

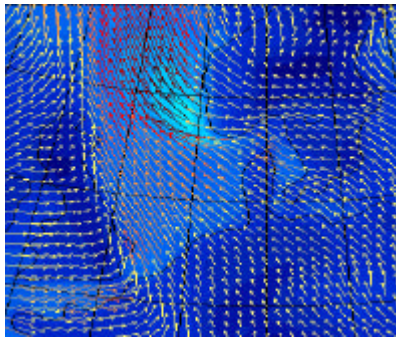


HIPOCAS

Hindcast of Dynamic Processes of the Ocean and Coastal Areas of Europe

Objective

The objective is to obtain a 40-year hindcast of wind, wave, sea-level and current climatology for European waters and coastal seas for application in coastal and environmental decision processes.



REMO Wind Fields in the North Sea

Atmospheric Data

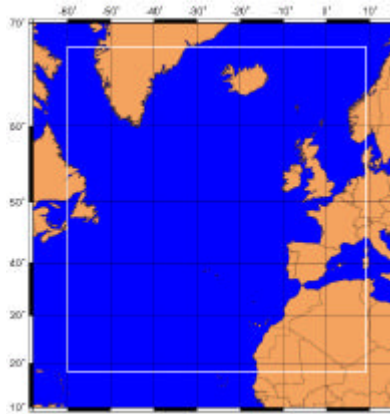
At present a 40-year global atmospheric re-analysis carried out by the National Centre for Environmental Prediction, Washington, USA (NCEP) and the National Centre for Atmospheric Research, Boulder, Colorado, USA (NCAR) is available, and will be used as a starting point.

A new technique will be used to obtain small-scale analyses from the global re-analyses. It is based on the view that small scale details of the atmospheric fields are a result of interaction between larger scale atmospheric flow and smaller scale geographic features such as topography, land-use or land-sea distribution.

The NCEP global data set and the new technique developed to obtain small scale analyses from the global re-analyses will be used in the frame of this project to produce a 40 years data set of homogeneous and high resolution atmospheric data.

The technique has been developed and applied to the NCEP-reanalysis for the period 1957-96 in a national project for an area covering most of Northern Europe and adjacent seas. The data are provided on a 50x50km grid and will be used in the project to force the wave and ocean models at the upper boundary.

A repetition of such a "regional reanalysis" will be executed within the project for three areas, namely, the Irish Sea, the Northeast Atlantic south of the UK and including the Azores and Canary Islands and the Mediterranean Sea. This effort aims at the use of already proven techniques to exploit the available atmospheric data and obtain the necessary forcing for ocean circulation and wave models.

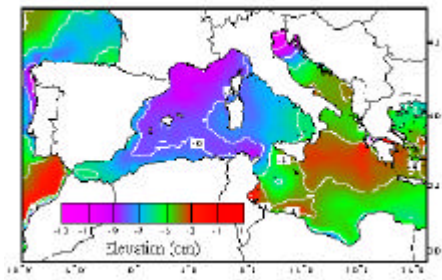


North Atlantic Area

Sea-level, Current and Wave Data

The atmospheric data will be used to force state-of-the-art wave models (WAM) and ocean circulation models (HAMSOM) in regional areas around Europe so as to produce climatic information on waves, sea levels, and currents in a very large extend of the European coast.

Measurements of the water level are available at a number of tide gauges. However, to take this data into account in the wave hindcast two-dimensional arrays at a high temporal resolution are needed instead of time series at a few locations irregularly distributed in space. In order to obtain these high-resolution data a high-resolution current model will be set-up and integrated for the past 40 years using the same meteorological forcing as the following-up wave hindcast. In order to guarantee the best possible representation of the 2-d water level field the output of this integration will be extensively verified against measurements.



Sea Level Elevation in the Mediterranean

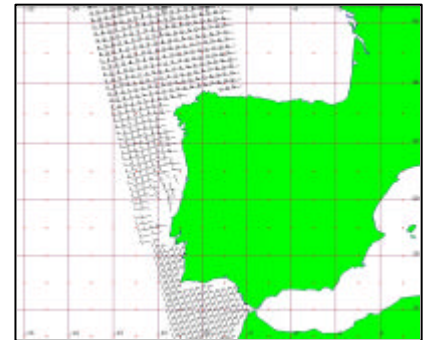
Finally, the meteorological and the water level data will be used to force high-resolution deep and shallow water wave model. The data of this fine grid hindcast will be used to compute the wave statistics (climatology, extremes) over the past 40 years.

The approach will be adopted by different partners' analysis of the North Sea south of approximately 56°N, the Irish Sea, the North East Atlantic south of the United Kingdom (included the Azores and Canary Islands) and the Mediterranean Sea.

Validation and Synthesis of the Data

The available satellite data, including wind, wave and sea-level data, will be collected and calibrated for the same areas with available measurements and will be used to be compared with the hindcast results, so as to yield some uncertainty measures related to the data.

All available experimental data will be used to verify the hindcast in order to assess the quality of the numerical data being produced. An important feature of this hindcast is that the use of the same numerical models for the whole period will reduce inhomogeneities to a minimum, being the only source, if present, in the meteorological data assimilated in the atmospheric model run. This fact will allow to extrapolate the conclusions about the accuracy of the data set, derived from the verified period (last 10 to 15 years), to the whole period.



Scatterometer Wind Fields in the Iberian Peninsula

The length of the period (40 years) will allow the carrying out of reliable extreme and mean analysis from the hindcast data, and the absence of inhomogeneities will make the data set extremely useful to study climate trends.

Statistical analysis of the produced atmospheric, circulation, wave and remote sensed data will be performed in order to provide information about the climatological trends in the European Waters and Coastal Seas.

For information contact: Prof. Carlos Guedes Soares
Instituto Superior Técnico

Av. Rovisco Pais
1049-001 Lisboa – PORTUGAL

Tel: (351-21) 8417957
Fax: (351-21) 8474015

E-mail: guedess@alfa.ist.utl.pt

