Eastern Equatorial Pacific

Overview

The Eastern Equatorial Pacific is the region of open ocean directly south of Mexico and Central America (between approximately 4°to 16°N, and 85° to 105°W) (Figure 1). Major bathymetric features include Guatemala Basin and the Cocos Ridge.

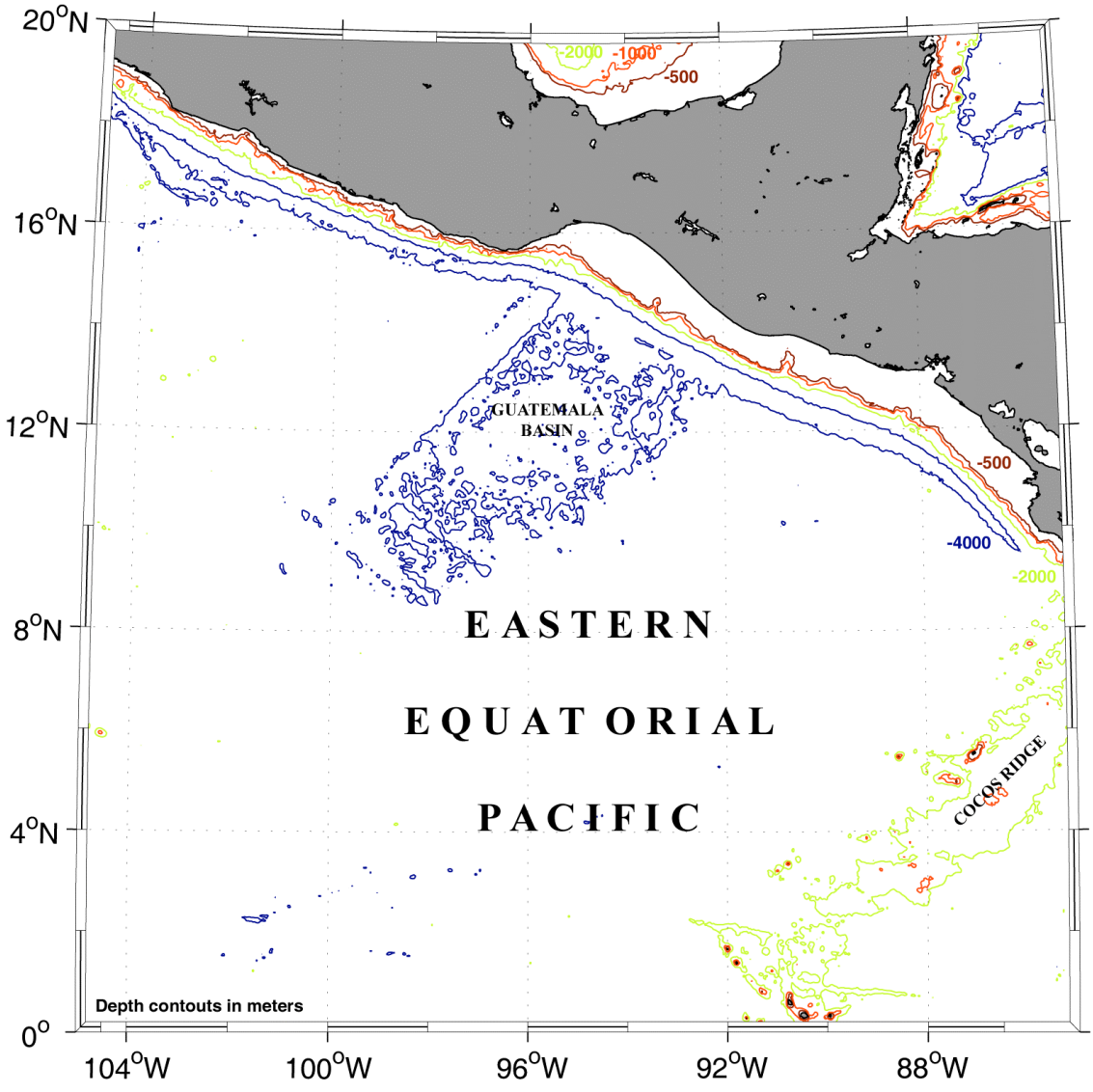


Figure 1. Bathymetry of the Eastern Equatorial Pacific. [Smith and Sandwell, 1997]

Observations

There has been no scientific research conducted on the internal waves in the Eastern Equatorial Pacific. Satellite imagery reveals that the wave occurrences have several unusual characteristics. The imagery show internal wave signatures over a region of open ocean, away from any significant bathymetic features such as a shelf edge, islands or seamounts. The closest region of significant bathymetric is the Cocos Ridge more than 1000 km distant. The SIR-C imagery (Figures 2-4) indicated the waves were propagating primarily north and northwest (4 and 6 October) and south and southeast (1, 8 and 9 October).

