

The role of Semi enclosed seas role in the new Space observation era

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The Mediterranean is taken as the most representative and complex case of the major semi-enclosed seas of the world. In the face of global environmental and climatic changes and of demographic explosion, satellite monitoring appears as an essential premise for its integrated management.

A timely assessment and prediction of the impacts of such changes depends on the availability and proper processing of interdisciplinary data, on scientific understanding of reliable information and on subsequent continuous monitoring for control.

Data - the major source of analysis and modelling - are still failing to satisfy users in time, space, quality and quantity; they need better integrated collections, overall standardisation, intercomparability and long continuous time series of *in situ* measurements. The new generation of Earth observation satellites planned by ESA, NASA and NASDA will provide a major contribution to the solution of these requirements but the exponential increase of the amount of data will require sound management including validation, distribution and technology of use. The planning of such management is in progress, or proposed by various international and national organisations at the present time.

An integrated management of ground and space data aimed at scientific and application users is needed also in the Mediterranean region. Archives of monitored data are planned in programs such as MEDIAS, an IGBP proposed regional center, or in long-term experiments and research programs such as PRIMO, POEM, or the Blue Plan. They should not exclude larger views of interdisciplinary data sets and the creation of meta-data referral systems with a coordination of UNEP, EEC, CIESM, WMO and other international and national organisations that deal with the many contributing factors of environment variabilities and trends. This would further serve such actions as planned by the World Bank and the European Development Bank in the Mediterranean area.

The Mediterranean has unique features. Placed between temperate and subtropical regions, from mountains to deserts subject to large seasonal variabilities, it is a challenging area for science. Oceanographers have always considered it a convenient model sea where most ocean mechanisms occur at time scales often one order of magnitude smaller than on the main oceans, and where campaigns can be conducted with less strain.

In order to better define the role of this semi enclosed sea on the global scale climate and environment change, and in reverse its response to global scale changes, research should be directed with greater priority towards the understanding of regional and global scale processes relationship. Compared to the global oceans, the relatively small semi enclosed seas offer the best opportunity to study and understand integrated mechanisms and relate them later to the global scale ones, as they offer excellent test areas for experiments, calibrations, interdisciplinary research and synergisms.

A number of interesting questions find answers in this regional context, for example the possibility to plan interdisciplinary research between meteorologist-oceanographers and hydrologists, so as to deal with the problems of water, from precipitation trends, catchments, runoff and ocean mixing and evaporation and coastal alterations. This could be a subject of discussion within CIESM and with other international organisations. There is also an opportunity, in this decade, to frame local and regional research in the major global international research programs such as WCRP, WOCE, TOGA, GEWEX, IGBP.

One other major contribution to environmental and climatic changes would be to transform the bibliographical wealth of CIESM in a practical information and referral system for the study of historical evolutions, variabilities, and tendencies. The present and coming earth observation management may benefit from historical data when alterations of specific processes and trends must be verified in a relatively short time. With a quality screening of products performed yearly by CIESM Committee chairmen and periodically by the Director in an integrated review of interdisciplinary mediterranean evolution there is certainly a way to derive useful syntheses and overall information on mediterranean facts.

The major Space Agencies including ESA are oriented towards new strategies in the organisation of the Space and Ground components, separating routinely Earth Observing services from Environment monitoring and scientific research. To prepare professionally each nation and user to benefit from this gigantic Earth Observing system will take time. But time should not be lost if we want to keep pace with the technological advances and facilities offered. Perhaps CIESM can contribute to enhance the know-how and progress in the role of science for a better life.

Remotely-sensed sea surface temperatures : cheap, adequate, convenient and significant information for all disciplines

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The physical oceanographers who have been processing infrared satellite data for about 20 years integrate more and more the resulting information to put forward working hypotheses, prepare and conduct experiments at sea and analyse *in situ* measurements. This should account for the interest to be given to a signal emitted by a few-micron superficial layer.

Nevertheless, some field physicists remain unattracted by this information as well as many biologists, chemists, sedimentologists and other scientists working on marine pollutants or coastal engineering. A major reason might be that the importance of the mesoscale phenomena (10 to 100 km, days to months), which are relatively intense and have generally a strong signature on the sea surface temperature (SST), is often underestimated. The aim of this presentation is to bring more evidence about the interest every scientist should find in analysing remotely-sensed SST images.

Practically, while in the office, one can purchase (sometimes with less than a dozen ecus a 1000km x 2000km scene with a ≈ 1 km² pixel) either numerical data or printed images at several places where these data have been archived for years. While at sea one can receive data in real time on board. It is possible to process the data and get coloured SST images with a simple micro computer in few tens of minutes. Provided the signal is oceanographically relevant, which is easily checked with basic knowledge and a bit of practice, one can infer information on the distribution of the surface water masses, the direction of the surface currents and, with a minimum background in physical oceanography, have indications on the dynamical structure at depth. Several examples will be given about the relationships between SST and parameters relevant to disciplines other than physical oceanography.

An atlas covering the whole Mediterranean Sea, and dealing with the analysis of representative images, monthly maps of thermal fronts and statistics collected during a 9-year period (LE VOURCH *et al.*, 1992) will be presented and made available during the congress.

REFERENCES

LE VOURCH J., MILLOT C., CASTAGNE N., LE BORGNE P., and OLRYS J.P., 1992. - Atlas of thermal fronts of the Mediterranean Sea derived from satellite imagery. *Mémoires de l'Institut Océanographique*.