# Downstream VRE: Land and Marine domain toolboxes

## R. Franceschini1, N.C. Reyes Suárez1, A. Altenburger1, G. Rossi1, and A. Giorgetti1

### 1National Institute of Oceanography and Applied Geophysics – OGS, Italy

### Email: [rfranceschini@ogs.it](mailto:rfranceschini@ogs.it)

As part of the ITINERIS project (2022–2025), funded by NextGenerationEU, a Virtual Research Environment (VRE) has been developed to investigate the impacts of climate and environmental change. Hosted on the D4Science infrastructure, the VRE (Assante et al., 2021) offers tools for data visualization, analysis, and sharing, with dedicated toolboxes for marine and land domains.

In the **marine domain**, the toolbox focuses in carbon cycling and acidification data available in the North Adriatic Sea mainly pH, pCO2, fCO2, temperature and salinity within the different RIs in the ITINERIS project in particular data from the National Institute of Oceanography and Applied Geophysics. Three user driven tools have been made available based on different users skills and the most common tools for marine domain users: WebODV access for the extraction, analysis, exploration and visualization of oceanographic and other environmental data restricted for Argo (TS & BGC) and SeaDataNet (TS) products, jupyter notebooks to access ICOS data and the ERDDAP-navigator, an open-source web application to navigate within different ERDDAP servers giving the freedom of exploring, merge, load, edit and manually assign a quality control (QC) flag to datasets by exploiting the ERDDAP RESTful API.

In the **land domain**, the toolbox focuses on areas affected by landslides. A GeoServer and a GeoNetwork have been added to host geospatial data, including regional-scale maps of the Friuli Venezia Giulia region and local-scale maps of the Passo della Morte area (Forni di Sotto). For Passo della Morte site, drone-derived products have been acquired and are available for visualization and download. A monitoring system has been deployed at the site, including GB-InSAR, one GPS station, two extensometers, two inclinometers, and a data coordinator. Interferograms and GB-InSAR time series can be visualized directly through the platform. Additionally, a dedicated application enables quick time series analyses and automatic plot generation.

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