Río, from the riverine source to the outer estuary. Let us emphasize

that Ifremer has a 20 years expertise in this field, and its work in numerical modeling of fine and mixed sediments is internationally acknowledged by the scientific community.

Several tasks will be undertaken in order to achieve the goals of the project.

- First, a numerical model of the Río de la Plata based on Ifremer's suite MARS-SIAM will have to be developed, which will cope with hydrodynamics and sediment related issues. Although several existing hydrodynamic models are running on the area, the coupling with sediment-related modules will be made easier with MARS-SIAM also being used for the hydrodynamic part of the modeling. The hydrodynamic modeling will benefit from the progress already made by our Argentinean and Uruguayan partners within FREPLATA.
- The calibration and validation of the model require data. Some hydrodynamic parameters (such as water levels and salinity) have been monitored for several years in the Río. However, other parameters required for this study still need fairly extensive work, such as waves, time evolution and vertical profiles of suspended matter, overall patterns of concentration from the Paraná and Uruguay rivers to the outer estuary. Several measuring stations and sampling campaigns are planned in order to obtain both continuous monitoring of parameters at several sites, as well as spatial variations of sedimentary parameters throughout the Río. The use of satellite images will also allow a systematic analysis of the surface concentration.
- The numerical model is a tool that reproduces processes otherwise known from theory or from experiments. While water motion obeys the same laws in all sites, sedimentary processes are site-specific. For that reason, we plan on carrying out a few studies in order to assess the local behavior of fine sediments (such as settling and compaction).

Model results will be made available through FREPLATA's geographic information system (GIS). However, this system will need some improvement, not only for the management of future model outputs, but also to correlate these outputs to other types of information already available within the GIS. Combining information available in the GIS will be possible through the internet