

## Eastern Equatorial Indian Ocean

### Overview

The Eastern Equatorial Indian Ocean is that part of the Indian Ocean bounded by the roughly 14°N, the Andaman Sea (to the east), the equator and 86°E. (Figure 1). It is an area of deep water, greater than 2000 m, with the bathymetry of the eastern boundary rising rapidly up to the Andaman and Nicobar Islands, and western Sumatra.

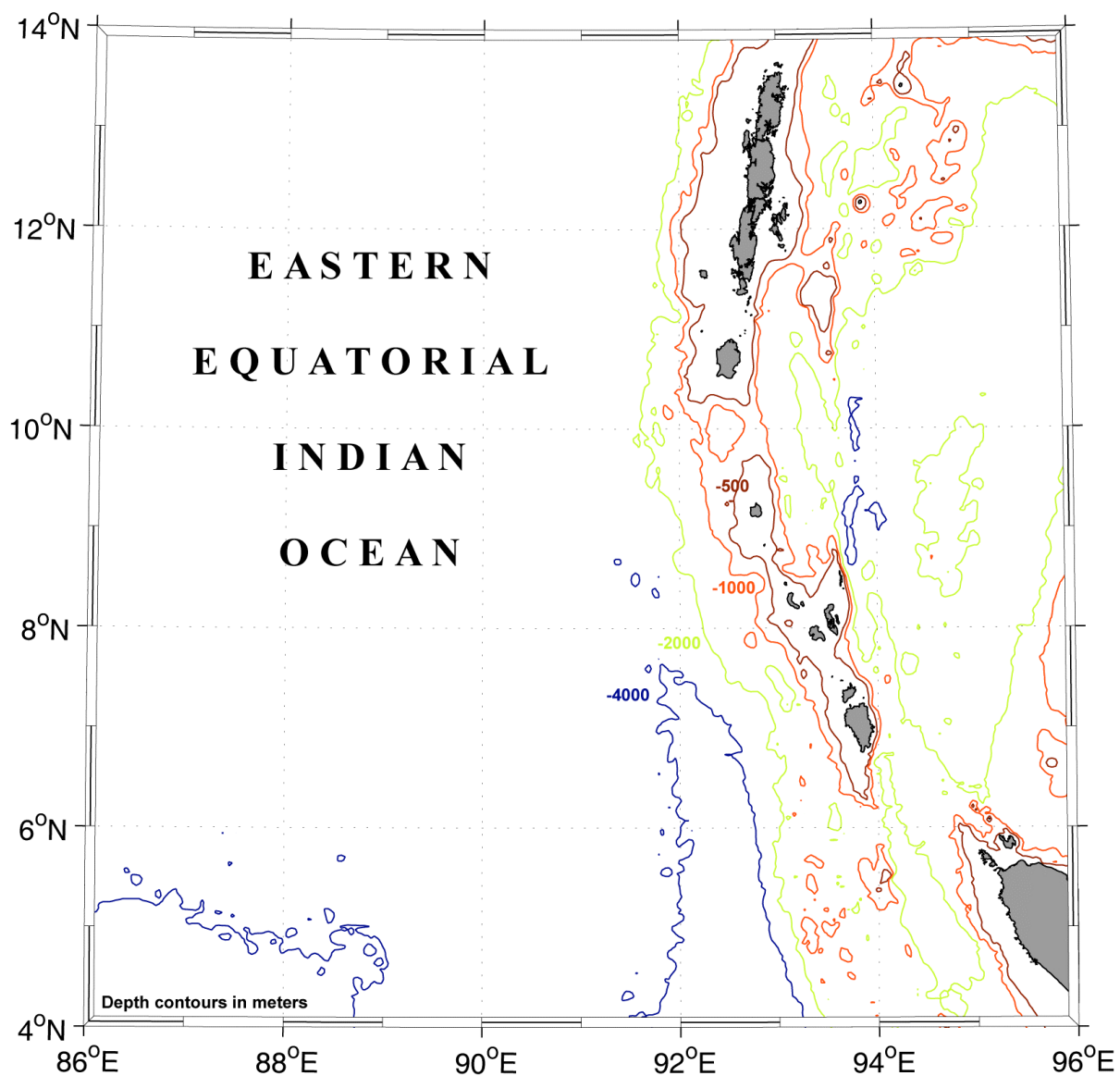


Figure 1. Bathymetry of the Eastern Equatorial Indian Ocean. [Smith and Sandwell, 1997]

