



Modeling and Detection of Regional Depth Phases at the GERESS Array

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The Vienna Basin in Eastern Austria is a region of low to moderate seismicity, and hence the seismological network coverage is relatively sparse. Nevertheless, the area is one of the most densely populated and most developed areas in Austria. The largest instrumentally recorded magnitude is around 5, and the Vienna Basin fault system (VBFS), which branches beneath the Basin, occasionally shows earthquakes with magnitudes larger than 4. So accurate earthquake location, including depth estimation and relation to faults is not only important for understanding tectonic processes, but also for estimating seismic hazard.

Particularly depth estimation needs a dense seismic network around the suspected epicenter. If the station coverage is not sufficient, the depth can only be estimated roughly. Regional Depth Phases (RDP) like sPg, sPmP and sPn have already been used successfully for calculating depth even if only observable from one station. However, especially in regions with sedimentary basins these phases prove difficult or impossible to recover from the seismic records.

For this study we use seismic array data from GERESS, an array which has been operating for more than 20 years. It is located 220 km to the Northwest of the Vienna Basin, which - according to literature - is a suitable distance to recover PmP and sPmP phases. We use array processing on recent earthquake data from the Vienna Basin with local magnitudes > 4 to reduce the SNR and to search for RDP. The same processing is performed on synthetic data specifically modeled for this application. We compare real and synthetic results to assert which phases can be identified and to what extent depth estimation can be improved.