Marine Ecosystem Restoration in Changing European Seas

merces
restoring marine ecosystems

Horizon 2020 project


Kelp forests are a key habitat requiring restoration to maintain the good and services they provide.

THE CHALLENGE OF MARINE ECOSYSTEMS RESTORATION

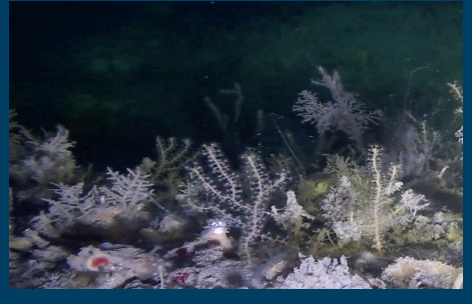
Global change and anthropogenic impacts (from farming to fisheries, from coastal development and industrial exploitation of marine resources) are having major impacts on the global biosphere. Direct and indirect human pressures on marine ecosystems are expected to increase considerably in the next few decades, leading to a serious loss of marine biodiversity and the degradation of ecosystem functioning.

Habitat loss and habitat degradation are the most important causes of collapses in population, species decline and extinctions in the marine environment. It is widely recognized that a range of restoration actions are essential to halt further decline. There is an urgent need for integrated environmental management actions for the preservation and restoration of habitats and key species based on the best scientific knowledge.

The knowledge of the ecological restoration of marine systems lags significantly behind that of terrestrial systems. However, it has been shown recently that the principles and attributes of restoration in terrestrial ecosystems can be applied to marine habitats. New scientific data and tools are essential for decision-making and resource management of European Seas.

The 'Marine Ecosystem Restoration in Changing European Seas' (MERCES) project aims to

i) assess the outcomes of different solutions for marine restoration across habitats;
ii) determine the degree of their effectiveness along with a socio-economic/cost-benefit analyses; and
iii) define legal, policy and governance frameworks of the restoration actions.

	Before Restoration	After Restoration
Shallow, soft-bottom habitats (e.g. Seagrass meadows)		
Shallow, hard-bottom habitats (e.g. Macroalgal beds)		
Deep-sea habitats (e.g. Cold-water corals)		

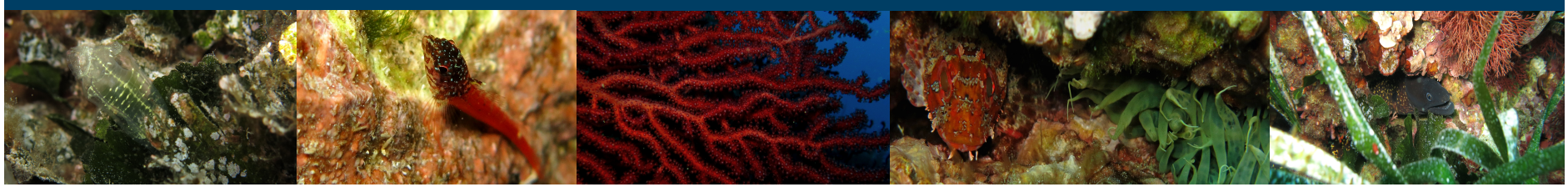
SPECIFIC RESTORATION ACTIONS

To date restoration actions carried out across different marine ecosystems are spatially scattered and temporally fragmented. While restoration is important in environmental policy at all levels of the EU governance the application of restoration principles in marine ecosystems is still in its infancy.

MERCES project is ambitious in providing, for the first time, an unprecedented multidisciplinary and integrated approach for the creation of new tools and methods to assess and predict the efficacy of environmental restoration measures, with special focus on biodiversity, ecosystem functioning, goods and services.

Pilot studies of restoration will be carried out in marine, shallow soft bottoms habitats (including seagrass meadows: *Zostera spp*. and *Posidonia oceanica*, and mussel reefs: *Mytilus, Pinna, Serripes, Ostrea*) and shallow hard bottoms and mesophotic habitats in different European Seas (gorgonians: *Paramuricea clavata, Corallium rubrum;* sponges: *Spongia officinalis, S. lamella, Hippospongia communis, Axinella polypoides, A. cannabina, Chondrilla nucula, Calyx nicaensis*; macroalgal beds: *Laminaria hyperborea* and *Saccharina latissima* kelp forests at the Norwegian coast, and *Cystoseira spp*. in the Mediterranean Sea).