The relatively strong signature of the wave fields, their location in the open ocean and the variation in propagation direction, suggest that the generation mechanism be something other than tidal flow over bathymetric variation. The waves could be generated by currents in the region or atmospherically generated. The atmospheric interpretation is supported by atmospheric and convection signatures on the ocean surface in adjacent frames of the SIR-C datatakes indicating significant storms in the area. Storm origin could also account for the variation in propagation direction. It is also possible that there are a few unknown seamounts in the region that interact with the local currents to create the waves.

Table 1 shows the months of the year when internal wave observations have been made.

Table 1 - Months when internal waves have been observed in the Eastern Equatorial Pacific.
(Numbers indicate unique dates in that month when waves have been noted)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
				1			1		5		

References

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

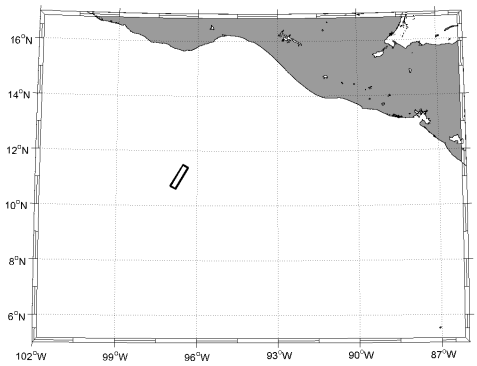
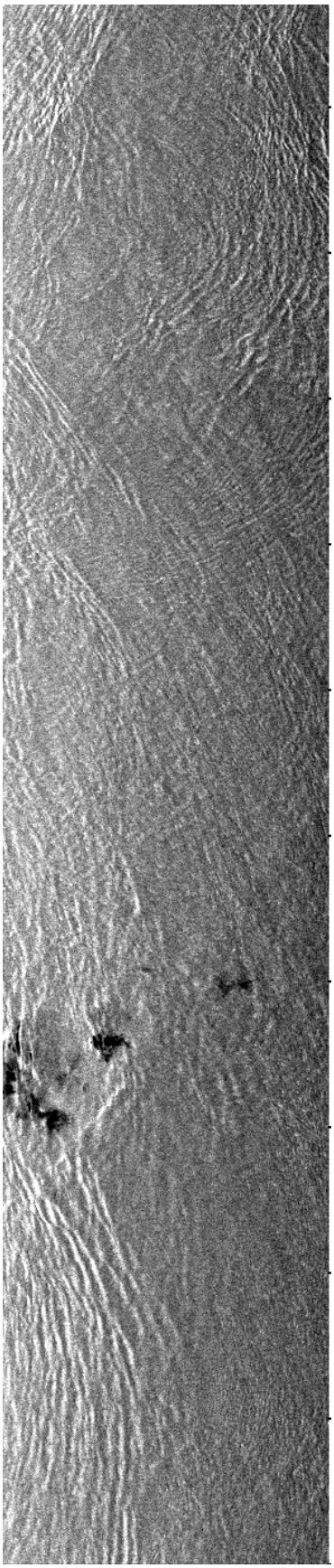


Figure 2. SIR-C L-Band SAR image showing southeast propagating internal waves in the Eastern Equatorial Pacific acquired on 8 October 1994 at 839 UTC (DT129.0 Seg. 2). The dark patches are believed to be atmospheric signatures associated with a rain or convection cell. Imaged area is 22.1 km x 106.9 km.



