

Feasibility of Developing a Regional Deformation Model for the South Pacific

Chris Pearson (New Zealand), Kevin Kelly (USA) and Paul Denys (New Zealand)

Key words: GNSS/GPS; Reference frames; Reference systems

SUMMARY

Due to advances in positioning technology, particularly the widespread availability of commercial PPP services, ordinary GNSS users are increasingly being presented with coordinates in the current ITRF at the epoch of observation and there are no tools to correct these coordinates to the reference epoch of the ITRF or the reference epoch of a national datum. In this paper we consider the South Pacific region as a test case for developing a regional deformation model using published sources. Our study shows that over much of the region the global models from Kreemer et al 2014 provides an adequate basis to estimate secular velocities but ,in some extremely tectonically active areas like Vanuatu, Papua New Guinea (PNG) and the Solomon Islands, results from elastic block modeling studies should be incorporated in the velocity model to develop a spatially coherent velocity field. The region is quite seismically active so earthquake patches make an important contribution model. Unfortunately major earthquakes in the western part of the region (Vanuatu, PNG and the Solomon Islands) do not have published dislocation models so the development of earthquake patches is not possible here. However, outside of this part of the region, there has only been one significant earthquake in recent times, the 2009 Samoa-Tonga Great Earthquake. Beavan et al (2010) present a dislocation model for this earthquake that provides a very good match for the limited displacement measurements and it would be a possible source for earthquake patches for Tonga and Samoa.