Research Objects for Sharing and Exchanging Research Data and Methods in Earth Science

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Scientists in data-intensive disciplines increasingly call for models that go beyond the publication of datasets, allowing systematic capture of the lifecycle of scientific investigations and providing a single entry point for accessing information about (to name a few) the hypotheses investigated, the datasets used, the computations, observations and experiments carried out, their outcomes and provenance, the conclusions and findings that were derived, and even the scientists involved in a particular investigation. In this scenario, Research Objects provide a structured means to encapsulate such information and the associated methods involved, along with essential metadata and annotations aimed at both humans and computers. Research objects are therefore portable units of scientific knowledge that enable the sharing, preservation, scholarly communication, validation, and re-use of scientific outcomes. In this presentation we will focus on the application of the Research Object concept in observational disciplines and particularly Earth Science. We will present the main concepts behind research objects and discuss the challenges involved in the extension and adaptation of existing practices, modelling vocabularies, middleware and tools for these disciplines. By deploying research object technologies in Earth Science, we aim to enhance the portability of scientific materials and methods, the collaboration capabilities within and between teams of earth scientists, the quality and long-term preservation capabilities of the methods, and the means to communicate, validate and measure the impact of scientific outcomes. This work is being conducted in the context of the Horizon2020 EVER-EST project, the main objective of which is the development of a research object-centric virtual research environment for Earth Science communities.