Evaluation of GOCE's Global Geopotential Model to The Accuration of Local Geoid (Case Study on Island of Java, Indonesia)

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Key words: "Geoid and Gravity"

SUMMARY

Determination of the geoid can be done by two methods : geometric and gravimetric. Geoid determination geometrically with co-site GPS and Levelling measurements, whereas in gravimetric geoid determination using three components, namely shortwave, medium wave, and long-wave components. Long-wave components using global geopotential models, generated by gravity satellites such as CHAMP, GRACE and GOCE. Until this, several global geopotential models (GGM) of GOCE have not been evaluated for their accuracy in modeling the geoid applied locally in Indonesia. Based on these problems, this study was conducted to evaluate the global geopotential models to the GOCE geoid accuracy locally with a case study on the island of Java, Indonesia. Gravimetric geoid modeling using SRTM data as short-wave components, terestrial-gravity data as medium wave components, and global geopotential models of GOCE as long-wave components. Five GGMs GOCE used consisted of three approaches, namely DIR, TIM and SPW. Degree of GOCE's models ranged from 210 to 250. Gravimetric geoid formed will be controlled by 49 Geodetic High Points of known geometric geoid value. The results showed that the highest accuracy of Java's geoid undulations generated by the model SPW-R1 of 0,644 meters, while the lowest accuracy generated by TIM-R3 models at 0,703 meters. In addition, the study also showed that SPW approach more closely than the model DIR and TIM. The amount of accuracy approach model SPW, DIR, and TIM row is 0,644 meters, 0,698 meters and 0,697 meters.
Keywords : Evaluation, GGM of GOCE, Local Geoid, Island of Java Indonesia.