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Airborne measurements of rogue waves in the Gulf of Tehuantepec (Joint work with Leonel Romero & Jessica Kleiss)

Until very recently, observations of rogue waves have typically been made by chance from ships or platforms, often with just a qualitative assessment of the height and period of the wave. Over the last decade synthetic aperture radar has been used to measure extreme waves from space, but despite great progress there are still serious issues to be addressed in calibrating SAR imagery for wave height. In this paper, we present airborne measurements of surface waves under high winds in the Gulf of Tehuantepec on the Pacific coast of Mexico. This region is known for its mountain-gap winds that blow out over the Pacific in winter with maximum speeds approaching hurricane force. In February 2004 we flew a scanning lidar (the NASA airborne terrain mapper), measuring 2D surface wave fields as the aircraft flew offshore along the core of the wind jet, and found a number of instances of rogue waves out to fetches of approximately 250 km. The statistical moments of the wave field as a function of fetch will be presented and discussed in the context of the occurrence of rogue waves. Simultaneous imagery of the surface permitted us to determine whether the waves were breaking, an important consideration in assessing the forces on ships and offshore structures.

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