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The VLab: a cloud-based platform to share and execute scientific models

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The need for cost-effective and sustainable solutions to environmental protection and management challenges drives the call for the adoption of sound holistic analysis, reflecting the inherent complexity and interconnectedness of environmental systems. Such systems and their reaction to varying conditions (e.g. climate change, anthropogenic pressure, etc.) can be represented by means of environmental models.
Despite the existence of many excellent models, their interoperability level is still limited. The complexity of Earth system requires breaking down research silos and bringing scientists from multiple disciplines together to collaborate with decision makers and other stakeholders to solve problems, all the while taking into consideration the social, economic, and environmental interdependency (Laniak et al., 2013).
In the Earth system science domain, most current digital infrastructures are able to support data access rather than provide answers to complex questions – noticeably, supporting the ability to address the what-if questions posed by users. That is, there is the need to shift from the data sharing paradigm to the information/knowledge generation and sharing.
In the context of the European projects ECOPOTENTIAL and ERA-PLANET, a Virtual Laboratory (VLab) is being developed. This is a cloud-based platform supporting the activity of environmental scientists in the: (i) generation of Essential Variables, Indicators and Indices from data and (ii) sharing of knowledge (ontologies), procedures (scientific business process), algorithms (source code) for reusability, reproducibility, etc. VLab is contributing to the advancement of this research area, in the context of the Global Earth Observation System of Systems (GEOSS) Model Web (Nativi et al., 2013) framework – specifically addressing the Science-to-Information Technology barrier (Santoro et al., 2016).
This presentation describes the architecture of the VLab, the results so far achieved and its way forward.

References

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