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A European vision for hydrological observations and experimentation

The OZCAR Critical Zone Observatory Network: an opportunity to enhance hydrological research through sites, data and model sharing

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The OZCAR (Critical Zone Observatories network) Research Infrastructure (RI) brings together several observatories documenting the critical zone, the thin pellicle on the Earth's surface between the non-weathered rocks and the lower atmosphere, which is the living environment of living beings. These long-term observatories were historically created in France to answer specific scientific questions such as the impact of rainfall acidification on forests, the genesis of extreme floods or the understanding of nitrate pollution. They monitor different compartments of the critical zone (atmosphere, soil, surface water, groundwater, cryosphere, wetlands, biosphere, etc.) through the measurement of a large number of meteorological, hydrological, hydrogeological, geochemical, surface fluxes and vegetation dynamics variables.

The aims of OZCAR RI are:

- i) To foster data sharing with the scientific community through the development of a common data portal;
- ii) To promote the use of the collected data in models;
- ii) To allow the development and deployment of new measurement techniques, taking advantages of large projects funded by the French government such as the CRITEX project (Innovative equipment for the critical zone, 2011-2022) and the TERRA FORMA project (Designing and testing a smart observatory of socioecological systems in the Anthropocene, 2021-2029), that aim at deploying innovative measurements to document the critical zone and design new observatories in the Anthropocene;
- iv) To favor interdisciplinary researches through dedicated calls.

The observatories, and their counterparts at the European scale gathered in eLTER RI, are highly instrumented sites where new measurement techniques can be tested and deployed, where hydrological functioning hypotheses can be assessed through the exploitation of data and models. These observatories are also good places to addressing some of the 23 unsolved problems in hydrology. The presentation will illustrate the value of a network of critical zone and hydrological observatories through examples of researches conducted in the OZCAR RI network.

https://www.ozcar-ri.org/

https://www.critex.fr/critex-3/observatories/

https://terra-forma.cnrs.fr/

https://elter-projects.org/