The Project MACMAP: an inter-disciplinary contribution to the study of the present changing climate

Antonio Guarnieri [(1)] (INGV), C. Fratianni[(1)], M. Olivieri[(1)], N. Lo Bue[(2)], S. Simoncelli[(1)], G. Muscari [(3)], S. Danesi[(1)], M. Locritani[(3)]

(1) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Bologna, Bologna, Italy
(2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Palermo, Palermo, Italy
(3) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Roma2, Roma, Italy

The rapid ongoing climate change, its driving mechanisms and its environmental, economic and societal implications in the mid to long-term time scales are among the most debated issues within the environmental scientific community today. Albeit the increasing effort made in recent years to understand the complex dynamics of climate change both at national and international level, the degree of comprehension of the behavior of the Earth system *as a whole* is far from being considered satisfactory.

The technological and scientific means available today and the integration of different disciplines offer the possibility to study climate in a multifaceted and manifold way, so that a single specific issue may be approached from different perspectives, resulting in a better focus of the entire problem.

MACMAP, a Strategic Department Project of INGV started in October 2020, aims to study the climate change in the Polar and Mediterranean regions by extending and integrating existing data with new observations, modelling outputs and qualitative information from the recent past to near future scenarios (Figure 1). The project follows a multidisciplinary approach involving transboundary expertise from different scientific fields: from atmospheric science to oceanography and hydrology, from space to sea level studies, from seismological to geochemical sciences. In particular, several different open issues are addressed:

- the impact of climate change on the ocean circulation;
- how climate change affects the deep ocean processes;
- the evolution of sea level rise from the recent past to the near future (up to 2100);
- the chemical composition of the sea as a proxy of climate change;
- how climate change affects the isotope composition of meteoric water;
- the relation between the ionized atmosphere and climate change;
- the impact of atmospheric forcing on the cryosphere, which is rapidly changing in response to global warming.

Such a diversity of topics and science backgrounds implies a dedicated effort to an optimized and efficient data management, following international standards in compliance with FAIR principles to ensure open data access and interoperability.

Beside the scientific targets, this project represents an important attempt to reduce the fragmentation of Research by creating strong synergies among different expertise and thematic areas.

In this presentation we will introduce MACMAP strategy, aims and structure after one year from the start of the activities, with a specific focus on the Mediterranean Region.