A special ambition of MERCES is to develop restoration approaches and tools in the most remote parts of the sea, the deep sea, which are being impacted increasingly by human activities, such as deep-water fisheries, oil and gas extraction and, potentially in the near future, deep-sea mining. Different restoration practices will be carried out in different habitats from the Norwegian margin to the Mediterranean Sea.




Fishery provides high quality food but bottom-trawling activities destroy the seafloor
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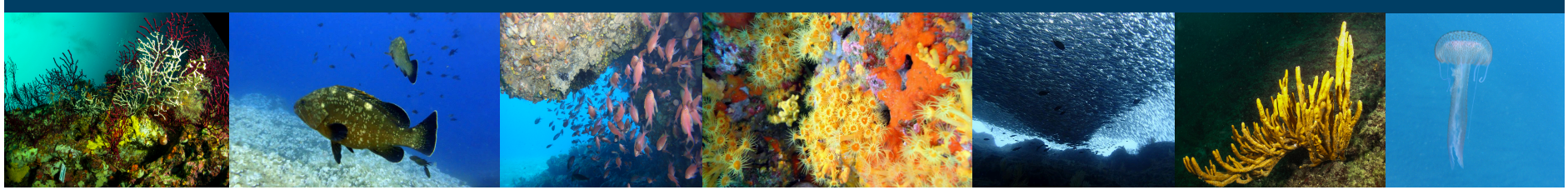
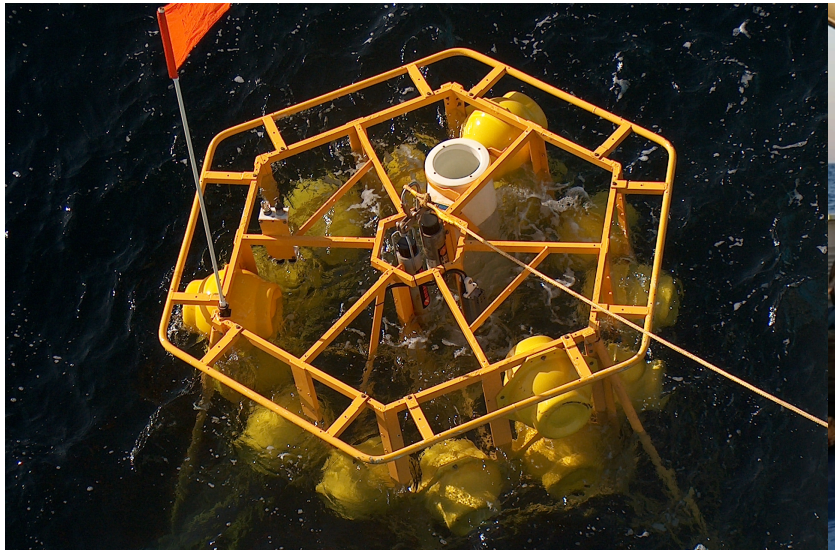
MARINE GOODS AND SERVICES

Conservation strategies alone cannot reverse the loss of natural capital due to the presence of multi-stressors. Well-designed restoration practices remain indispensable to the recovery of marine good and services important for human well-being.

