

On the Development and Implementation of the New Semi-Dynamic Datum for Indonesia

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SUMMARY

Indonesia is a maritime continent with a complex and active tectonic setting and therefore prone to various natural hazards. The surface deformation caused by these hazards, coupled with tectonic plate motion in and around the Indonesian region, will cause the geocentric coordinates of many geodetic benchmarks and monuments in Indonesia to change with time. Since the 19th century, several local static topocentric geodetic datums have been used for surveying and mapping in Indonesia. In 1975 the Indonesian Datum 1974, which is a national static topocentric datum, was introduced and then replaced by the National Geodetic Datum 1995 which is a static geocentric datum realized using GPS observations. In recent years it has been realized that, due to on-going active tectonics in the Indonesian region, the National Geodetic Datum 1995 is inadequate for surveying and mapping in some regions of Indonesia, and also for some current and emerging applications. Initial studies suggested that a semi-dynamic geocentric datum is suitable for Indonesia. On 11 October 2013, BIG launched a new geocentric datum named the Indonesian Geospatial Reference System 2013 (IGRS 2013). This new datum is a semi-dynamic datum in nature, which uses the global ITRF2008 reference frame, with a reference epoch of 1 January 2012. A velocity model, which incorporates tectonic motion and earthquake related deformation, is used to transform coordinates from an observation epoch to or from this reference epoch. For its initial implementation, the model considers an initial deformation model setting based on 4 tectonic plates, 7 tectonic blocks, and 126 earthquakes. At present, the velocity model of IGRS 2013 will be mainly realized using the GPS-derived rates at passive and continuous GPS stations in Indonesian region. This paper presents and discusses main aspects of development and implementation of this new semi-dynamic datum of Indonesia.