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the subsurface using earthquake-generated infrasound

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The deployment of ground-based seismic or infrasound instruments can be complex and costly in remote regions on Earth, or in harsh environments like the surface of Venus. Recent studies have demonstrated that as an alternative, balloon platforms can be used to monitor seismic activity from the atmosphere, at a comparably low operational cost. Such balloons carry pressure sensors and can record infrasound waves resulting from the coupling of seismic waves into the atmosphere. The analysis of these signals represents an enticing alternative to traditional ground-based seismology for seismic source characterization and subsurface exploration.

Seismic infrasound signals show similar dispersion properties as surface waves recorded at the ground, enabling the use of classical inversion techniques to retrieve source and subsurface properties. However, it remains unclear how acoustic and instrumental noise, path effects, and the lack of polarity information translate into posterior distributions of source and subsurface parameters.

In this contribution, we explore different inversion scenarios based on the characteristics of available Earth observations. We propose a Bayesian Markov chain Monte Carlo inversion method to assess the sensitivity of inversion results to the prior knowledge of the subsurface, the data quality, the number of balloons, and the types of acoustic arrivals.

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