Geosphere-biosphere interactions in European Protected Areas: a view from the H2020 ECOPOTENTIAL Project

Antonello Provenzale (1), Carl Beierkuhnlein (2), Arnon Karnieli (3), Carmela Marangi (4), Mariasilvia Giamberini (1), and Simona Imperio (1)

(1) IGG-CNR, CNR, Pisa, Italy, (2) Chair of Biogeography, BayCEER, University of Bayreuth, Germany, (3) Ben Gurion University, Sede Boker Campus, Israel, (4) IAC-CNR, Bari, Italy

The large H2020 project ECOPOTENTIAL (2015-2019, 47 partners, contributing to GEO and GEOSS - http://www.ecopotential-project.eu/) is devoted to making best use of remote sensing and in situ data to improve future ecosystem benefits, adopting the view of ecosystems as one physical system with their environment, focusing on geosphere-biosphere interactions, Earth Critical Zone dynamics, Macrosystem Ecology and cross-scale interactions, the effect of extreme events and using Essential (Climate, Biodiversity and Ocean) Variables as descriptors of change. In ECOPOTENTIAL, remote sensing and in situ data are collected, processed and used for a better understanding of the ecosystem dynamics, analysing and modelling the effects of global changes on ecosystem functions and services, over an array of different ecosystem types, including mountain, marine, coastal, arid and semi-arid ecosystems. The project focuses on a network of Protected Areas of international relevance, that is representative of the range of environmental and biogeographical conditions characterizing Europe. Some of the activities of the project are devoted to detect and quantify the changes taking place in the Protected Areas, through the analysis of remote sensing observations, in-situ data and gridded climatic datasets. Likewise, the project aims at providing estimates of the future ecosystem conditions in different climate and environmental change scenarios. In all such endeavours, one is faced with cross-scale issues: downscaling of climate information to drive ecosystem response, and upscaling of local ecosystem changes to larger scales. So far, the analysis has been conducted mainly by using traditional methods, but there is wide room for improvement by using more refined approaches. In particular, a crucial question is how to upscale the information gained at single-site scale to larger, regional or continental scale, an issue that could benefit from using, for example, complex network analysis.