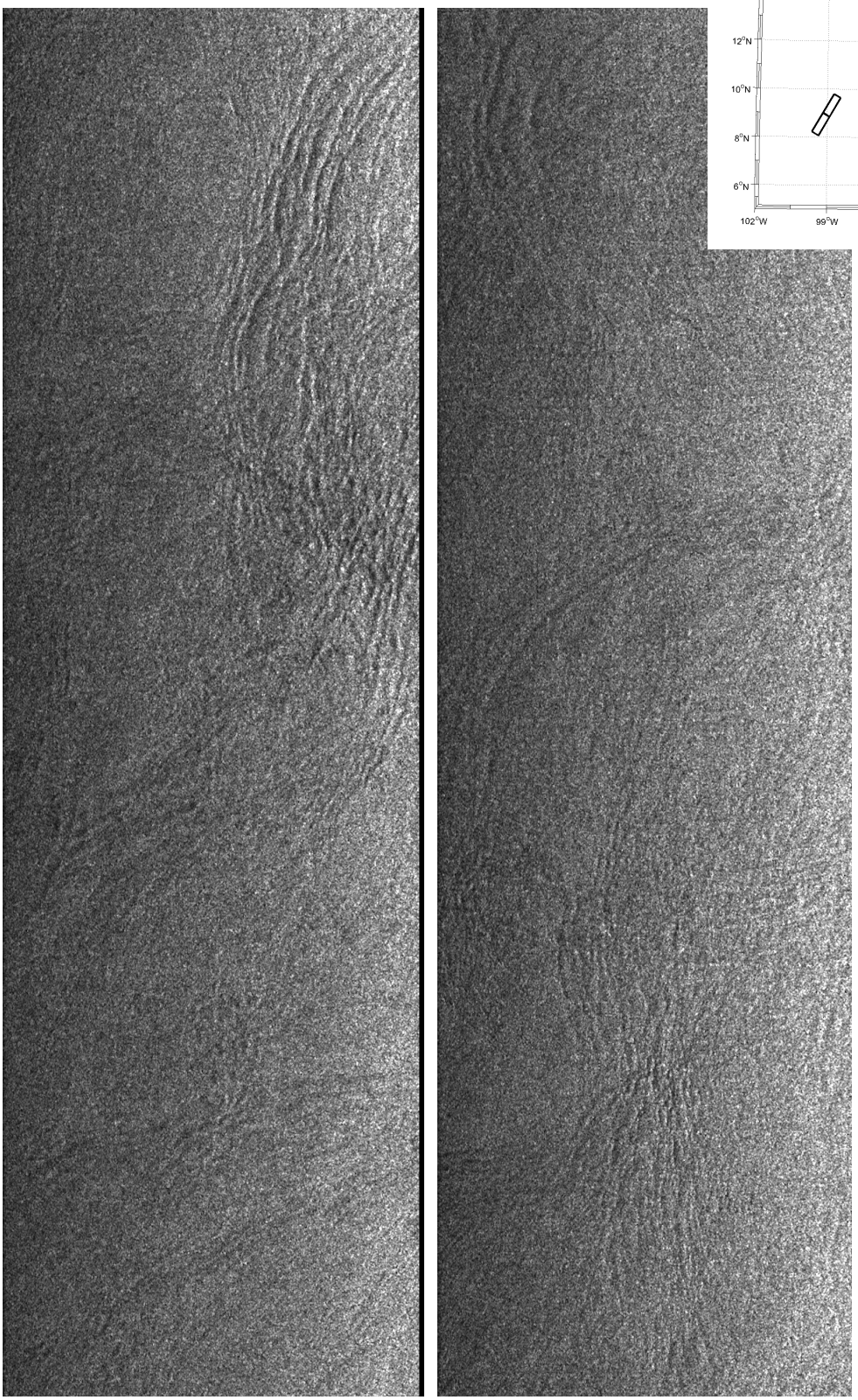


Figure 3. SIR-C SAR images showing northwest propagating internal waves in the Eastern Equatorial Pacific acquired on 4 October 1994 at 1000 UTC (DT65.0, Seg 2 & 3). The waves are distributed across and area more than 200 km in extent. Each imaged area is 34.6 km x 100 km.

