

The deformation characteristics along the Andaman-Nicobar arc associated with the December 26, 2004 megathrust earthquake: Insights from GPS data.

Anil Earnest and C.P. Rajendran

Centre for Earth Science Studies, Akkulam, Trivandrum 695013, India

The December 26 2004 Sumatra-Andaman, earthquake (M 9.0) has attracted immense scientific interest owing to its historically unprecedented size and ~1000-km-long rupture. We have obtained a minimum convergence rate of 17 mm/yr from our GPS observations between Port Blair and Bangalore, and this samples only 33% of the actual convergence rate. The data from other segments are being estimated, which includes observations from the GPS control points in Car Nicobar in the south and Diglipur in the north. Assuming a possible convergence rate of ≥ 40 mm/year, recurrence of a large earthquake (M ~7.5) could have been expected in the Nicobar segment (last earthquake occurred in 1881). The present earthquake, however, occurred ~600 km south of Car Nicobar, most probably a long-lived unruptured segment. Geological observations indicate that the areas around Great Nicobar (350 km to the north of the source) had a post-seismic subsidence of about 1-1.5 meters. The tidal data suggests that the Port Blair area in the South Andamans recorded an increase in sea level by 1 meter. On the contrary, the sea level North Andaman (Diglipur) has registered lowering by about 0.50 meters. The west facing parts of North Sentinel Island was raised to a height of about 0.75 meters, whereas the Little Andamans show no net change. The pattern of deformation along the arc indicates that the December 26 rupture propagation probably got arrested somewhere south of Diglipur in North Andamans and deformation field along the arc apparently looks variable. Arc velocity and strain variations from North Andamans to Great Nicobar Islands are being estimated and the results will be presented in this paper.