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the use of subspace detectors for seismic survey signals observed on the IMS hydroacoustic network

Marine seismic surveys make use of a ship-towed air-gun array. The compressed-air shots fired into the water generate impulsive sound wave fronts whose reflections are recorded to map the oceanic crust. These intense sounds cause depletion of the local zooplankton [1], and can impact the detection capability of the CTBTO hydroacoustic stations and their automated processing [2]. It is desirable to detect the presence of these surveys, also when at great remove and low SNR. To this end, we explore adaptation of the subspace detection method [3] from seismology to hydroacoustics. In implementing the requisite algorithms, use was made of the ObsPy framework [4]. [1] McCauley, R.D. et al. (2017) Nature Ecology & Evolution 1, 0195. https://doi.org/10.1038/s41559-017-0195 [2] Brouwer, A., Le Bras R., Nielsen P. L., Bittner P., Wang H. (2018) Assessing and Mitigating the Impact of Seismic Surveys on CTBTO Hydroacoustic Detections, EGU General Assembly PICO presentation EGU2018-8367. [3] Harris, D. B. (2006). Subspace detectors: Theory. Lawrence Livermore National Laboratory Internal Report UCRL-TR-222758. [4] M. Beyreuther, R. Barsch, L. Krischer, T. Megies, Y. Behr and J. Wassermann (2010). ObsPy: A Python Toolbox for Seismology, SRL, 81(3), 530-533, https://doi.org/10.1785/gssrl.81.3.530

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