

IS THE STRAIN ACCUMULATION ON THE RISE BETWEEN INDIA AND ANTARCTICA IN THE SOUTHERN INDIAN PENINSULA? GPS-GEODESY ANSWERS

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Global Positioning System (GPS) measurements at Maitri, Indian Antarctic Station, have been carried out for the period 1997 to 2005 to study the seismotectonics and geodynamical processes between India and Antarctica. The IGS Stations, in different plates, Casey, Davis along with Maitri in Antarctic Plate, Seychelles in Mahe Island of Somalian Plate, Coco in Indo-Australia diffuse plate boundary region, Hartebeesthoek in South African Plate, Yaragadee, and Tidbinbilla in Australian Plate, have been chosen in the global network and the data processing was done using Bernese version 4.2 software and the time series of all the stations and the baseline lengths between Kergulen and all the other stations and also the velocity vectors of all the sites have been estimated. The GPS velocity fields of Maitri and other IGS stations in and around Antarctica in different plates relative to Kerguelen show the departure from rigid plate behaviour in a manner consistent with the mapped intra plate stress field, deformations and seismicity in the region. The analysis shows lengthening of baselines for sites Yaragadee and Tidbinbilla in Australian plate; and Seychelles and COCO in Indian plate at the rates of 5.5cm/yr, 2.8cm/yr, 5.6mm/yr and 5.5 cm/yr respectively. The high rate of movement of COCO Island in comparison to Seychelles could be the result of excessive strain accumulation due to the Indo-Australia diffuse plate boundary forces acting upon this region. The station Hartebeesthoek (HRAO) in South African plate shows a trend of minimal shortening at the rate of 1.4mm/yr. The velocities and the corresponding errors are estimated by a weighted least squares line fit assuming a simple white noise model. The velocities with uncertainties ($\pm 1\sigma$) are in good agreement with geodetic and geologic models. Our estimated velocity vectors do conform to those of SCAR GPS velocities. Our results with precisions of approximately 3-4mm (North), 5-6 mm (East), and 10-12mm (vertical) and the increase in the accumulation of elastic strain at rate of $1.27 \times 10^{-8} \text{ yr}^{-1}$, provide new information on the direction and rate of Indian plate motion, and intra plate seismicity of the Indian Ocean.