## Observations

There has been no scientific research on the internal waves of the Eastern Equatorial Indian Ocean. Satellite imagery shows they are very likely generated at shallow areas between the Andaman Islands, Nicobar Islands and Sumatra and propagate westward into the Indian Ocean. 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 Indian Ocean.  
 (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						1		1

Figures 2 and 4 show the signatures of westward propagating internal wave packets generated between the Little Andaman Island and Car Nicobar Island in the Ten Degree Channel and in the channel south of Car Nicobar Island. The packet structure suggests some kinds of regular tidal generation mechanism. The characteristic phase shifts associated with soliton interaction can be seen in the packet below middle left where the waves emerging from between Car Nicobar and Teressa Island encounter the solitons from the Ten Degree Channel. Figures 5 and 6 show how the packets evolve as they propagate into the Indian Ocean.

## 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](http://topex.ucsd.edu/marine_topo/mar_topo.html)

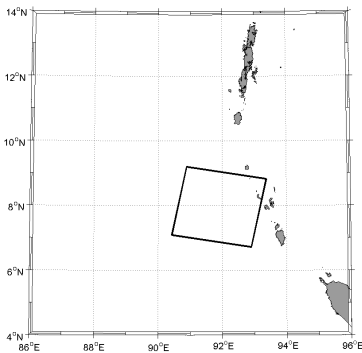
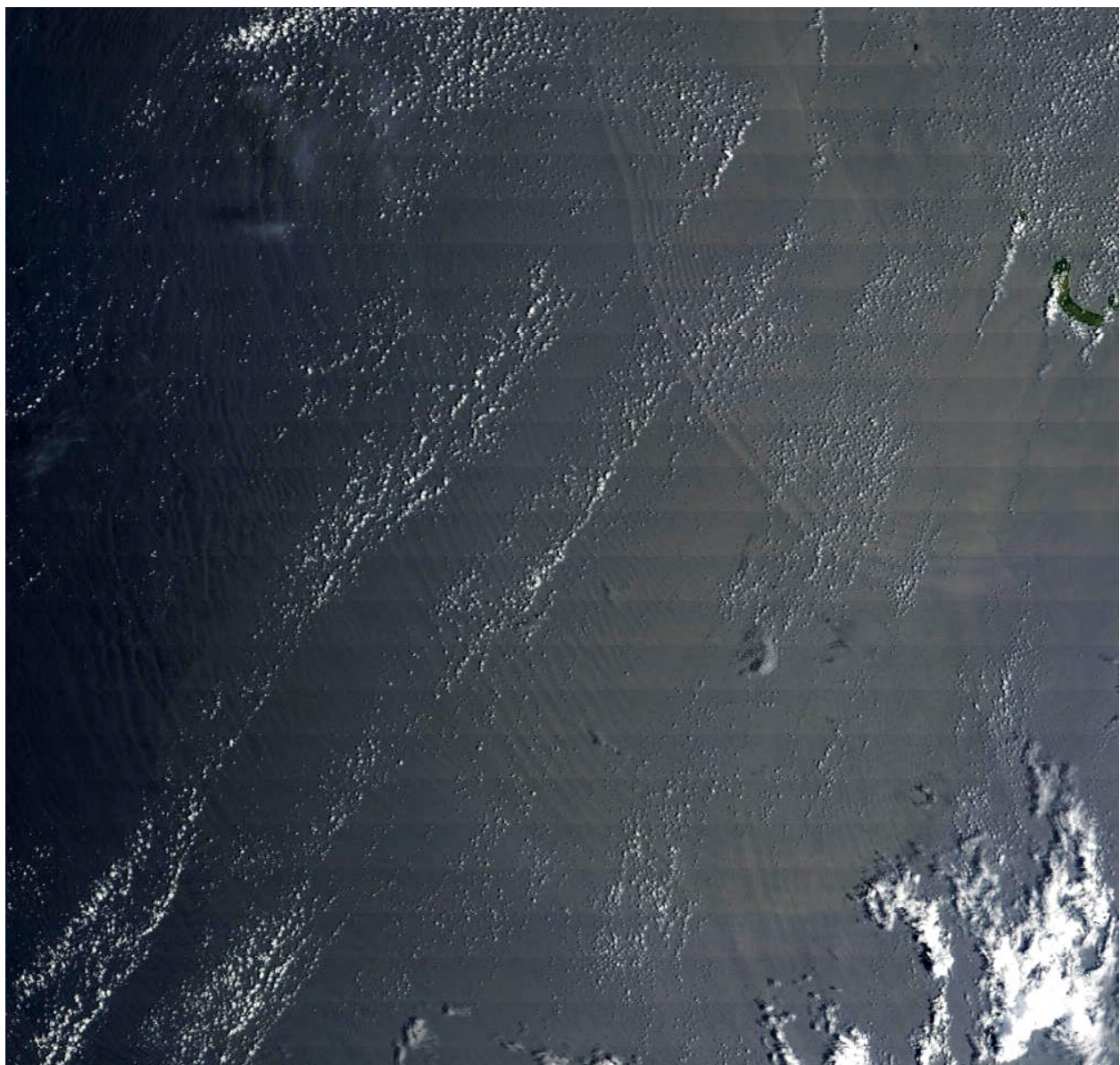


