

## **Joint session WP9 (Marine corrosion) and WP21 (Historical and archaeological artefacts)**

### **Title: Ancient metals in marine environments: corrosion mechanisms and protective treatments**

Marine environments are particularly aggressive to historical and archaeological artefacts. Immersed environments have high sulphur and chloride levels, producing a range of sulphur and chloride bearing corrosion products, controlled by levels of oxygenation and the action of sulphate reducing bacteria within the sea and seabed. Post excavation oxidation of sulphides, transformation of corrosion products and the action of chloride electrolytes, support rapid corrosion that results in the physical destruction of artefacts. In coastal areas, in situ historical and cultural objects, buildings and museum collections are at a high risk of corrosion from the prevailing chloride laden atmosphere.

Understanding corrosion mechanisms and their impact on the physical integrity and heritage value of marine archaeological and historical metal objects is essential for developing evidence based treatments that have predictable outcomes. Composite historical metal objects will place compatibility constraints on the choice of treatments, which is further complicated by contextual and ethical factors such as aesthetics and material integrity.

Multidisciplinary research is needed to develop a synergy that is strong enough to deliver proven preservation methods for heritage objects in marine contexts. Areas of research would include:

- long term corrosion mechanisms of archaeological metals immersed in seawater;
- atmospheric corrosion mechanisms of metals commonly encountered in heritage and art contexts within marine environments (wrought and cast iron, weathering steels, bronze, aluminum and other alloys);
- preservation and protection in-situ within seawater (diffusion barriers and cathodic protection);
- preservation of metallic objects in the atmosphere (traditional and innovative organic coatings).

The aim of this joint session is to present papers that address the challenges highlighted. In doing so, it is hoped that links between marine corrosion scientists and researchers in the heritage profession will be forged. These will offer opportunity to identify collaborative avenues of research that will generate evidence based preservation procedures, which will enhance the life span of our historical and archaeological cultural heritage.