SURFACE ROUGHNESS MODELLING USING FULLY POLARIMETRIC SAR DATA TO DELINIATE MINERALIZATION ZONE AT VOLCANIC TERRAIN

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ABSTRACT: Volcanic terrain could be classified into central, proximal, medial, and distal facies based on geomorphologic features. Fully polarimetric Synthetic Aperture Radar (PolSAR) data are used to determine the roughness of each geomorphologic feature. PolSAR sensor enable to transmit and receive microwave radiation with four polarization modes: HH, HV, VH, and VV. The H and V indicates the direction of electromagnetic wave propagation, whether horizontal (H) or vertical (V). The digital number of radar images are converted into backscattering coefficient and used as basis of surface roughness modeling. The accuration of surface roughness model from PolSAR data are known from comparing it with field roughness measurement data. A field survey was conducted using a pin meter at the 31 sample points. Then, the root mean square (RMS) of surface roughnes presented by pin meter is calculated for each location. The correlation between field measurement and roughness model from PolSAR data is calculated to determine the variable of surface roughness model. Mt. Manglayang in West Java, Indonesia is selected as study area. Mt. Manglayang is a composite volcano (stratovolcano) with the summit elevation about 1818 m above mean sea level. The result of this study proved that the roughness model from PolSAR data are similar to the field measurement. The smoother roughness surface are predicted to be mineralization zone. Intrusive volcanic activity makes reaction between heat emission of magma then create a hydrothermal fluid that produce mineral. Whereas, that heat emission of magma cause erosion at the volcanic surface which effect to volcanic surface roughness.

KEY WORDS: Surface Roughness, Fully Polarimetric SAR, Mineralization, Volcanic Terrain, Mt. Manglayang.