Figure 2. MODIS (Bands 1,3,4) 250-m resolution visible image acquired on 25 February 2004 at 0430 UTC. The image shows three packets of internal waves propagating westward into the Indian Ocean. Image is approximately 250 km x 238 km.





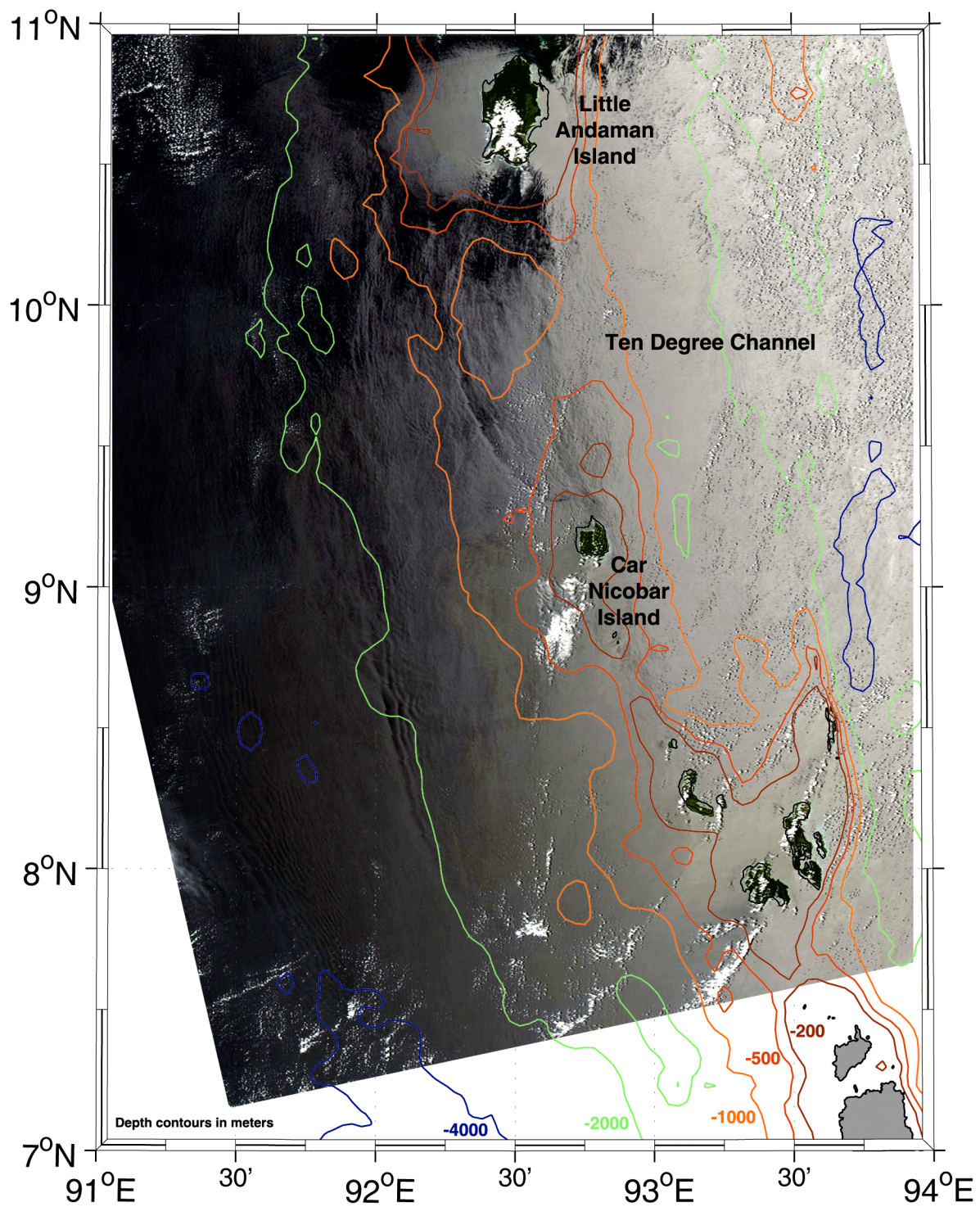


Figure 3. MODIS image from 8 April 2003 image shown with local bathymetry [Smith and Sandwell, 1997].



