

Development of a New Research Data Infrastructure for Collaboration in Earth Observation and Global Change Science

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With the global population having surpassed 7 billion people in 2012, the impacts of human activities on the environment have started to be noticeable almost everywhere on our planet. Yet, while pressing social problems such as mass migration may be at least partly a consequence of these impacts, many are still elusive, particularly when trying to quantify them on larger scales. Therefore, it is essential to collect verifiable observations that allow tracing environmental changes from a local to global scale over several decades. Complementing in situ networks, this task is increasingly fulfilled by earth observation satellites which have been acquiring measurements of the land, atmosphere and oceans since the beginning of the 1970s. While many multi-decadal data sets are already available, the major limitation hindering their effective exploitation in global change studies is the lack of dedicated data centres offering the high performance processing capabilities needed to process multi-year global data sets at a fine spatial resolution (Wagner, 2015). Essentially the only platform which currently offers these capabilities is Google's Earth Engine. From a scientific perspective there is undoubtedly a high need to build up independent science-driven platforms that are transparent for their users and offer a higher diversity and flexibility in terms of the data sets and algorithms used. Recognizing this need, TU Wien founded the EODC Earth Observation Data Centre for Water Resources Monitoring together with other Austrian partners in May 2014 as a public-private partnership (Wagner et al. 2014). Thanks to its integrative governance approach, EODC has succeeded of quickly developing an international cooperation consisting of scientific institutions, public organisations and several private partners. Making best use of their existing infrastructures, the EODC partners have already created the first elements of a federated IT infrastructure capable of storing and processing Petabytes of satellite data. One central site of this infrastructure is the Science Centre Arsenal in Vienna, where a cloud platform and storage system were set up and connected to the Vienna Scientific Cluster (VSC). To provide functionality, this facility connects several hardware components including a Petabyte-scale frontend storage for making data available for scientific analysis and high-performance-computing on the VSC, and robotic tape libraries for mirroring and archiving tens of Petabyte of data. In this contribution, the EODC approach for building a federated IT infrastructure and collaborative data storage and analysis capabilities are presented.

REFERENCES

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