SOLID EARTH SEMINARS

A BACKPROJECTION TOOL TO LOCATE WEAK EMERGENT EVENTS USING THE CROSS-CORRELATION ENVELOPE BETWEEN STATION PAIRS: APPLICATION TO MUD-VOLCANOES, GEOTHERMAL EXPLORATION AND MAGMATIC-VOLCANOES







Weak emergent signals with complex waveforms are often observed in fluid-driven environments (e.g., magmatic volcanoes). These signals are of difficult analysis due to low signal-to-noise ratios, emergent onsets with no clear/distinct phase arrivals and/or present in a few (2-3) stations. For this reason, the standard methods for earthquake location, based on the picks of the phase arrivals, cannot be applied. To locate such unconventional events, we developed a python tool using a back-projection method that uses the cross-correlation envelope of signals recorded at different station pairs to provide a likelihood source location.

We successfully tested the code with known source locations (active hammer shots) at different positions of the network. Finally, we applied the code to different environments: drumbeat signals generated by the Nirano Mud Volcano Field (Italy); seismic signals associated with well-drilling operations at the Larderello-Travale geothermal field (Italy) and LP magmatic events at the Irazú-Turrialba Volcanic Complex (Costa Rica).

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https://videoconf-colibri.zoom.us/j/89018419156

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