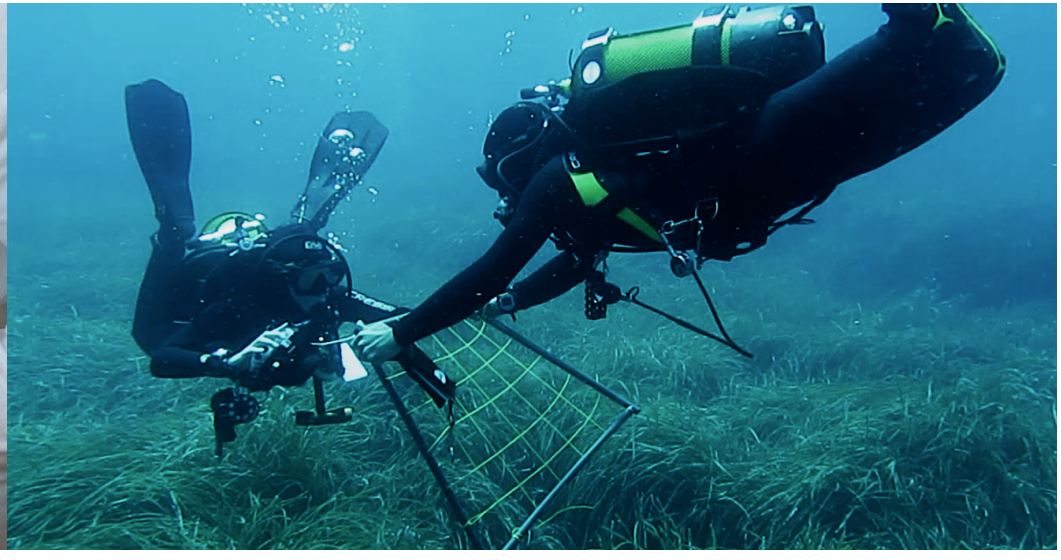
MERCES will devise methods for scaling up restoration practices for a selection of damaged EU marine ecosystems and habitats with the aim of assessing the effects of the ecological restoration on ecosystem services. It will undertake a multi-disciplinary analysis of the socio-economical costs, benefits and sustainability of marine restoration practices at the EU scale. MERCES also aims to generate job opportunities for a new generation of environmental scientists and restoration operators.

To do this MERCES will engage, particularly thorough Citizen Science tools and events, the whole restoration community (business, academia, including social sciences and humanities, public administrations and civil society) to exchange experiences, identify strengths, weaknesses and best practices, encourage the development of new techniques and technologies, and share information, knowledge and know-how in order to promote effective and sustainable restoration activities across the EU.





Active restoration means damage assessment of marine habitats, fieldwork and laboratory analyses, and monitoring of the resilience of the ecosystems.



USING SCIENCE AND TECHNOLOGIES TO DEVELOP BEST PRACTICES

MERCES will i) test new and existing restoration practices/protocols and tools on different marine ecosystems and habitats, ii) provide best practice protocols and new policy guidelines, and iii) advise on practical steps for administrations, private and public stakeholders in marine restoration. Pilot studies will allow to assess the effectiveness of the proposed actions for a new generation of restoration operators.

MERCES will provide a strong platform for the transfer of knowledge to the whole restoration community, including business, public administrations and civil society. The findings of MERCES will be translated into practical guidance for industry on how and when to implement marine restoration measures. Coupled with regulatory reform, this will help stimulate private-sector innovation in marine restoration, create economic opportunity as well as promoting sustainable business.

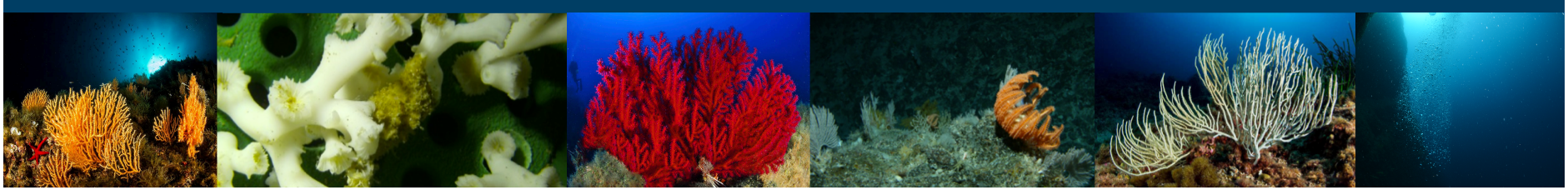
EXPECTED BENEFITS

MERCES will foster the development of new techniques and technologies, and disseminate widely information, knowledge and know-how. The results of MERCES will clearly provide vital information for the EU's growth strategy for the coming decade (the European Union's five Europe 2020 Strategy objectives - on employment, innovation, education, social inclusion and climate/energy).