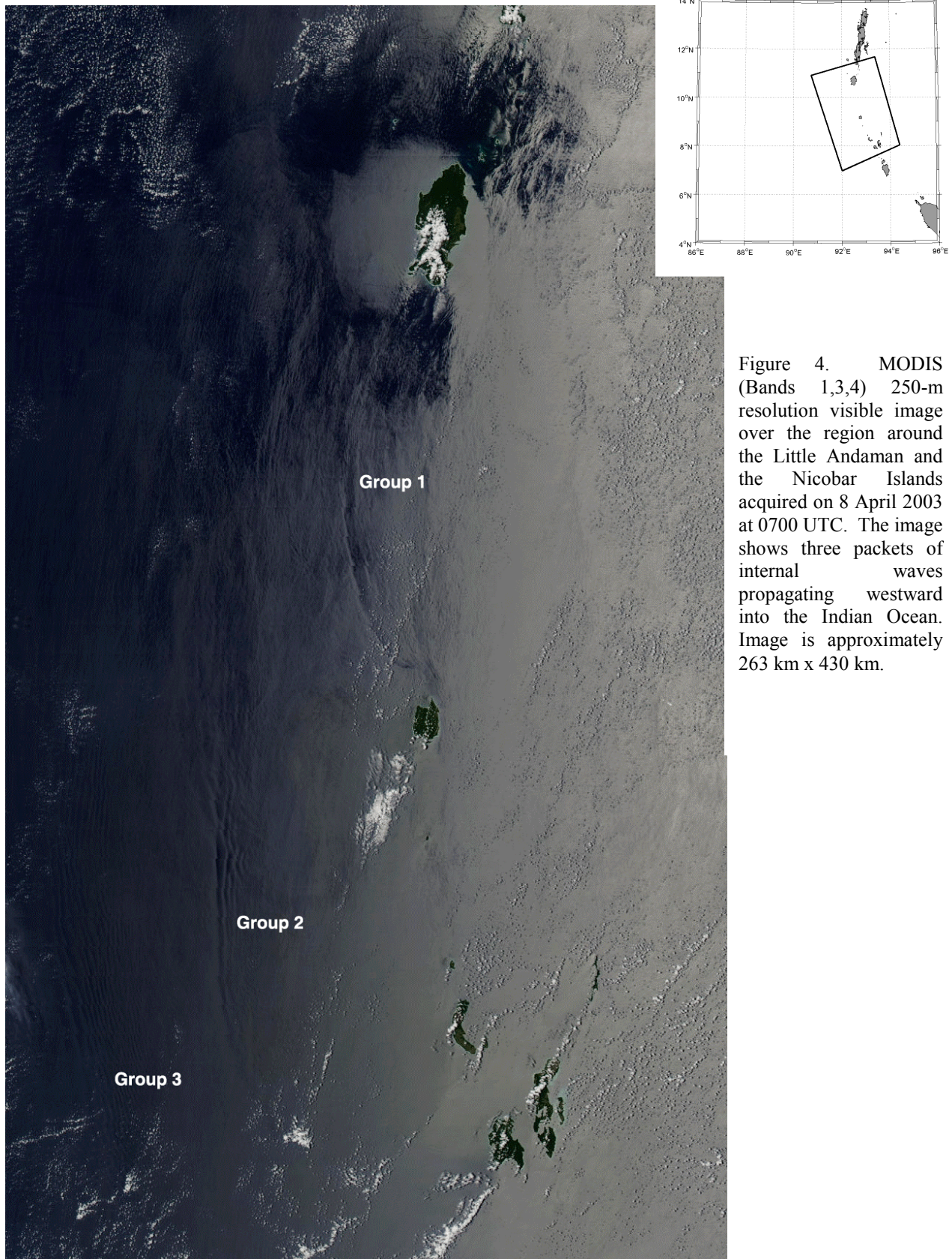


Figure 4. MODIS (Bands 1,3,4) 250-m resolution visible image over the region around the Little Andaman and the Nicobar Islands acquired on 8 April 2003 at 0700 UTC. The image shows three packets of internal waves propagating westward into the Indian Ocean. Image is approximately 263 km x 430 km.

