

EGU24-17890, updated on 16 Feb 2025

<https://doi.org/10.5194/egusphere-egu24-17890>

EGU General Assembly 2024

© Author(s) 2025. This work is distributed under the Creative Commons Attribution 4.0 License.



## The mobile Finnish Seismic Instrument Pool

**Roméo Courbis**<sup>1</sup>, Gregor Hillers<sup>1</sup>, Emilia Koivisto<sup>2</sup>, Päivi Haapanala<sup>1</sup>, Ilmo Kukkonen<sup>2</sup>, Yinshuai Ding<sup>2</sup>, Thomas Fordell<sup>3</sup>, Suvi Heinonen<sup>5</sup>, Niina Junno<sup>1</sup>, Anssi Juntunen<sup>1</sup>, Kari Komminaho<sup>1</sup>, Elena Kozlovskaya<sup>6</sup>, Jussi Leveinen<sup>4</sup>, Kari Moio<sup>6</sup>, Jyri Näränen<sup>9</sup>, Tahvo Oksanen<sup>1</sup>, Pietari Skyttä<sup>8</sup>, Eija Tanskanen<sup>7</sup>, and Timo Tiira<sup>1</sup>

<sup>1</sup>Institute of Seismology, University of Helsinki, Helsinki, Finland

<sup>2</sup>Department of Geosciences and Geography, University of Helsinki, Helsinki, Finland

<sup>3</sup>VTT Technical Research Centre of Finland, Espoo, Finland

<sup>4</sup>Aalto University, Espoo, Finland

<sup>5</sup>GTK, Espoo, Finland

<sup>6</sup>Oulu Mining School, University of Oulu, Oulu, Finland

<sup>7</sup>Sodankylä Geophysical Observatory, University of Oulu, Oulu, Finland

<sup>8</sup>University of Turku, Turku, Finland

<sup>9</sup>Finnish Geospatial Research Institute, National Land Survey, Espoo, Finland

We report on establishing the Finnish mobile seismic instrument pool that is owned and operated by seven Finnish academic and research institutions. The pool infrastructure is funded by the Research Council of Finland, through the FLEX-EPOS project and under the FIN-EPOS umbrella. It is financing the build-up stage and started in 2021 with an end in 2024. By then the seismic instrumentation is anticipated to include 46 Güralp broadband seismometers, 5 Güralp accelerometers, and 1197 and 70 Geospace and SmartSolo self-contained geophone units, respectively. It is making this probably the largest coherent mobile seismic instrument pool in Europe in the public sector. The pool supports domestic and international collaborative projects of temporary deployments to enhance data-driven subsurface and environmental applications. Those deployments are for active or passive experiments and can last a few days up to a few years. The acquisition of such pool is motivated and facilitated by the advent of efficient data storage and transmission and powerful computing systems; progress in the understanding of the seismic wavefield coupled with the development of new types of analysis techniques and algorithms; and the manufacturing of sensitive, affordable data-dense sensor systems. Despite these game-changing and promising developments, the access to many seismic sensors for large-N deployments is not pervasive. Even in developed countries, it is challenging for a single institution to acquire and maintain a sufficiently large mobile pool of instruments and ensure sustainable data production and distribution. Our report on the equipment, facilities, ownership, and governance structure, project management, and data systems is essential background information for the access to and utilization of the pool instruments, and the interaction with the support community. A discussion about best practices for establishing and maintaining a mobile pool infrastructure can benefit from our experience of building such an extensive public seismic

infrastructure from the ground up, and it provides relevant information for communities considering similar research infrastructure projects. Among the many challenges and opportunities associated with establishing effective pool management and operations, we highlight the lack of a coherent community protocol to store, find, disseminate, and analyze the associated large datasets. The Finnish mobile seismic instrument pool actively engages with ORFEUS/EIDA and the Geo-INQUIRE project to contribute to developing community solutions for data discovery and accessibility.