

ABSTRACK

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Study Program : *Geodesy Technique*

Title : *Correlation of Groundwater Use Against Land subsidence based on Episodic GPS Observation Data for 2017 - 2018 (Case Study: Semarang Region)*

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Semarang City is the capital of Central Java Province which can be classified as a metropolitan city. Geographically the area of Semarang City is between 6°50' - 7°10' South latitude and 109°35' - 110°50' East longitude with an area of 373.70 square kilometers. The city of Semarang has a population of more than 1.7 million and during the day it can reach 2 million. With such a large population, Semarang City is one of the cities that uses a lot of ground water in carrying out its various activities. The purpose of this study is to monitor the phenomenon of land subsidence and its correlation to water table decline that occurs in the Semarang region due to excessive use of ground water. To see the value of land subsidence requires very precise position accuracy (order mm) because the slightest change must be observed. Therefore a GPS measurement is performed using a static differential method using phase data from a dual frequency receiver to get good accuracy. With the differential method the position of a point is determined relative to other points whose coordinates are known (reference points). In this study GPS data processing was carried out using BERNESE 5.2 software with QIF (Quase Ionosphere Free) as a method of solving phase ambiguity. The interpolation of land subsidence data is done using ArcGIS 10.1 software and overlaying with various parameters that are believed to have a close relationship with the phenomenon of land subsidence. The results obtained from this study are a graph of land subsidence at 24 monitoring points, a map of land subsidence in the Semarang region in 2018, and a correlation graph with a water table decline using a linear equation $y = 20.879x + 0.5774$. The conclusion

obtained from this study is that the Semarang region continues to experience land subsidence each year ranging from 6 to 14 centimeters. This is based on the correlation that is very closely related to the distribution of ground water extraction points, land use and cover (industrial and residential areas), as well as the geological structures formed in Semarang.

keyword:

Semarang Region, GPS, Land Subsidence, Water Table Decline.