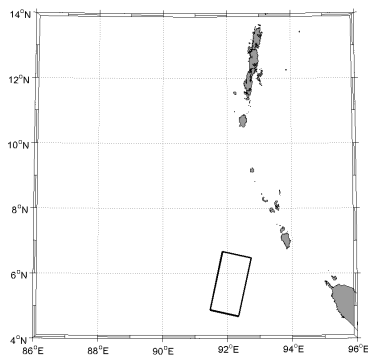
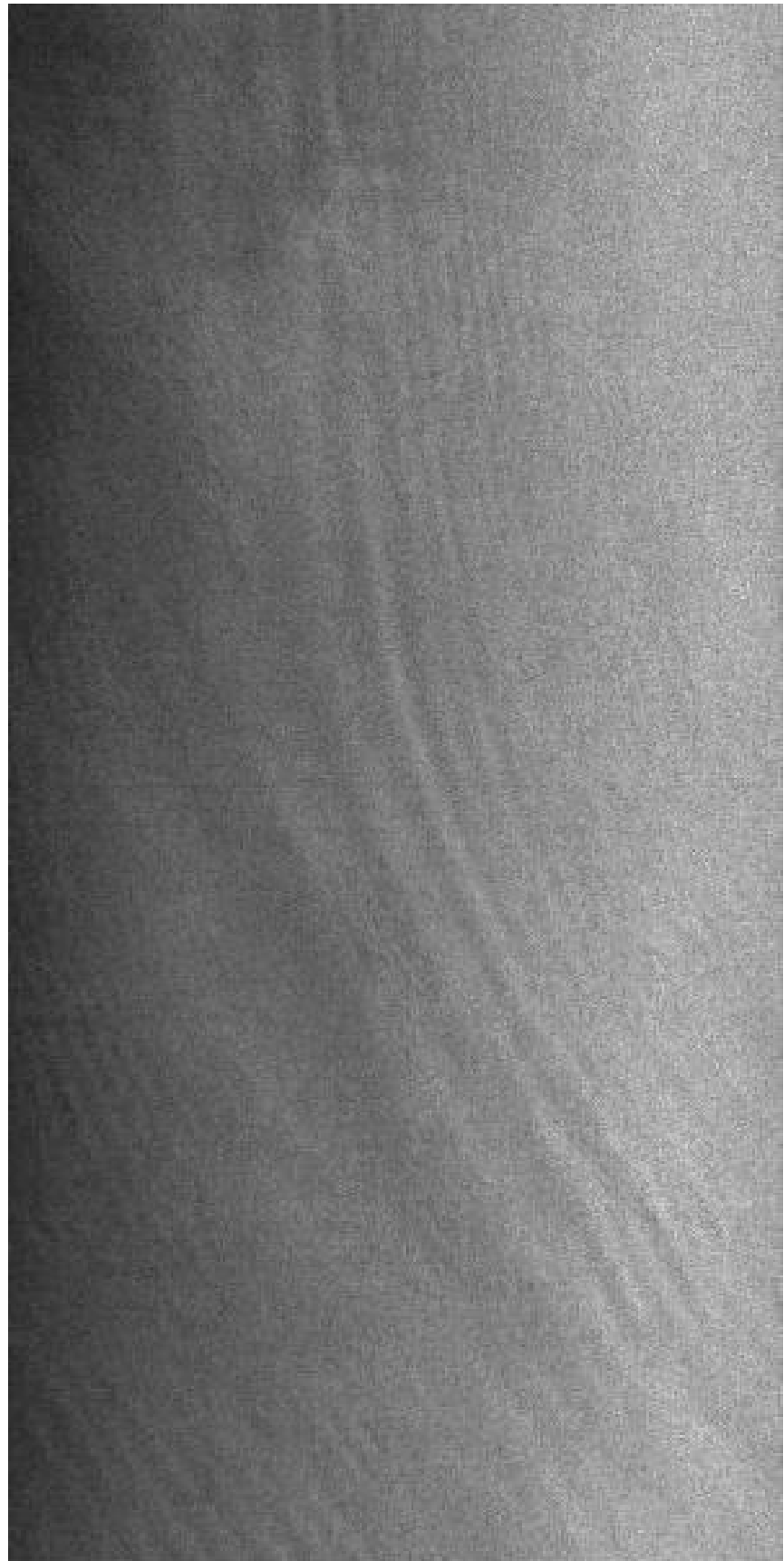


Figure 5. ERS-1 (C-Band, VV) SAR image of the Indian Ocean West of the Nicobar Islands acquired on 28 December 1996 at 1414 UTC (orbit 8833, frames 3483, 3501). The image shows two internal wave packets propagating westward. The waves are located west of the Great Channel (south of Great Nicobar Island). Image is 200 km x 100 km. © 1996 ESA [Image courtesy of *The Tropical and Subtropical Ocean Viewed by ERS SAR* <http://www.ifm.uni-hamburg.de/ers-sar/>]





