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VIBRATIONS ON THE ROLL-MANA, A ROLL ALONG ARRAY EXPERIMENT TO MAP LOCAL SITE EFFECTS ACROSS A FAULT SYSTEM

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The effects of surficial geology on seismic notion (site effects) are considered one of the major controlling factors to the damage distribution during earthquakes. Qualitative and quantitative estimates of local site amplifications provide important information for the identification of potential high risk areas. In this context, the analysis of ambient vibrations is an attractive tool for the mapping of site conditions. It is low-cost alternative to expensive active seismic experiments or geophysical well-logging and especially well suited for the use within urban areas.
Within the MANA experiment we conducted ambient vibration measurements at roughly 100 sites in the Lower Rhine Embayement (NW-Germany) to test various aspects of site effect determination, especially the feasibility of a roll along technique. A total of 13 three-component seismometers (5s corner period) have been used in a linear array configuration (station distance ~ 100 m). At all times during the roll-along experiment at least 8 stations (mostly 10) were operating simultaneously, meanwhile the other stations were moved from the rear to the front of the line and re-installed. Thus, a total progress of almost 10 km could be obtained within two days. The line stretched across the NW-SE striking Erft fault system, one of the major faults in the eastern part of the Lower Rhine Embayement.
The thickness of cenozoic soft-sediments overlying the basement of paleozoic age increase at the individual branches of the fault in abrupt steps of uncertain magnitude from around 200 m in the east to almost 100 M in the west.

The results of single station horizontal to vertical spectral ratios (HVSR) along the line are presented as well as the spatial evolution of local dispersion curves obtained from a slantstack analysis (SSA). The spatial variation of feature along the line in both the HVSR and SSA are discussed in terms of sedimentary thickness and modifications of the wavefield properties of the ambient vibrations.