AlpArray - technical strategies for large-scale European co-operation in broadband seismology

A. Brisbourne (1), J. Clinton (2), G. Hetenyi (2), C. Pequegnat (3), M. Wilde-Piorko (4), A. Villasenor (5), P. Comelli (6), and the AlpArray Working Group (7)

(1) SEIS-UK, University of Leicester, Leicester, UK, (2) Swiss Seismological Service (SED), ETH Zürich, Switzerland, (3) LGIT/CNRS, Seismology, Grenoble, France, (4) Faculty of Physics, Institute of Geophysics, University of Warsaw, Poland, (5) Institute of Earth Sciences "Jaume Almera", CSIC, Barcelona, Spain, (6) Centro di Ricerche Sismologiche, OGS, Udine, Italy, (7) www.seismo.ethz.ch/alparray

AlpArray is a new initiative to study the greater Alpine area with a large-scale broadband seismological network. The interested parties (currently 32 institutes in 12 countries) plan to combine their existing infrastructures into an all-out transnational effort that includes data acquisition, processing, imaging and interpretation. The experiment will encompass the greater Alpine area, from the Black Forest in the north to the Northern Apennines in the south and from the Pannonian Basin in the east to the French Massif Central in the west. We aim to cover this region with high-quality broadband seismometers by combining the ∼400 existing permanent stations with an additional 400+ instruments from mobile pools. In this way, we plan to achieve homogeneous and high resolution coverage while also deploying densely spaced stations along swaths across key parts of the Alpine chain. These efforts on land will be combined with deployments of ocean bottom seismometers in the Mediterranean Sea.

Significant progress has already been made in outlining the scientific goals and funding strategy. A brief overview of these aspects of the initiative will be presented here. However, we will concentrate on the technical aspects: How efficient large-scale integration of existing infrastructures can be achieved. Existing permanent station coverage within the greater Alpine area has been collated and assessed for data availability, allowing strategies to be developed for network densification to ensure a robust backbone network: An anticipated deployment strategy has been drawn up to optimise array coverage and data quality. The augmented backbone network will be supplemented by more densely spaced temporary arrays targeting more specific scientific questions. For these temporary arrays, a strategy document has been produced to outline standards for station installation, data acquisition, processing, archival and dissemination. All these operations are of course vital. However, data dissemination is seen as the most critical component of such a large-scale initiative and is therefore being addressed in most detail. Similar to the routine for permanent networks, temporary stations will acquire data according to community standards with archival at, and data retrieval from, umbrella organisations such as the Orfeus Data Centre. These aspects will strengthen ongoing efforts to establish common European data centres through expansion of use of EIDA.