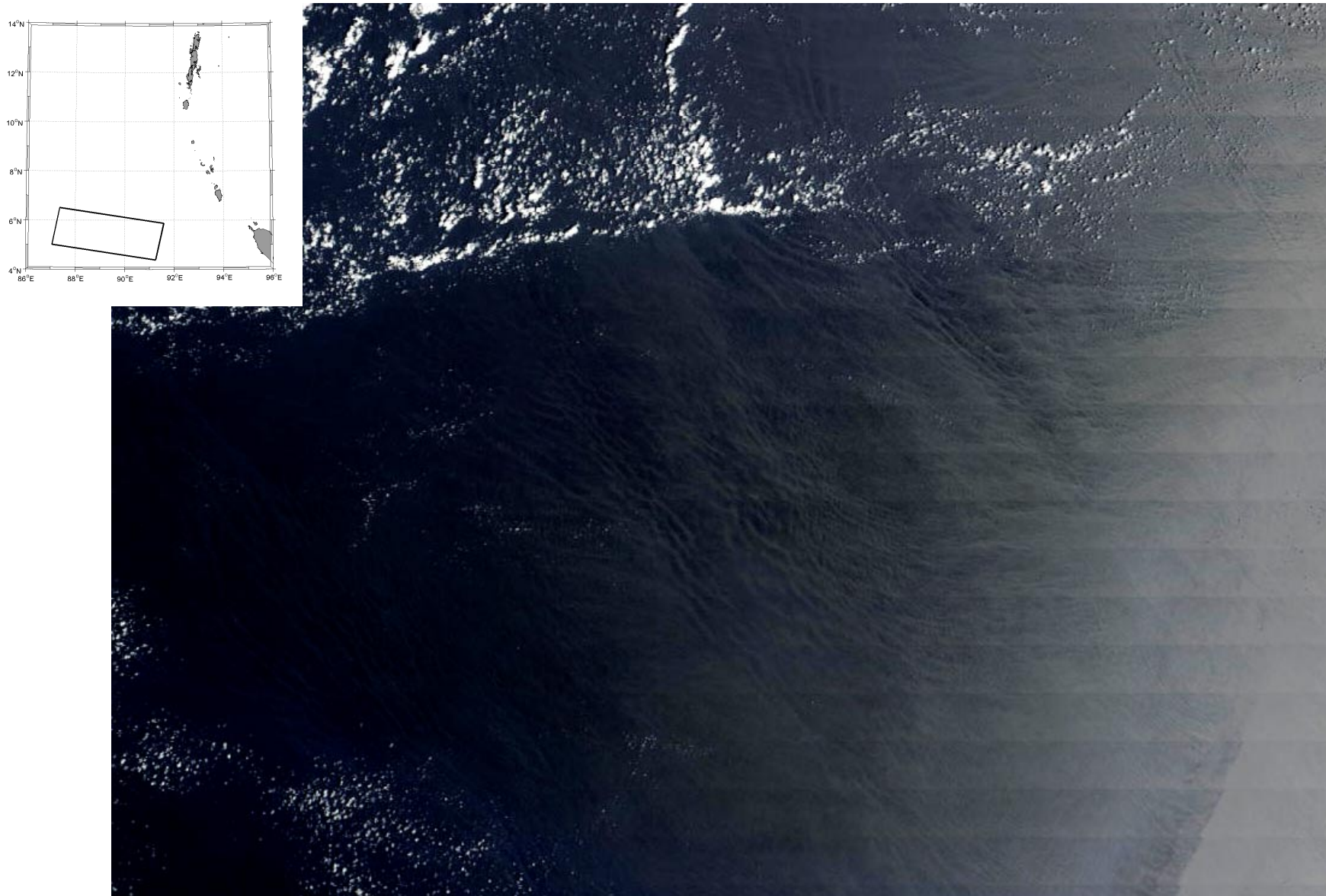


Figure 6. MODIS (Bands 1,3,4) 250-m resolution visible image acquired on 25 February 2004 at 0435 UTC. The image shows three packets of internal waves propagating westward into the Indian Ocean. Image is approximately 250 km x 185 km.

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