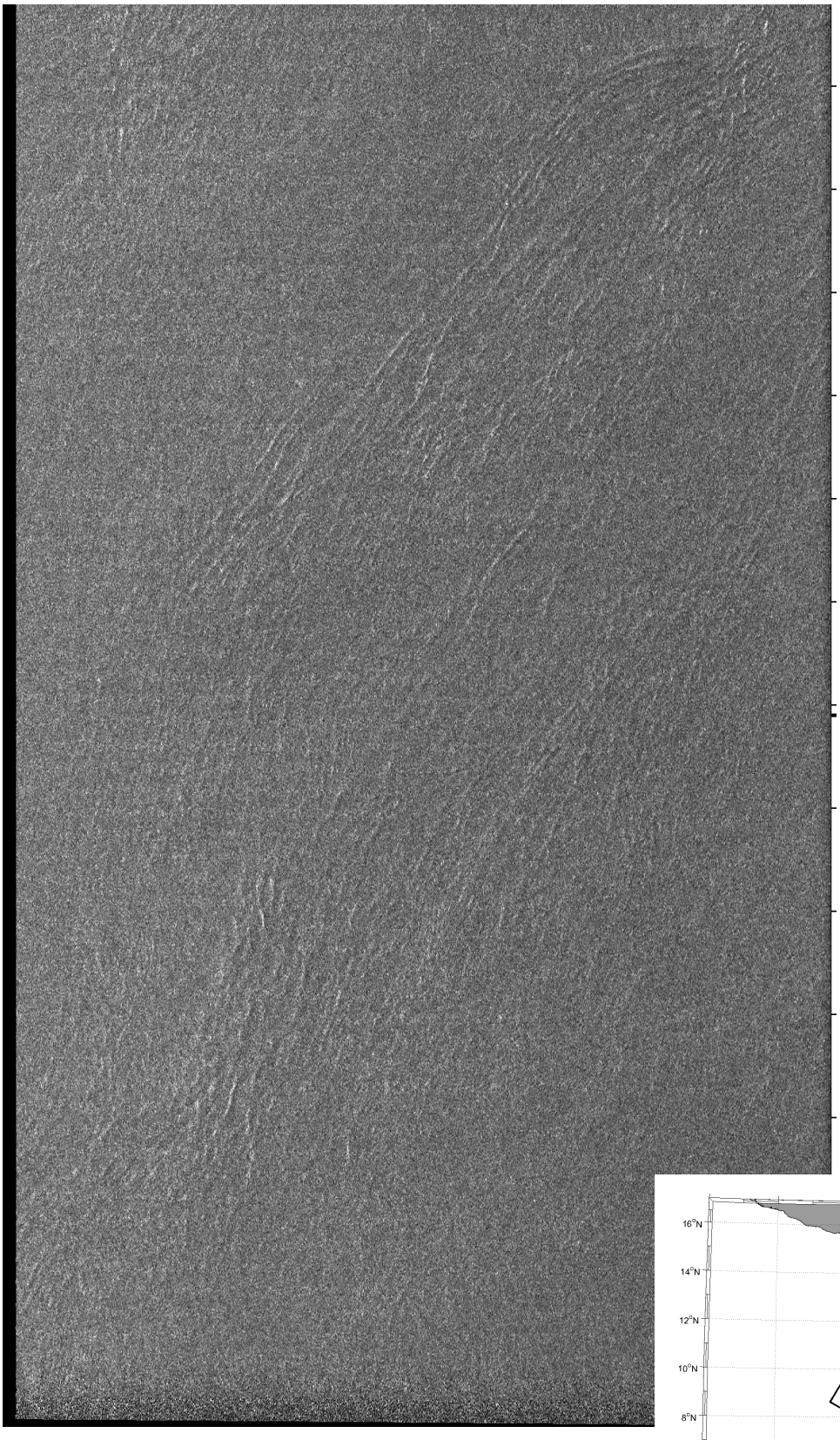
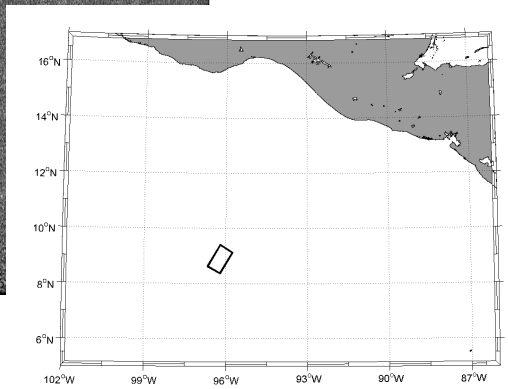


Figure 4. SIR-C SAR image showing northwest propagating internal waves in the Eastern Equatorial Pacific acquired on 6 October 1994 at 0921 UTC (DT97.1 Seg. 1). The weaker signatures indicate a strong surface wind in the area. Imaged area is 58.4 km x 100 km