The results of MERCES will produce a valuable and practical contribution to EU policies for managing and protecting marine habitats. Direct experience from case studies can be used to justify policy actions, by identifying socially accepted strategies, and known positive impacts of restorations on the maintenance and enhancement of the natural capital of the European seas.

MERCES will valorize previous research investments in restoration practices, provide a new vision for marine restoration in European seas and contribute to the roadmap for the European green economy.

MERCES aims to have important impacts on the European job market by involving of a large number of young scientists, as well as engaging with all levels of education. This will promote awareness in a new generation of the potential of marine restoration in providing healthy seas for them and their children, as well as providing them with new job opportunities in environmental sciences.

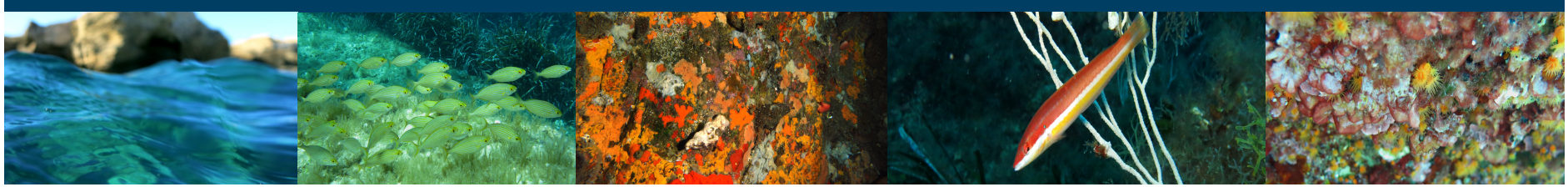


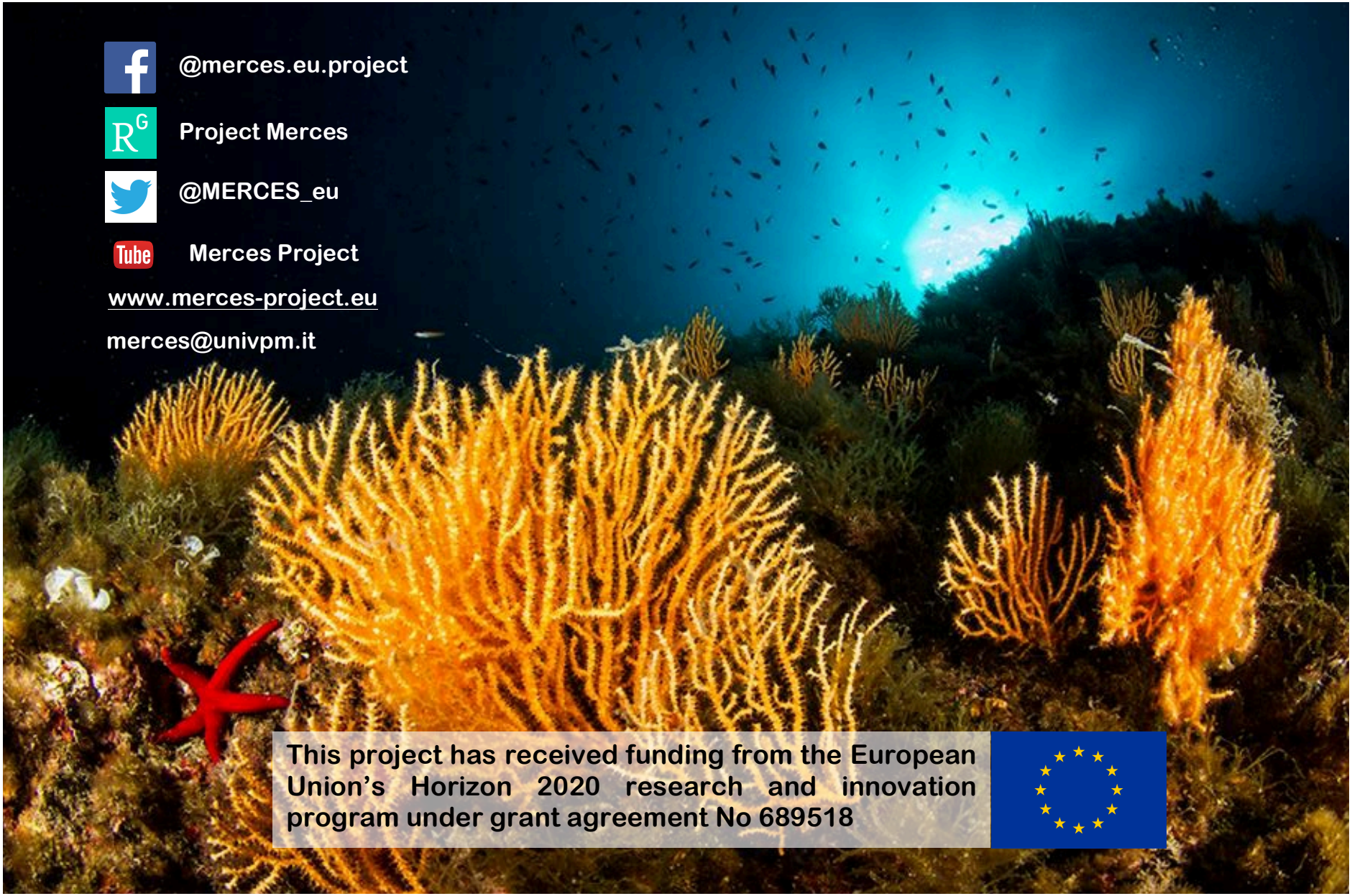
THE MERCES CONSORTIUM

28 partners from 16 countries

The MERCES multi-disciplinary consortium includes experts in marine ecology, spatial modeling, ecosystem restoration, marine law, policy and governance, socio-economics, knowledge transfer, dissemination and communication.

- *Università Politecnica delle Marche (UNIVPM) Italy*
