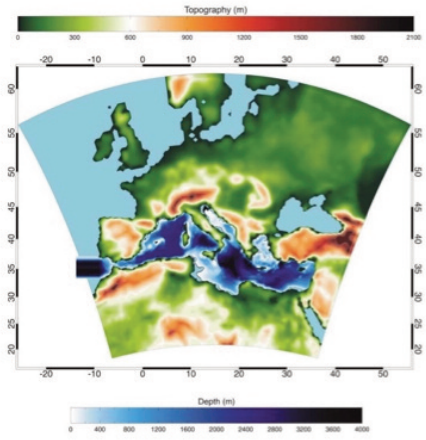
NACE CODE M72

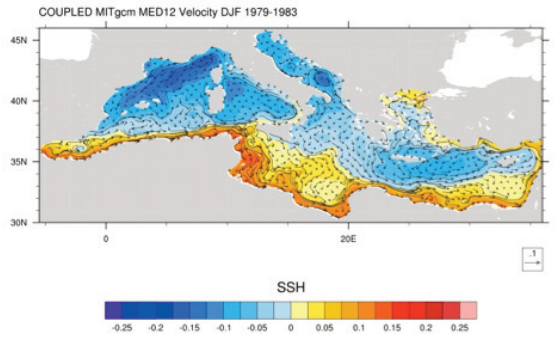
HIGH-RESOLUTION REGIONAL CLIMATE MODELING

Innovations and benefits - Regional climate models (RCMs) have the general objective of producing data at local scale (<10-15 km) and their outputs are increasingly used for impact assessment and adaptation studies to climate change. The main advantage with respect to climate models or Earth System models is the limited use of computing resources and the possibility to produce high spatial resolution predictions on a relatively limited region of the Globe allowing a more accurate description of the interactions between the atmospheric dynamics and the Earth's surface, both in terms of air-sea interactions and interaction with land surface (topography, vegetation, lakes, cities).
In general, regional climate models are made up by a mesoscale model simulating the physics and dynamic of atmosphere while processes occurring at land surface are represented through specific embedded models, ranging from relatively simple parameterizations to complex terrestrial ecosystem models. On the other side, the sea surface in commonly considered as a boundary condition, thus the information on ocean state is collected from coarse global models as an input data.
Unlike traditional RCMs, the regional earth system model ENEA-REG, developed and used by SSPT-MET-CLIM, is made up of an atmospheric model, a regional ocean model and an hydrological model which simultaneously exchange data between them; this coupled model has the capability to simulate the whole climate system taking into account the feedbacks occurring between atmosphere, land surface-and ocean.

Use - Considering the Euro-Mediterranean area, several studies suggest that this region is particularly sensitive to climate change and reduced precipitation, increasing heat-waves and land degradation have been projected for the coming decades. Therefore, the data produced by ENEA-REG will be useful to study the climate variability and its impacts on the Mediterranean region, to assess frequency and intensity of extreme events (heat waves, drought, wildfires) during the present and projected climate, and more in general for any risk assessment (e.g. human or ecosystem heath, energy and food production).

Applications and ongoing Activities - The ENEA-REG regional coupled model system has the capability to include or exclude several model components (atmosphere, land carbon cycle, river routing, ocean, wave) to allow different applications. Currently, we are producing climate data to be used by ENEA laboratory of sustainability to estimate plant phenology and food production, and for some Italian Ministry; in addition, simulations are used for scientific purposes within the international MED-CORDEX framework.





Characteristics: CUSTOM
The service can be flexibly adapted to different needs and situations

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