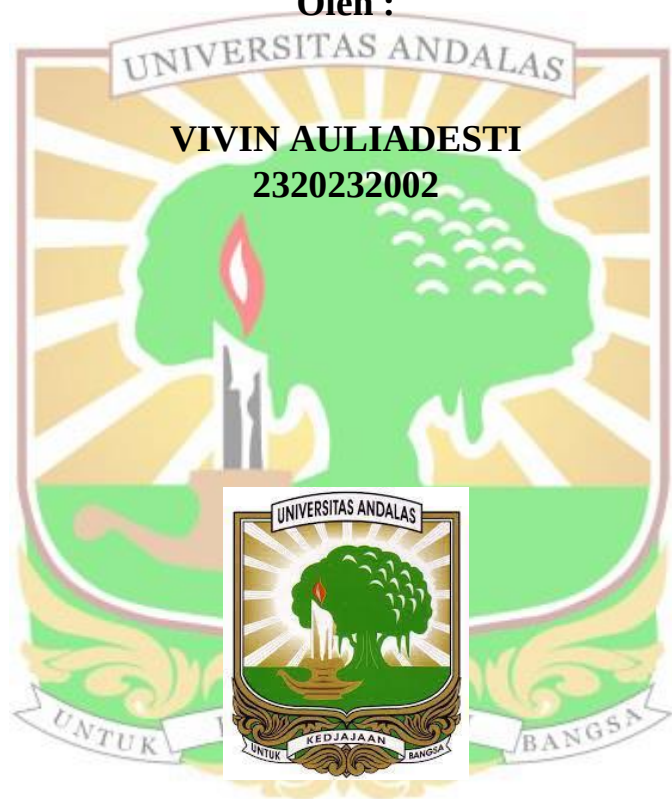


**DISTRIBUSI SPASIAL KARBON DAN MINERAL LIAT
NON KRISTALIN PADA TANAH TERDAMPAK ERUPSI
GUNUNG MARAPI**

TESIS

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DISTIBUSI SPASIAL KARBON DAN MINERAL LIAT NON KRISTALIN PADA TANAH TERDAMPAK ERUPSI GUNUNG MARAPI

ABSTRAK

Aktivitas gunung api secara signifikan mampu mempengaruhi distribusi karbon dan fraksinya di dalam tanah. Tanah vulkanis memiliki kadar karbon yang tinggi akibat terperap pada mineral liat non kristalin sehingga sulit terdekomposisi. Penelitian ini bertujuan untuk mengkaji dan memetakan karbon tanah vulkanis Gunung Marapi. Sebanyak 93 sampel tanah diambil dengan interval grid 750 x 750 m kedalaman 20 cm pada penggunaan lahan hortikultura, sawah, kebun campuran dan hutan yang tersebar di wilayah Barat Daya, Barat dan Barat Laut pada wilayah yang terdampak erupsi Gunung Marapi di radius 4,5-7 km dari pusat erupsi. Parameter yang dianalisis yaitu: berat volume tanah, kemasaman tanah, P tersedia, P retensi, C organik, fraksionasi C dan mineral liat non kristalin tanah. Hasil penelitian menunjukkan bahwa, kemasaman tanah berkisar 4,59-6,19 (pH H₂O) dan 3,8-5,8 (pH KCl), kadar C organik tanah (3-14%), nilai BV tanah (0,53-0,99 Mg/m³). Kadar fraksi C sangat labil > C labil > C metal kompleks > kadar C terikat mineral liat non kristalin. Kadar P tersedia tanah (0,05-71 ppm), nilai P retensi tanah (85-98%), kadar alofan (0,05-22%) dan kadar ferihidrit (0,05-7%). Tanah di wilayah Barat Laut memiliki pH yang berbeda dengan pH tanah di wilayah Barat dan Barat Daya. Karbon sangat labil tanah di wilayah Barat Daya berbeda dengan karbon sangat labil tanah di wilayah Barat dan Barat Laut. Nilai C-metal kompleks tanah di wilayah Barat Laut berbeda dengan nilai C-metal kompleks tanah wilayah Barat dan Barat Daya. Tanah di wilayah Barat lebih memiliki kombinasi yang seimbang antara ketersediaan hara, kestabilan karbon, struktur tanah yang baik, dan mineral liat non kristalin dalam jumlah yang sedang diantara wilayah Barat Daya dan Barat laut. Erupsi Gunung Marapi tidak hanya mengubah sifat tanah tetapi juga membentuk tanah vulkanis yang dapat berpotensi besar dalam menyimpan karbon melalui peran mineral liat non kristalin. Keberagaman fraksi C di dalam tanah dapat dijadikan acuan dalam pengolahan tanah untuk simpanan karbon dalam tanah dan menjadi penanda untuk kesehatan tanah.

Kata kunci: distribusi karbon, fraksionasi karbon, gunung api, pemetaan digital, tanah vulkanis

SPATIAL DISTRIBUTION CARBON AND NON CRYSTALLINE CLAY MINERALS IN SOIL AFFECTED BY THE ERUPTION OF MARAPI MOUNTAIN

ABSTRACT

Volcanic activity can significantly carbon distribution component and its fractions in soil. Volcanic soil have high affect carbon content due to its adsorption on non-crystalline clay minerals, making it difficult to decompose. This study aimed to examine and map the carbon content of volcanic soil from Mt. Marapi. A total of 93 soil samples were taken with a grid intervals of 750 x 750 m at a depth of 20 cm from horticultural land, rice fields, mixed gardens, and forests scattered across the southwest, west, and northwest areas affected by the eruption of Mt. Marapi at a radius of 4.5-7 km from the peak. The parameters analyzed were: bulk density, soil acidity, available P, retention P, organic C, C fractionation, and non-crystalline clay minerals in the soil. The results showed that soil acidity ranged from 4.59 to 6.19 (pH H₂O) and 3.8 to 5.8 (pH KCl), soil organic C content (3-14%), and bulk density value (0.53-0.99 Mg/m³). The carbon fraction content was highly unstable > unstable carbon > metal complex carbon > non-crystalline clay mineral bound carbon content. The available phosphorus content of the soil was 0.05-71 ppm, the phosphorus retention value of the soil was 85-98%, the allophane content was 0.05-22%, and the ferrihydrite content was 0.05-7%. Soil pH in Northwest was different from those of in West and Southwest. Very labile carbon in Southwest slope was different compare those found in West and Northwest. C-metal complex in Northwest soil were not same as those found in West and Southwest. Soils in the western region have a more balanced combination of nutrient availability, carbon stability, good soil structure, and moderate amounts of non-crystalline clay minerals between the southwest and northwest regions. The eruption of Mt. Marapi not only changed the properties of the soil but also later on forming volcanic soil that has great potential for carbon storage through the role of non-crystalline clay minerals. The diversity of C fractions in the soil can be used as a reference in soil management for carbon storage in the soil and as an indicator of soil health.

Keywords: carbon distribution, carbon fractionation, digital mapping, fire mountain, volcanic soil