

## **Geodetic Tying of Antarctica and India with 10 years of Continuous GPS/GNSS data for Geodynamical and Strain Accumulation Studies in the South of Indian Peninsula**

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To holistically understand the geodynamical and crustal deformation processes in the south of Indian peninsula between India and Antarctica, two global networks (IND and ANT) have been chosen that geodetically connect the two continents. The IGS Station at Diego Garcia (DGAR) is the common station between the two networks. 10 years of data from 1997 to 2007 were used. By these global networks' analyses, the stations HYDE and MAIT are geodetically tied through DGAR. Very long baselines have been estimated from HYDE and also from Kerguelen (KERG) to other chosen IGS stations in and around India and Antarctica. Our analysis and results using ANT network show an increase in the baseline lengths between Kerguelen in Antarctica plate and other stations such as SEY1, DGAR and COCO and shortening of baseline lengths between HYDE in Indian plate and all these above stations using IND network. The analysis using ANT network also shows lengthening of baselines from Kerguelen to the sites Yaragadee (YAR1) and Tidbinbilla (TID2) in Australian plate; and Seychelles (SEY1) in Male plate, COCO in the diffuse plate boundary between India and Australia and DGAR in Capricorn plate at the rates of 5.3cm/yr, 3.8cm/yr, 5.6mm/yr, 3.03 cm/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 estimated elastic strain accumulation shows an increasing trend of  $1.27 \times 10^{-8} \text{ yr}^{-1}$  in the south of Indian peninsula. Our results show the precision of approximately 3-4mm (North), 5-6 mm (East), and 10-12mm (vertical) for the estimation of site coordinates. These results provide new information on the direction and rate of Indian plate motion, the driving mechanisms of Indian plate and intraplate seismicity of the Indian Ocean on the whole.

**Key words:** Indian Ocean Basin, Strain accumulation, Geodetic tying, very long baselines