Land and Marine earth science applications within a Downstream Virtual Research Environment

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Sharing is encouraged

Land domain toolbox

The land domain aims to analysis areas exposed to hydrogeological hazards, in particular landslides. The focus is on the potential impact of climate change on pilot test sites. Data from the test site is collected using monitoring systems. The data are available in different formats for map visualisation and localization of events, and by means of application it is possible to create time series of displacement (Figure 1).

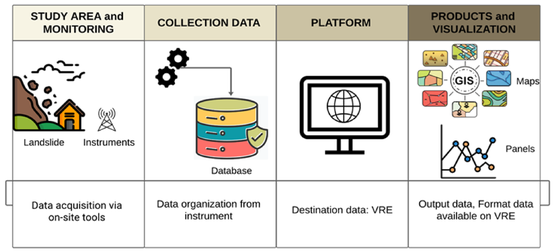


Figure 1. Workflow about data collection and products and visualization by means of maps and panels

Virtual Research Environment

A geoserver and geonetwork have been implemented hosting regional scale maps of the NE-Italy region of Friuli Venezia Giulia. To local scale, different monitoring systems (interferometric radar in Figure 2, 1 GPS, 2 extensometers and 2 inclinometers, 1 telecamera, date coordinator) have been installed at Passo della Morte in Forni di Sotto (Udine) to delineate possible ground instabilities.

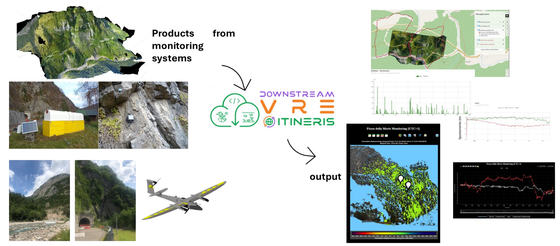
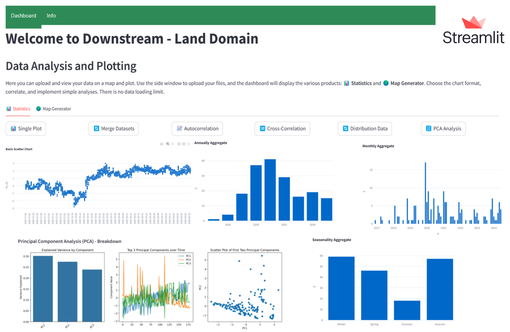


Figure 2. Input and output within VRE

To quickly analyze time series, an application was created with the help of Streamlit with python language. The application allows you to create graphs, make analyses (merge dataset, auto-correlation, cross-correlation, seasonality, PCA) and insert on map the data in csv, txt and xlsx format (Figure 3).



- Expeditious analysis
- Upload one or more data
- Analyze data by means of Statistics or Map Generator
- Different analysis can be chosen
- Downloable data plot

Figure 3. Application interface created with Streamlit and equipped by D4Science within the VRE.

Marine domain toolbox

The marine domain toolbox (Figure 4) focalizes 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. Figure 3 shows the toolbox workflow:

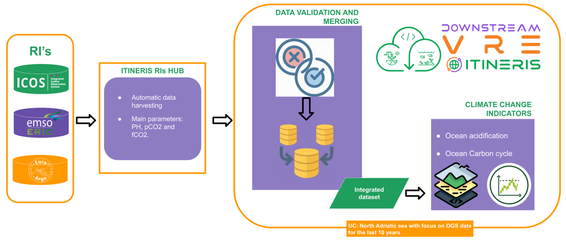


Figure 4. Marine domain toolbox workflow.

Virtual Research Environment

The webODV application has been linked to the Downstream VRE for data extraction, analysis, exploration and visualization restricted for Argo (TS & BGC) and SeaDataNet (TS) products.

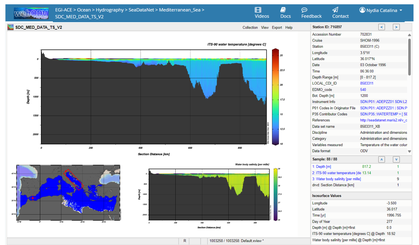


Figure 5. T&S section of the Adriatic Sea using BGC argo dataset available in the webODV application using the downstream VRE.

Implementing the ICOScp python library in the VRE by means of jupyter notebooks allows the user to explore ICOS data. Figure 6 shows OGS station (IT-FOS-MIRAMARE) use case.

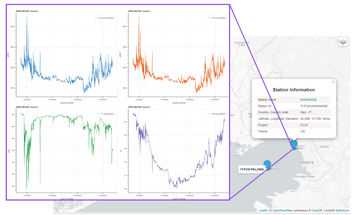


Figure 6. ICOS available stations and parameters. The plot has been generated using ICOScp python library in the downstream VRE.

The ERDDAP-navigator app allows you to navigate within ERDDAP servers and options as seen in figure 7.

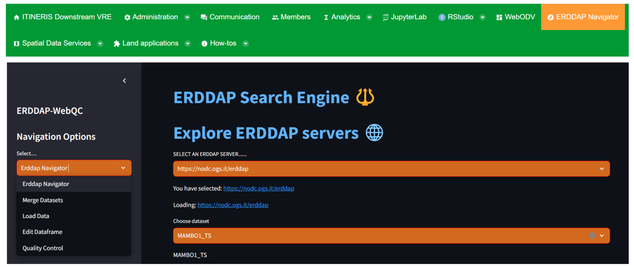


Figure 7. ERDDAP search engine screenshot and QRcode to access the application. Access is made upon register to the D4Science platform and to the downstream VRE.

Acknowledgements

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