Geological Structure Detection Digitally Using Synthetic Aperture Radar (SAR) Data

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ABSTRACT

Geological structures detection can be performed using the height model data. This data is Synthetic Aperture Radar (SAR), Shuttle Radar Topographic Mission (SRTM) and XSAR. Geological structure consists of joint, faults, folds. Geological structures can be used for various applications such as geological mapping and mining. Height model is made using the integration method, namely the incorporation of at least two height models with the same reference plane, and be weighted at each height models. SRTM is made of interferometry C band. XSAR made of interferometry X band. SRTM and XSAR still in the form of Digital Surface Model (DSM). Then do the terrain correction, which transform DSM into the Digital Elevation Model (DEM) or by changing the DSM to be Digital Terrain Model (DTM). Bull Eye's correction needs to be done if the terrain correction has completed. Bull Eye's correction done in order to eliminate the high anomaly of value happens to be eight pixels around the pits and spire or fill and sink. It cultivated near zero error value or a minimum of 3σ. After that, do the Geoid undulation correction using Earth Gravitational Model (EGM) 2008. EGM 2008 is made from Grace satellite data. SRTM and XSAR has had the same reference plane, then later be weighted in order to obtain new height models with high accuracy and precision. Then carried out by the geological structures detection using dip and strike methods. This detection is done digitally. This dip and strike method can be done with three-point approach, contact plane, strike from the map, retrace, and parallel contact. The geological structure can be used for energy and mineral mining detection, such as coal, copper, tin, petroleum, geothermal, iron ore, and others. This digital geological structure method could be used to geological preliminary survey so that it will minimize the cost and time and improve efficiency of geological mapping.

Keywords: geological structure, SRTM and XSAR, Dip and Strike, cost, time