Overview

Seamounts are large submarine mountains rising more than 1,000 m above the surrounding sea floor. Many are volcanic in origin. Their presence can disrupt tidal or current flows resulting in the generation of internal waves. SEASAT SAR imagery collected over the North Atlantic in 1978 first provided evidence for internal waves near seamounts in the deep ocean [Fu and Holt, 1982]. ERS SAR imagery collected over the Andaman Sea also suggested seamounts internal wave generation sources [Alpers, 1997]. It is estimated that over 25,000 seamounts exist over all the major ocean basins, each being a potential internal wave generation site. With limited imagery over the open ocean, it is currently difficult to develop a complete understanding of the contribution seamount generated internal waves make to the overall ocean wave spectrum.

References

- Alpers, W., H. Wang-Chen and L. Hock, "Observation of Internal Waves in the Andaman Sea by ERS SAR," Proc. 3rd ERS Symp. on Space at the Service of our Environment, Florence Italy, 17-21 March 1997, pp.1287-1291.
- Fu, L.L., and B. Holt, 1982, Seasat Views Oceans and Sea Ice with Synthetic Aperture Radar, JPL Publication 81-120
- Smith, W. H. F., and D. T. Sandwell, 1997; Global seafloor topography from satellite altimetry and ship depth soundings, *Science*, v. **277**, 1957-1962 http://topex.ucsd.edu/marine_topo/mar_topo.html



Figure 1. SEASAT (L-band, HH) SAR image from 6 October 1978 (Rev 1446) shown with the local bathymetry [Smith and Sandwell, 1997]. The images show internal wave signatures near the Rockaway seamount. The signatures suggest the seamounts at $35^{\circ}27'$ N., $51^{\circ}23'$ W and $34^{\circ}48'$ N.; $50^{\circ}30'$ W are the sources of the waves.

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Figure 2. SEASAT (L-band, HH) SAR image over the Atlantic Ocean around the Rockaway Seamount acquired on 6 October 1978 (Rev 1446) at 0332 UTC. The image shows an example of an internal wave in the open ocean generated by flow over a seamount. Imaged area is 100 km x 200 km. [Image courtesy of NASA JPL]





Figure 3. ASTER image from 3 September 2001 shown with the local bathymetry [Smith and Sandwell, 1997]. The images show internal wave signatures near the Plato Seamount in the Mid_Atlantic Ridge.



Figure 4. ASTER false-color VNIR image over the Atlantic Ocean near the Plato Seamount acquired on 3 September 2001 at 1255 UTC. Imaged area is 60 km x 60 km.





Figure 5. SEASAT (L-band, HH) SAR image from 20 August 1978 (Rev 785) shown with the local bathymetry [Smith and Sandwell, 1997]. The image shows internal wave signatures near the Ormonde and Gettysburg Seamounts that rise to less than 200 meters below the surface. [Afteer Fu and Holt, 1982]

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Figure 6. SEASAT (L-band, HH) SAR image of the Atlantic Ocean over the Gorringe Ridge southwest of Portugal acquired on 20 August 1978 (Rev 785) at 2144 UTC. The image shows internal wave signatures near the Ormonde and Gettysburg Seamounts. Imaged area is 100 km x 100 km. [Image courtesy of NASA JPL] [After Fu and Holt, 1982]



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