East Greenland Shelf

Overview

The East Greenland Shelf extends from Greenland's southeast coast along the Denmark Strait from roughly 70°N down to 60°N (near Cape Farewell at the southern tip) (Figure 1). The Greenland Current flows south along the coast through the strait. The shelf is irregular, varying in width from 130 km near Iceland to less than 50 km along southeast Greenland.

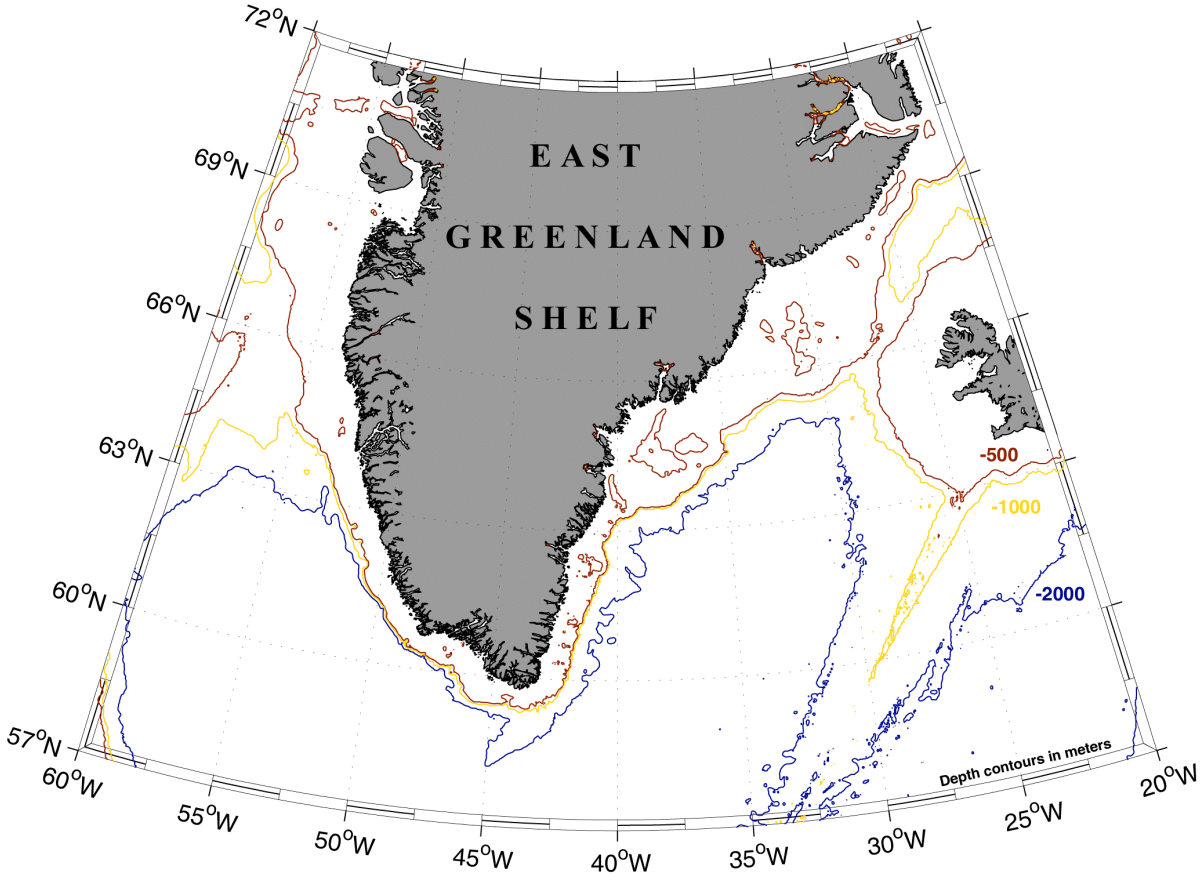


Figure 1. Bathymetry of the East Greenland Shelf. [Smith and Sandwell, 1997]

Observations

Landsat-7 captured an image of spiral eddy pattern of ice off the southeastern coast of Greenland on 14 May 2001 (Figure 2). Spiral eddies occur regularly along the east coast of Greenland. The eddies propagate along the ice edge transporting sea ice out into open water and advecting warm water into the pack ice [Johannessen et al 1992]. Around the eddy appears to be internal wave packets, highlighted by concentration of ice in curvilinear lines. The ice follows the surface current pattern associated with the internal waves: ice is entrained in convergent regions similar to how surfactants are entrained in these regions causing them to appear dark in synthetic aperture radar images.

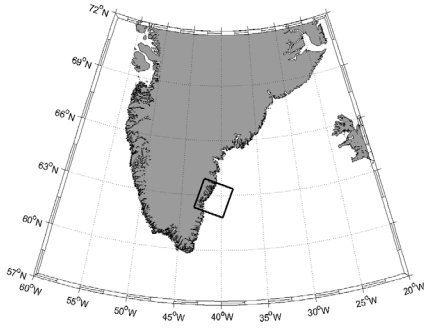


Figure 2. Landsat-7 Enhanced Thematic Mapper+ optical image off the east coast of Greenland acquired on 14 May 2001 at 1350 UTC. The image shows ice on the sea surface in a spiral pattern along with internal wave packets. The packets are along the right side of the image and are propagating northward parallel to the coast. The image is a false-color composite image made using infrared, red, and green wavelengths. Imaged area is approximately 35 km x 35 km.

