Study of the 3-D circulation in the Ligurian Sea during the Haven disaster

E. FERRETTI(1), A. LISCA(1), G.M.R. MANZELLA (1), S. MARULLO (1), V. CASULLI(2), R. SANTOLERI(3), M.E. SCHIANO(3), M. ASTRALDI(4), G.P. GASPARINI(4), G. BORZELLI(5), P. CECAMORE(5), A. CIAPPA(5), U. PERUSINI(5) and A.J. ELLIOTT(6)

(1)Centro Ricerche Ambiente Marino ENEA, LA SPEZIA (**Italia**)
(2)Dipartimento di Matematica Università di TRENTO (**Italia**)
(3)Istituto di Fisica dell'Atmosfera CNR, ROMA (**Italia**)
(4)Stazione oceanografica CNR, LA SPEZIA (**Italia**)
(5)Telespazio, ROMA (**Italia**)
(6)Unit for Coastal and Estuarine Studies, North Wales University (**United Kingdom**)

During April 1991 the Haven tanker discharged accidentally 15,000 tons of crude iranian oil in the Ligurian Sea. During the activity related to the monitoring of the spill effects on living resources a large amount of data where gathered, using different platforms and sensors; AVHRR, TM, SPOT, Daedalus, shipborne IR Radiometer, Pyrgeometer, CTD, Current meters. Those data contributed to the definition of the circulation current field during the accident. Numerical experiments were carried on for the simulation of the circulation pattern, oil spill dispersion, weathering of the oil and sinking. The general cyclonic circulation existing in the Ligurian Sea was influenced by wind forcing, which was responsible of small scale instabilities evolving in a rather complex eddy structures. Numerical experiments were able to describe the importance of the topography on the circulation, as well as the vertical density structure. The numerical model adopted was semi-emplicit, allowing a large time step. Model simulation was validated by a comparison with the time evolution of the thermal features observable in a time series of AVHRR images. In situ radiometer measurements allowed the geophysical validation of AVHRR satellite data in case of presence of oil.

The Heat Content Changes in the surface layers of the Ligurian Sea during October 1978

G. FLOCCHINI, P. PICCO and A. RIBOTTI

DISTER, Geophysical Section, Università di GENOVA (**Italy**)

The knowledge of heat content in the sea and its space and time variation is of importance in many atmospheric and oceanic dynamical processes. Estimations of oceanic heat content and heat budget on climatological and large spatial scale can be found in literature, but there is a general lack of information about the total heat budget on regional and synoptic scale.

An attempt to estimate surface heat budget, heat content variation and advection from currents during October 1978 in the Ligurian Sea is performed.

Two hydrographic sections, Genova-Capo Corso and Imperia-Capo Corso were repeated three times during October 1978; 52 Temperature, Salinity and Density profiles through a depth of 400 m. were collected. Meteorological and global solar radiation data for the whole period were provided by Genova and Imperia Meteorological Obsevatory; other meteorological measurements were performed on board during the three oceanographic cruises.

Heat storage computation was performed for each station at different levels by :

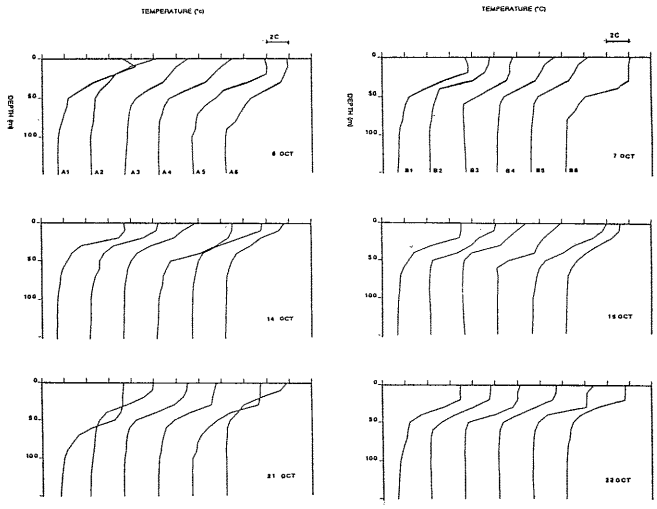
$$Q = Cp\, e\, T\, Dz$$

Cp sea water heat capacity = 4000 J/°K
e mean density
T mean potential temperature
Dz layer thickness

Vertical resolution was 10 m in the upper 100 m, 25 m between 100 m and 200 m and 50 m between 200 and 400 m.

Surface heat balance were estimated by using bulk formulas and heat advection by means ofcomputed geostrofic currents.

Fig.1 reports six vertical temperature profiles in the section Genova-Capo Corso (A) and Imperia-Capo Corso (B).



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