Pemetaan Geologi Gunung Api Dijital Daerah Ngebels, Madiun berdasarkan Data Reflektansi dan Susceptibilitas Magnetik Batuan

Volcanic Geology Digital Mapping of Ngebels Area, Madiun based on Reflectance and Rock Magnetic Susceptibility Data

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Abstract - This study was taken as a part of volcanic geology mapping at Ngebels area including volcanoostratigraphy and structural geology interpretations by optimizing the satellite remote sensing and terestrial data. Ngebels area is located at the western flank of Mt. Wilis volcanic complex, Madiun District, East Java, Indonesia. The purpose of this study is to obtain the effectiveness of atmospherically corrected satellite image of Landsat-8 OLI (Operational Land Imager) TIRS (Thermal Infrared Sensor) and rock magnetic susceptibility for identifying volcanic products. The Landsat-8 OLI/TIRS image processing is performed in two steps: pre and post field observation. The pre field observation step was treated by processing and analysing the Landsat-8 OLI/TIRS to produce geomorphological units, circular linear feature, rock unit boundary, and interpreted epicenter by examining image color, tone, and texture. Furthermore, the reflectance spectra analyses of Landsat-8 OLI/TIRS were obtained to define detailed volcanic product unit boundary after the field observation performed. Magnetic susceptibility of the rocks was used to classify the volcanoostratigraphic units based on their magnetization degree of the induced rocks. Considering the magnetic susceptibility, there are suggested two groups of volcanic unit or Hummocks (Gumuk): Hummock of Ngebels with low susceptibility (9.9 × 10⁻⁵ – 20.7 × 10⁻⁵) and Hummock of Manyutan with medium (20.7 × 10⁻⁵ – 48.7 × 10⁻⁵) to high susceptibility (≥ 48.7 × 10⁻⁵). Noticing the reflectance spectra of Landsat-8 OLI/TIRS, it can be defined five volcanic rock units: pyroclastic fall Ngebels (reflectance value at 0.63 – 0.71), pyroclastic flows Ngebels (reflectance value at 0.71 – 0.74), pyroclastic flow Manyutan (reflectance value at 0.74 – 0.78), lava Manyutan 1 (reflectance value at 0.78 – 0.84), and Lava Manyutan 2 (reflectance value at ≥ 0.84).

Keyword: Volcanoostratigraphy, Landsat-8 OLI/TIRS, magnetic susceptibility, reflectance, Ngebels

Kata Kunci : Volcanoostratigraphy, Landsat-8 OLI/TIRS, susceptibilitas magnetik, reflektansi, Ngebels

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