- *Agencia Estatal Consejo Superior de Investigaciones Cientificas (CSIC) Spain*
- *Hellenic Centre for Marine Research (HCMR) Greece*
- *IMAR- Instituto do Mar (IMAR-UAZ) Portugal*
- *Alfred-Wegener- Institut Helmholtz- Zentrum Fuer Polar- und Meeresforschung (AWI) Germany*
- *Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) France*
- *National University of Ireland, Galway (NUIG) Ireland*
- *Wageningen University (WU) Netherlands*
- *Aalborg Universitet (AAU) Denmark*
- *Åbo Akademi (ÅAU) Finland*
- *Tartu Ulikool (UTARTU) Estonia*
- *University of Zagreb (PMF ZAGAREB) Croatia*
- *Consorzio Nazionale Interuniversitario per le Scienze del Mare (CONISMA) Italy*
- *Stichting Nioz, Koninklijk Nederlands Instituut voor Onderzoek der Zee (NIOZ) Netherlands*
- *Ecopath International Initiative Asociacion (EII) Spain*
- *Stichting Katholieke Universiteit (RU) Netherlands*
- *Norsk Institutt for Vannforskning (NIVA) Norway*
- *Natural Environment Research Council (NERC)*
- *Ecoreach srl (ECOREACH) Italy*
- *Studio Associato Gaia snc (GAIA) Italy*
- *Deep Seas Environmental Solutions Ltd (DSES) UK*
- *Marine Law and Ocean Policy Research Services Ltd (MLOPRS) Ireland*
- *WWF Italia (WWF-IT) Italy*
- *WCMC Lbg (WCMC) UK*
- *Akdeniz Koruma Dernegi (MCS) Turkey*
- *Universitat de Barcelona (UB) Spain*
- *Heriot-Watt University (HWU) UK*
- *Iodine sprl (IODINE) Belgium*





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