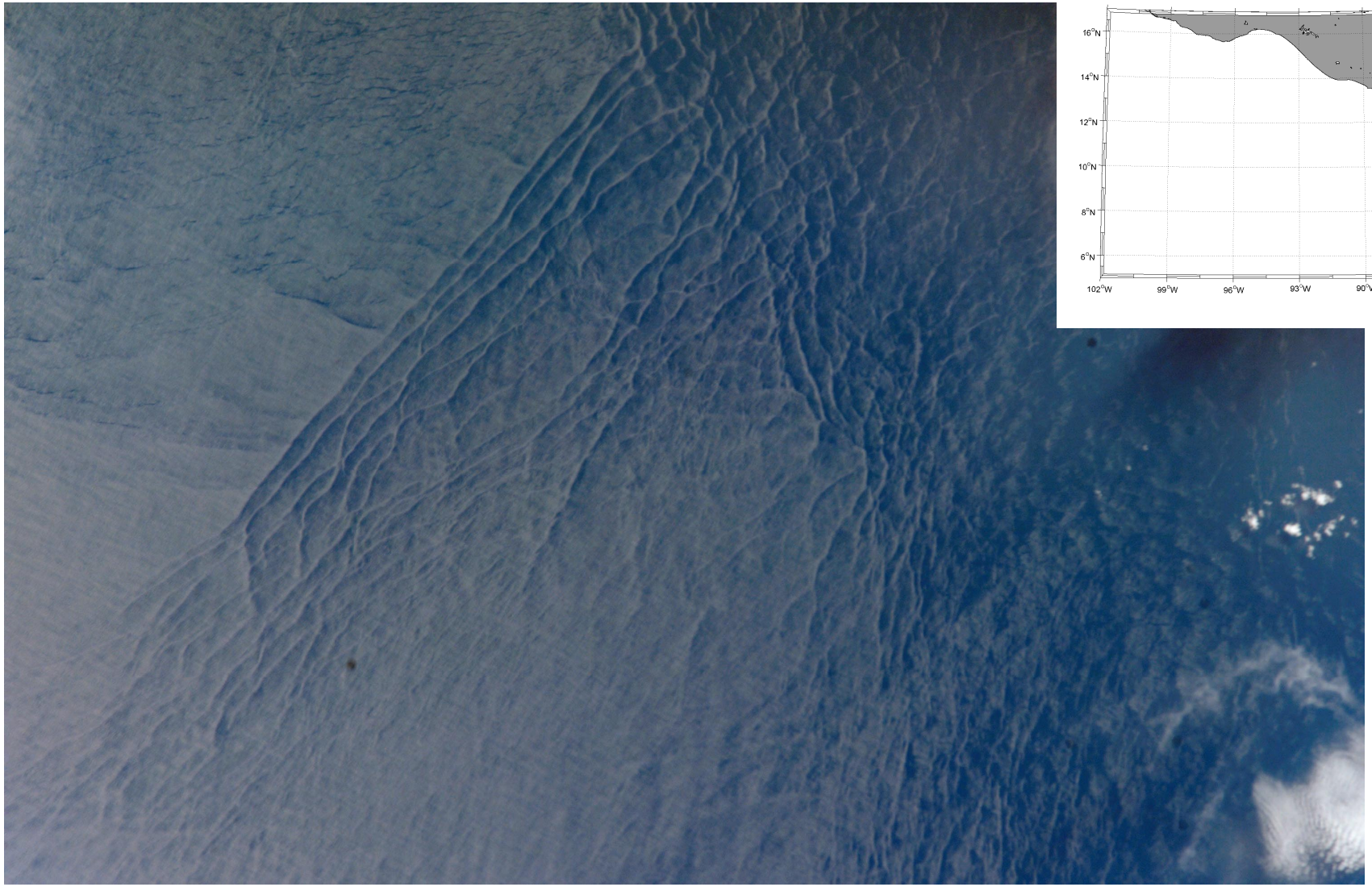


Figure 5. Astronaut photograph (ISS004-E-11683) south of Central America acquired on 12 May 2002 at 1729 UTC. The image shows very strong signatures of an internal wave field and associated soliton-soliton interactions. Position estimate based on spacecraft nadir (black dot) and sun specular location (red dot). Imaged area and orientation are unknown. [Image Courtesy of Earth Sciences and Image Analysis Laboratory, NASA Johnson Space Center (http://eol.jsc.nasa.gov)]

