



## Data, product and service from Copernicus program to support Cultural and Natural Heritage monitoring, protection and management.

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During the last decades, there has been quickly increasing awareness of the need for efficient, science-based tools, to be used to monitor and protect cultural and natural heritage. Indeed heritage assets are increasingly at risk because of the impact of natural and anthropogenic hazards, the frequency and intensity of which continue to be amplified and worsened by climate change. The protection of archaeological sites and monumental complexes in the age of mass tourism and climate change represents a growing challenge that can only be addressed by integrating management models and best practices. In this context, the innovative application of remote sensing technologies and Copernicus data and information could certainly constitute a turning point as demonstrated in other transversal areas. Sites and monuments are affected by various anthropogenic environmental pressures, acting in synergy, that impact them with varying frequency and intensity both in space and time. Therefore, long-term monitoring of prioritised environmental and climate parameters and indicators, at proper spatial and temporal resolution, is a key requirement for setting up action plans and strategies of sustainable management. This monitoring should rely on the integration of data from remote sensing and in situ measurements, along with climate modeling and forecasting outputs. The present paper aims to summarize the work and outcomes conducted by the Task Force Copernicus Cultural Heritage (CCHTF) to evaluate the uptake extent in the field of Cultural Heritage management by the Copernicus Committee. The objective of CCHTF was to assess the current and future potential of Copernicus data, services and products uptake by users, and identify the possible Copernicus architectural solutions to support data and/or information access. The CCHTF was composed by the Member States' (MS) national experts, from both the Cultural Heritage and Earth Observation domains, officially coordinated by Italy and chaired by the Italian Ministry of Culture. The CCHTF included an extended range of stakeholders (research and business communities, public authorities, policy and decision makers, operational bodies and social players), who provided a set of users' needs, extending across the different cultural heritage disciplines.

The interaction with the Copernicus Entrusted Entities responsible for the Service, Space and in-situ component developments resulted in the identification of a number of further Copernicus products, suitable for support of CH users' activities; these mostly stem from the Global Land Component, Atmosphere, Climate Change and Marine monitoring Services, as well as Emergency and Security. At the end of the users consultation phase, 41 specific requirements were identified. After that, the matching of the identified requirements with the Copernicus capacity was addressed, identifying 31 requirements partially or completely satisfiable by the current Copernicus products. As general outcome we can say that cultural heritage sector stands to benefit greatly from an increased use of

remote sensing technologies. It is also expected that the use of Copernicus capabilities by cultural heritage stakeholders will produce innovative new methods and approaches to cultural heritage protection and management. This importance must urgently be reflected by substantial and sustainable investment into all of the EU's relevant technological programs.