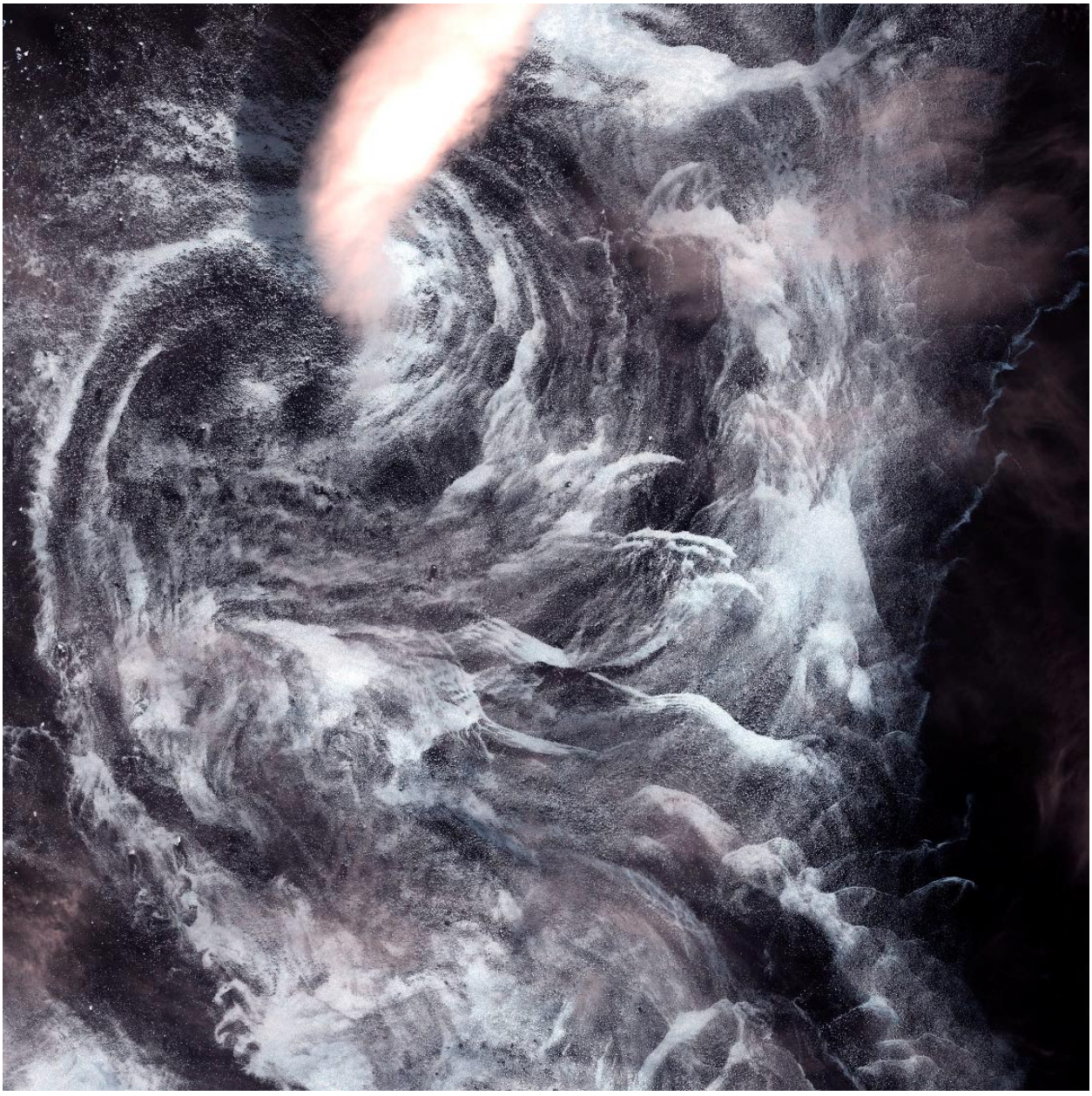
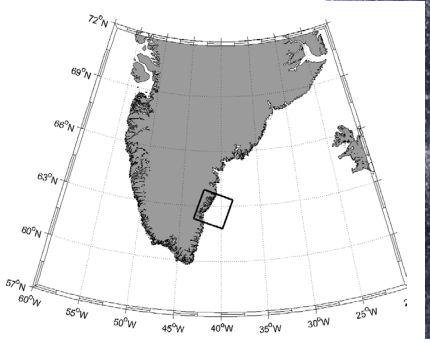


Figure 3. Expanded view of the Landsat-7 image shown in Figure 2 from 14 May 2001 at 1350 UTC. The wavelength of solitons within the packets is approximately 100 m with packet separations of roughly 1 km near the bottom of the image to 3.5 km near the top. Imaged area is approximately 13.6 km x 24 km.



References

Johannessen, O. M, W. J. Campbell, R. A. Shuchman, S. Sandven, P. Gloersen, J. A. Johannessen, E. G. Josberger, and P. M. Haugan, 1992: Microwave study programs of air-ice-ocean interactive processes in the seasonal ice zone of the Greenland and Barents seas. *Microwave Remote Sensing of Sea Ice*, *Geophys. Monogr.,* No. 68, Amer. Geophys. Union, 261–289.

Smith, W. H. F., and D. T. Sandwell, Global seafloor topography from satellite altimetry and ship depth soundings, Science, v. 277, p. 1957-1962, 26 Sept., 1997. http://topex.ucsd.edu/marine_topo/mar_topo.html