

Beyond the antipode: Hydroacoustic detection of earthquake activity along the Middle America Trench

*Dirk Metz¹, Julien Vergoz²

1. Japan Agency for Marine-Earth Science and Technology, 2. French Alternative Energies and Atomic Energy Commission

Earthquakes occur regularly along the northern Middle America Trench, a major subduction zone located offshore the Pacific coast of Mexico. Results from phased array beamforming suggest that low-frequency acoustic phases generated by these events couple into the Sound Fixing and Ranging (SOFAR) channel and can be recorded as far as Diego Garcia, Indian Ocean, where a hydrophone triplet station is operated as part of the International Monitoring System (IMS). At more than ~21,300 km, source-receiver ranges exceed antipodal distances ('suprapodal propagation'), marking the furthest hydroacoustic transmissions to have ever been observed on Earth. Transmission loss modeling indicates that hydroacoustic propagation between the epicenter region and the IMS station is feasible and matches observed travel times. Implications for test-ban monitoring and the potential of the Diego Garcia station for further studying seismic activity along the Middle America subduction system will be discussed.

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