



## **OLES : Online Laboratory for Environmental Sciences**

Sandrine Anquetin (1), Xavier Beaufil (2), Véronique Chaffard (1), and Patrick Juen (1)

(1) Laboratoire d'étude des Transferts en Hydrologie et Environnement, Grenoble, France, (2) Observatoire des Sciences de l'Univers de Grenoble, France

One of the major scientific challenges in the 21st century is to improve our understanding on the evolution of the water cycle associated with the climate variability. Main issues concern the prediction of i) the water resource and the access to drinkable water and ii) the extreme events, both droughts and floods. Observation strategies covering a wide range of space and time scales must therefore be set up, while continuing advanced research on the involved mechanisms and developing integrated modeling approaches.

Within this general context, the present work relies on three natural observatories, located in West Africa, World-wide Glaciers, and in Mediterranean region, managed at LTHE (Laboratoire d'étude des Transferts en Hydrologie et Environnement; Grenoble, France) and gathered at OSUG (Observatoire des Sciences de l'Univers; Grenoble, France). Their scientific objectives aim at improving the understanding of the water cycle functioning, providing water and mass balances for multi-scale basin sizes, and evaluating the hydrological impacts of the evolving climate. Water cycle variables (precipitation; soil moisture; snow cover; discharge; air and river temperatures; suspended material; etc ...) are observed and recorded in 3 different databases built under specific technical constraints linked to the respective partnerships of the natural observatories.

Each of the observatories has its own database, and modeling tools were developed separately leading to important efforts often duplicated. Therefore, there was a need to build an integrated cyber-infrastructure to provide access to data, and to shared tools and models that enable the understanding of the water cycle. This is the project called OLES, for Online Laboratory for Environmental Sciences.

Focused on the understanding of the water cycle under contrasted climates, OLES facilitates the work of the scientific community and then, help interactions between the research community and water agencies or diverse stakeholders. OLES aims at i) extracting the required data from a GIS server, based on OGC web services (CSW, SOS, ...), ii) building a specific process chain based on modules that use NETcdf for data interoperability, iii) running the process in chosen computing facilities, OLES can connect outside on a private LAN and iv) visualizing the result of the process. Based on J2EE, the MMI of OLES is a web interface and interacts with EJB objects. OLES uses web services to communicate with a sequencer developed in C++.

Long-term objective is to promote education centered in water science strongly connected with climatic issues.

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