

VERCE Delivers a Productive E-science Environment for Seismology Research

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Abstract:

The VERCE project has pioneered an e-Infrastructure to support researchers using established simulation codes on high-performance computers in conjunction with multiple sources of observational data. This is accessed and organised via the VERCE science gateway that makes it convenient for seismologists to use these resources from any location via the Internet. Their data handling is made flexible and scalable by two Python libraries, ObsPy and dispel4py and by data services delivered by ORFEUS and EUDAT. Provenance driven tools enable rapid exploration of results and of the relationships between data, which accelerates understanding and method improvement. These powerful facilities are integrated and draw on many other e-Infrastructures. This paper presents the motivation for building such systems, it reviews how solid-Earth scientists can make significant research progress using them and explains the architecture and mechanisms that make their construction and operation achievable. We conclude with a summary of the achievements to date and identify the crucial steps needed to extend the capabilities for seismologists, for solid-Earth scientists and for similar disciplines.