A Comparative Study of Solid Earth Tides at Indian Stations

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SUMMARY

In many geodetic analyses, it is important to consider the effect of earth tide on the instantaneous position of a station and its subsequent influence on the computation and interpretation of time series of coordinates as well as related data products. In this research work, effect and temporal variations in position of the IGS (International Global Navigational Satellite Systems [GNSS] Service) station at Hyderabad and some of the other Indian stations due to solid earth tide, has been carried out. Mean daily coordinates of the station has been computed using static precise point positioning (PPP) method for a month. Results show that the station undergoes temporal displacements and its coordinates varies continuously within a day and all the days in the month. It has been found that the tidal oscillations follow some periodicity, and thus need to be studied independently for all stations. By Precise Point Positioning the variation in the position at a particular station is observed for a month of November 2013. Baseline distance is calculated between the four Indian stations. Variation along baseline is observed by computing six baselines between four stations and when the effect is studied simultaneously for all baselines it follows a definite pattern. This shows that the effect on the coordinates of the station is almost similar due to the Solid Earth Tides. By studying the simultaneous effect between two stations with known baseline distance and the time taken by the tide (either high or low) to reach from one station to another, the propagation velocity of the Solid Earth tides can be computed.