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# of Natural and Induced Seismic Events and Monitoring of the Nuclear Underground Depository Using Slim Borehole Adapted SIA Sensors

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Over the past five years ASIR has adapted silicon audio (SiA) interferometer based sensors in our borehole broadband seismometer, model ASIR ABB, for making seismic observations in ~100 to 1000 m deep slim boreholes. The shifts are used to rapidly and accurately control a force-feedback circuit. The current ~60 mm outer diameter triaxial SiA sonde has been installed in drill hole with inner diameters as small as 76 mm and tilts with 15d.These sensors have a 3 dB frequency-response bandwidth of 120 sec to 1300 Hz, a clip level of +0.5 g, and a dynamic range of 172 dB. During a rapid, long tilt event, sensor settles with a 60s long exponential decay. Ranging from a plate boundary to an underground mine, and a subsidence site, these sensors have returned complete seismograms for nearby events ranging in size from M < -1.5 to M> 4.5. The SiA sonde's ~1-10 s seismic event spectrum is well above background noise. At the plate boundary, the borehole SiA improved event detection over the local surface net by as much as one unit in magnitude.

ASIR ABBT (with Thermal probe) broadband seismometer is successfully used for micro seismic monitoring of the nuclear underground depository in Europe.

Promotional text

ASIR has integrated for borehole installation triaxial SiA optical-interference sensors with high resolution recording systems and optional triaxial coil-spring geophones to
create scientific grade broadband and fullband borehole sensors.

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Oral preference format

in-person

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