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Federated platforms in support of risk assessment and cascading effects: EOPEN[1] - one step done, still more to go

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Earth Observation (EO) data plays an important role in understanding how climate change impacts our environment. However, when considering the ensuing disaster as the result of heavy precipitation for instance, we observe that anthropogenic contributions such as urbanisation and land use change contribute significantly to the risk of a hazard influenced by external factors becoming a disaster (man-made disaster).

The H2020 EOPEN Project (https://eopen-project.eu/) demonstrated possibilities to fuse Sentinel data with multiple, heterogeneous, and big data sources, to improve the monitoring and analysis capabilities of the future EO downstream sector2. Additionally, the involvement of mature ICT solutions in the EO sector shall address major challenges in effectively handling and disseminating Copernicus-related information to the wider user community. A reasonable level of automation was achieved making it possible to establish workflows to implement systematic processing of multiple data sources.

EOPEN**3** components are a framework core, a Dashboard environment, application specific extensions and three Pilot Use Cases which demonstrate its usage focused, respectively, on flood risk assessment and prevention, food security and climate change; moreover, the Crop Water Demand module implemented in the H2020 MOSES4 was run through the platform to demonstrate its interoperability.

Some achievements with regards to Mediterranean natural risks are:

PUC1 - Flood risk assessment and prevention - in this use case stakeholders, from offices, from local scale (municipality of Vicenza) to government scale, with specific roles during flood emergencies, have been involved to specify the needed information elements and presentation features to support their current operations; also, the early warning system (EWS) Flood Forecasting System to predict water level of the Bacchiglione river in Vicenza, implemented by the Eastern Alps River Basin District Authority (AAWA), was empowered through access to several additional input data for their hydrological model, such as those available from Copernicus Global Land Services (CGLS) as well as an additional weather forecast, provided by the Finnish Meteorological Service, and maps of the flooded areas generated in the platform.

PUC3 - Climate Change - this use case focused on challenges that climate change brings to the local reindeer herding livelihoods and to the infrastructure and transportation in Finland, which can be a reference for Mediterranean countries facing similar problems in mountainous areas.

While EOPEN achieved a level of processing autonomy, not all aspects of the operational workflow

were included. Adding interconnection and feedback mechanisms would significantly reduce human intervention needed to compliment the data and connect the systems that eventually lead to delivering the service in support of decision makers, also interfacing currently used DSS. For example, in the case of PUC1, the system supported the preparedness and partly the response (weather forecast included) phases whereas recovery and prevention actions were not included.

Anticipating future Horizon calls, future EOPEN improvements will address the quality of modelling in particular risk assessment and compounding cascading events, and the connectivity of the various steps of operational workflows thus reducing the need for human intervention simply to create a continuum of the workflow to deliver services.