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A self-noise model for the German DEPAS OBS pool

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The DEPAS (DEutscher Pool für Amphibische Seismologie) is the largest pool of wideband ocean-bottom seismometers in Europe. It consists of LOBSTER OBS, manufactured by KUM, which are equipped with Güralp CMG-40T-OBS and Trillium compact sensors. Multiple operators reported a relatively high long-period noise level of the original CMG-40T-equipped design. It has been discussed whether the source of this noise is the integration of the seismometer into the frame or the instrument itself.

Using vault installations of the seismometer and test deployments of different LOBSTER next to a current sensor, we can show that the long-period noise is caused by the CMG-40T-OBS sensor itself. Equipped with a Trillium compact seismometer, the LOBSTER has a median vertical noise level of -155 dB at 120s period for current velocities below 10cm/s, which is essentially the self-noise of the seismometer. Even at relatively high bottom currents above 20 cm/s, the noise level does not exceed the Peterson New High Noise Model at these periods.

We present a quantitative noise model for the LOBSTER and conclude that its rugged design is suited for seismology on periods below 300 seconds, if it is equipped with a good seismometer.