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Stochastic heterogeneity mapping around a Mediterranean salt lens

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We present the first application of stochastic heterogeneity mapping based on the band-limited von Kármán function to a seismic reflection stack of a Mediterranean water eddy (meddy), a large salt lens of Mediterranean water. This process extracts two stochastic parameters directly from the reflectivity field of the seismic data: the Hurst number, which ranges from 0 to 1, and the correlation length (scale length). Lower Hurst numbers represent a richer range of scale lengths and correspond to a broader range of reflection events. The Hurst number estimate for the top of the meddy (0.39) compares well with recent theoretical work, which required values between 0.25 and 0.5 to model internal wave surfaces in open ocean conditions based on simulating a Garrett-Munk spectrum (GM76) slope of -2. Varying stochastic parameters, which correspond to different spectral slopes in the Garrett-Munk spectrum (horizontal wavenumber spectrum), can therefore provide an estimate of different internal wave scales from seismic data alone.