Contribution ID: **50** Type: **talk**

Seismic and Newtonian noise estimate at Terziet - the Euregio Meuse-Rhine candidate site for Einstein Telescope

Monday, 17 May 2021 12:20 (20 minutes)

The Einstein Telescope observatory aims to improve the low-frequency sensitivity of current detectors by more than three orders of magnitude at 10 Hz. This is a challenge, as Newtonian noise is expected to limit the low-frequency sensitivity. Surface array studies of vertical component seismic noise and single-station measurements at a depth of 250 m were conducted at Terziet, Netherlands. The observed surface wave dispersion and ellipticity was used to identify the modal contribution of surface wave noise and derive a subsurface velocity model up to a depth of 200 m. Cross-correlation analysis between surface and underground noise was used to understand the surface-body wave contribution to the underground noise. The observed underground noise attenuation and theoretical surface-wave attenuation estimates were used to understand the contribution of different surface wave modes to the underground noise. Further, the diurnal variation of seismic noise measured on the surface and underground was used to quantify the contribution of far-away body-wave sources to the underground noise. Using these parameters, elastic wave simulations were performed for both surface and body-wave sources to estimate the Newtonian noise at a depth of 250 m. The stochastic body-wave background was found to dominate our Newtonian noise predictions for the BGN-site and would constitute one of the main technical noise background for frequencies below 10 Hz and hence would also require a cancellation.

Primary author: KOLEY, Soumen (GSSI)

Co-authors: VAN DEN BRAND, Jo (Nikhef - VU); BULTEN, henk (Vrije Universiteit Amsterdam/Nikhef); LINDE, Frank (Nikhef - APPEC); BADER, Maria (PhD student, Nikhef); Dr CAMPMAN, Xander

Presenter: KOLEY, Soumen (GSSI)

Session Classification: Recorded talks: Third Generation Infrastructures