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Presentation Title: Detection of internal waves in SRTM data of the Andaman Sea

Abstract: By chance, a single pass of SRTM C-band data was acquired over the Andaman Sea, an area known for the existence of internal waves. Because no other SRTM passes were averaged with the single pass, the internal waves were detected in both the DEM and the image data. Surprisingly, the DEM showed an apparent amplitude of several meters for the waves, which seems too large for oceanic internal waves. This signal is most likely produced by the effects of strong ocean currents induced by the internal waves on the radar interferometry measurements. Although the amplitude of several meters is unrealistic for internal waves, the observations may demonstrate the detection of ocean currents with along-track radar interferometry, which has been done with X-SAR SRTM already. Internal waves occur in the ocean within a natural channel formed by two layers of different density caused by differences in temperature or salinity. They are commonly observed in radar images and optical photographs over regions of shallow bathymetry (e.g., the Straits of Gibraltar, the Gulf of California, and the Andaman Sea). The mechanism for imaging has been established as a change in surface roughness caused by currents induced by the orbital motion of the waves. However, the signatures of internal waves in radar interferometry measurements have never before been reported. The energetic internal waves in the Andaman Sea are well known for their strong horizontal currents of up to 1m/sec. These currents are apparently the cause of the wave showing up in the SRTM DEM. The Andaman Sea internal waves were observed in SRTM cell N08E092 and image N08E092_143_060_SS2_1_01; unfortunately, X-SAR SRTM did not cover this area, so no X-band data are available.

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