

"Circulation and diffusion processes in the Archipelago of Maddalena"

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SUMMARY

Results are herewith presented on current measurements, CTD measurements and diffusion experiments conducted at the Archipelago of La Maddalena (Sardinia) by the Stazione Oceanografica, CNR, S. Terenzo (SP) in cooperation with the Laboratorio per lo Studio Ambiente Marino, CNEN, Fiascherino (SP). A first result of a circulation model is also presented.

RESUME'

La Stazione Oceanografica du CNR de S. Terenzo (SP) et le Laboratorio per lo Studio Ambiente Marino, CNEN, Fiascherino (SP) ont effectuées mesures de courantes, de CTD et expériences de diffusion avec Rhodamine B dans l'Archipelago de La Maddalena. Nous présentons ici les résultats relatives à la circulation, des processus de diffusion et les premières résultats d'un modele de circulation.

An environmental investigation was conducted in the Archipelago of La Maddalena due to the stationing of a nuclear submarine base in the area. Knowledge of hydrodynamical processes is necessary for an evaluation of the consequences of a casual radiative release in the sea. Current measurements, hydrological measurements and diffusion experiments were made for a period from the Summer 76 to the Spring - Summer 77.

An analysis of current meters and meteorological data has shown that there is a tight correlation between winds and currents, particularly in the Bucinare Channel which separates the Archipelago from Sardinia. This correlation becomes weaker during certain periods, specially when two layers are present.

The spectrum analysis reveals that the most important periods of time are from 12 to 13 hours, that is, typical tidal frequencies. Less important are the periods of time around 6 hours.

Regarding the diffusion experiments, the measurements were conducted only inside the S. Stefano Bay and for all the tests it was used a synthetic tracer (Rhodamine B). The dyes formed were considered radially symmetric and amongst all the models presented by Okubo (1969) those which best suited the physical conditions of the area, were chosen.

At the moment it is under study a numerical hydrodynamic model using the shallow water theory.

A result is presented of the numerical model for a constant depth case. Non linear terms are examined, but the Coriolis force is forgotten. The Archipelago is considered as a single isle. The next step will be the calculation of a real case, so that it will be possible to find some realistic boundary conditions for the same numerical model adopted for a narrow area with all the Archipelago inlands in evidence.