

COUNTRY: ITALY

Project Title:

SINAPSI (Seasonal Interannual and Decadal Variability of the Atmosphere, Oceans and Marine Ecosystems)

Source of information:

Dr. Nadia Pinardi, June 2000, updated by Dr Marco Zavatarelli, December 2003

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Project Description:

The project contributes to the analysis of the observed climate variability both at the global and regional scales and to the development of global and regional numerical models of the atmosphere, ocean and marine ecosystems. The project aims to stimulate the development and the utilisation of state-of-the-art numerical models of the global atmosphere and ocean for the scientific, academic and operational Italian communities. It concentrates on the global atmosphere-ocean interactions and in particular on the Mediterranean Sea ecosystem dynamics. The Mediterranean is now recognized as a "climatic laboratory" where important interactions between atmosphere, hydrosphere and biosphere occur at high intensity and they can be used as indicators of more general fluctuations and trends. The proposed research is based upon both existing observational data sets and modeling work and the collection of new observations and development of new models in order to be able to better understand and predict the climate fluctuations at seasonal, interannual and decadal time scales.

The main goals will be achieved through a number of more specific objectives, namely:

1. The understanding and simulation of the seasonal to interannual variability of the atmospheric and coupled ocean-atmosphere systems, through coupled ocean-atmosphere numerical simulations, model developments, diagnostic and theoretical studies. In particular the climate anomalies over the European sector and the Mediterranean area will be investigated;
2. The investigation of the seasonal, interannual and decadal variability of the Mediterranean Sea ecosystem structure through the collection of new observations in key areas of climatic response, the study of existing observational time series, the modeling of the interactions between the atmosphere and the ocean and the numerical modeling of the general circulation variability;
3. The study of the seasonal and interannual variability of primary productivity in the Mediterranean together with the study of benthic, pelagic organism and fish stocks fluctuations through the analysis of existing observational long time series and the modeling of the response of biota to geophysical forcing variability;
4. The study of the paleoclimatic records in the terrestrial and marine ecosystems in order to detect the seasonal/interannual and decadal changes in past climatic regimes and intercompare the conceptual models of the recent and past climate variability.

System Type Studied:

Coastal and open ocean ecosystems in the Mediterranean Sea

Target Organisms:

Zoobenthic and phytoplankton communities
Small pelagic fishes (sardines and anchovies)

Physical Processes Examined:

Large scale upwelling and primary production
Coastal versus open ocean ecosystem dynamics

Key Questions, Hypotheses and Issues:

- to increase our capability to predict climate fluctuations in the atmosphere, ocean and marine ecosystems at the relevant time scales;
- to define key climatic biogeochemical and physical parameters and key marine areas for monitoring the Mediterranean basin fluctuations in terms of ecosystem response at the seasonal, interannual and decadal time scales.

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Participating Institutions:

Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna (ARPA-SMR).
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Consorzio Interuniversitario CINECA
Consorzio Nazionale Interuniversitario per le Scienze del Mare (CONISMA)
Laboratorio di Biologia Marina (LBM-TS)
Dipartimento di Biologia, Università di Padova (BIOL-PD)
Dipartimento di Biologia ed Economia Agro-Industriale, Università di Udine (BIOL-UD)
Dipartimento di Scienze dell'Uomo e dell'Ambiente, Università di Pisa (DAU-UNIPI)
Dipartimento di Biologia Animale e dell'Uomo, Università di Roma "La Sapienza" (DBA-ROMA)
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Istituto Centrale per la Ricerca scientifica e tecnologia applicata al Mare (ICRAM)
Istituto Nazionale di Geofisica (ING)
Istituto di Fisica dell'Atmosfera (IFA-CNR)
Istituto di Geologia Marina (IGM-CNR)
International Marine Center (IMC)
Istituto per lo studio dell'Oceanografia Fisica (IOF-CNR)
Istituto di Ricerche sulla Pesca Marittima (IRPEM-CNR)
Istituto Sperimentale Talassografico (IST-CNR)
Istituto Sperimentale Talassografico "A. Cerruti" (ITA-CNR)
Istituto Talassografico di Trieste (ITT-CNR)
Istituto Universitario Navale di Napoli (IUN)
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Stazione Zoologica Anton Dohrn (SZN)
Università Ca' Foscari di Venezia, Dip. di Scienze Ambientali
Università degli studi di : Tor Vergata, Ancona, Firenze, Genova, Lecce, Milano, Trieste.

Number of scientists and fte:

70

Duration:

3 years

Budget:

Lit. 3.500.000.000 (approved in 1998 and started in 2000)

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Ministero dell'Universita' e della Ricerca Scientifica e Tecnologica (MURST)