



Seismic noise related to swells across the Pacific: a joint analysis of satellite, buoy, and seismometer data

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Ocean swells generated by strong Pacific storms travel across the entire ocean basin, with a characteristic pattern related to the dispersive nature of ocean waves (Darbyshire 1955, Munk 1963). The analysis of wave mode data from ENVISAT's synthetic aperture radar provides a global-scale tracking of these swells. When these waves reach a coastline they generate seismic noise. For Southern ocean storms, swells will first pass the South Pacific islands (Tuamotus, Marquesas, Easter Island) before hitting Chile, 4-5 days after the storm, and lighting up the entire American coastline with waves arriving in Alaska as late as 2 weeks after the storm. In such cases the strongest noise sources appear to move northward along the coast as can be verified by the polarization of the seismic signals. Storms that occur closer to the American continent also generate noise that can be also recorded directly at the time of the swell generation. These different classes of noise generation are confirmed by a direct numerical wave model. Without this knowledge of the wave field the seismic noise of the first kind could be wrongly attributed to a single moving source located far away from the shoreline.