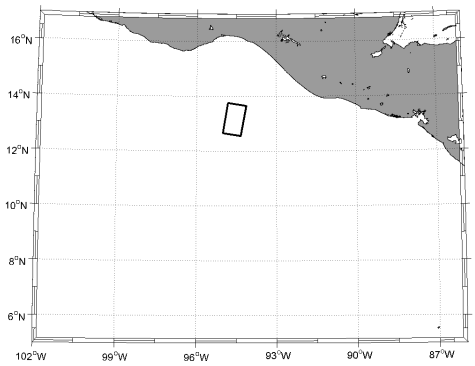
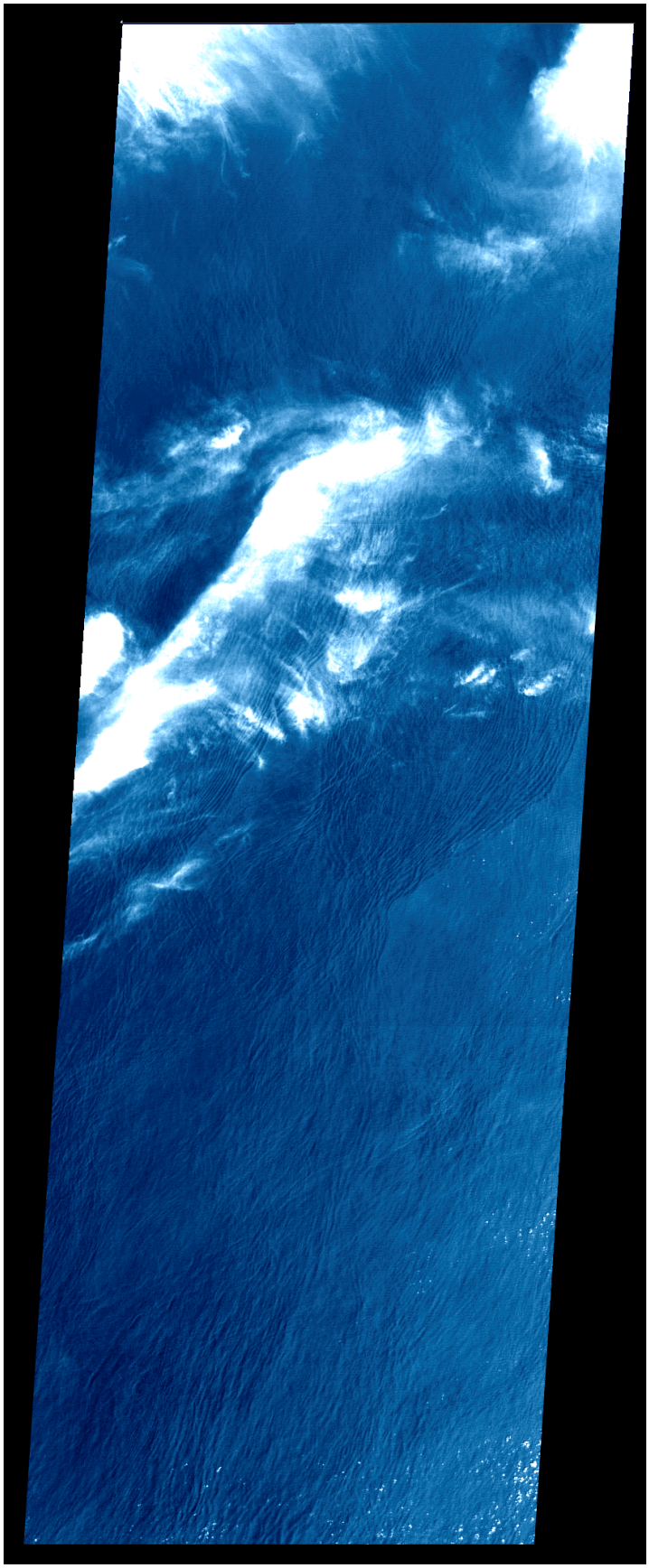


Figure 6. ASTER false-color VNIR image south of the Gulf of Tehuantepec acquired on 6 October 2001 at 1700 UTC. The image shows the signature of an internal wave field propagating to the east-southeast. Imaged area is 60 km x 180 km.



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