

ABSTRAK

MODEL KARAKTERISTIK ENDAPAN DAN ESTIMASI SUMBER DAYA BAUKSIT LATERIT MENGGUNAKAN METODE *INVERSE DISTANCE WEIGHTING (IDW)* DAN *ORDINARY KRIGING (OK)* DI DAERAH SIANTAU RAYA, KECAMATAN NANGA TAYAP, KABUPATEN KETAPANG, PROVINSI KALIMANTAN BARAT

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Daerah Siantau Raya, Kecamatan Nanga Tayap, Kabupaten Ketapang, Provinsi Kalimantan Barat, merupakan bagian dari Zona Schwaner yang memiliki potensi endapan bauksit laterit signifikan dikarenakan keterdapatan batuan beku asam sampai intermediet, topografi yang bergelombang sedang, kondisi iklim tropis basah, dan kondisi tektonik yang relatif stabil. Kondisi tersebut merupakan kondisi yang ideal untuk pembentukan endapan bauksit laterit. Dengan adanya potensi endapan bauksit laterit, diperlukan adanya pemodelan geologi dan estimasi sumber daya yang akurat. Penelitian ini bertujuan untuk membuat model karakteristik endapan bauksit laterit dan mengestimasi total sumber daya bauksit dengan membandingkan dua metode interpolasi geostatistik, yaitu *Inverse Distance Weighting (IDW)* dan *Ordinary Kriging (OK)*. Metode penelitian dilakukan dengan mengintegrasikan 63 data *drillhole* eksplorasi untuk membuat model endapan bauksit laterit. Hasil pembagian horizon laterit pada pemodelan geologi menunjukkan empat horizon utama dari atas ke bawah yaitu lapisan *soil*, zona bauksit, lapisan saprolit, dan batuan dasar (*bedrock*) yang berupa *syenogranite*. Kadar Al_2O_3 pada horizon bauksit berbanding lurus dengan presentase mineral K-Feldspar pada *bedrock*. Estimasi sumber daya menggunakan metode *Inverse Distance Weighting (IDW)* menghasilkan total tonase sebesar 435.387,42 ton Al_2O_3 , sedangkan metode *Ordinary Kriging (OK)* menghasilkan total tonase 435.592,03 ton Al_2O_3 . Validasi model melalui validasi visual, histogram, *swath plot*, dan validasi silang, menunjukkan bahwa metode *Ordinary Kriging (OK)* memberikan estimasi yang lebih akurat karena penggunaan variogram mampu merepresentasikan korelasi spasial data. Berdasarkan nilai *Kriging Efficiency* pada model *Ordinary Kriging (OK)*, total sumber daya terklasifikasi adalah 419.995,46 ton Al_2O_3 , meliputi sumber daya teroka sebesar 57.979,99 ton Al_2O_3 , sumber daya tertunjuk sebesar 69.719,70 ton Al_2O_3 , dan sumber daya terukur sejumlah 292.295,76 ton Al_2O_3 .

Kata kunci : bauksit, *inverse distance weighting*, *kriging efficiency*, *ordinary kriging*, sumber daya

ABSTRACT

MODEL OF DEPSOSIT CHARACTERISTICS AND RESOURCE ESTIMATION LATERITIC BAUXITE DEPOSIT USING INVERSE DISTANCE WEIGHTING (IDW) AND ORDINARY KRIGING (OK) IN SIANTAU RAYA, NANGA TAYAP SUBDISTRICT, KETAPANG REGENCY, WEST KALIMANTAN PROVINCE

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The Siantau Raya area, Nanga Tayap District, Ketapang Regency, West Kalimantan Province, is part of the Schwaner Zone, which hosts significant lateritic bauxite deposits due to the presence of acidic to intermediate igneous rocks, moderately undulating topography, a humid tropical climate, and relatively stable tectonic conditions. These factors represent ideal conditions for the formation of lateritic bauxite deposits. Given the potential of lateritic bauxite in this area, accurate geological modeling and resource estimation are required. This research aims to develop a geological model of the lateritic bauxite deposit and estimate the total bauxite resources by comparing two geostatistical interpolation methods, namely Inverse Distance Weighting (IDW) and Ordinary Kriging (OK). The research method integrates 63 exploratory drillhole data to construct the geological model of the lateritic bauxite deposit. The subdivision of the lateritic horizons in the geological modeling identified four main horizons from top to bottom: soil layer, bauxite zone, saprolite layer, and bedrock composed of syenogranite. The Al_2O_3 grade within the bauxite horizon is directly proportional to the percentage of K-Feldspar minerals in the bedrock. Resource estimation using the Inverse Distance Weighting (IDW) method resulted in a total tonnage of 435,387.42 tons of Al_2O_3 , while the Ordinary Kriging (OK) method produced a total of 435,592.03 tons of Al_2O_3 . Model validation through visual validation, histograms, swath plots, and cross-validation demonstrated that the Ordinary Kriging (OK) method provides a more accurate estimation, as the variogram is able to represent the spatial correlation of the data. Based on the Kriging Efficiency values in the Ordinary Kriging (OK) model, the total classified resources amount to 419,995.46 tons of Al_2O_3 , comprising inferred resources of 57,979.99 tons of Al_2O_3 , indicated resources of 69,719.70 tons of Al_2O_3 , and measured resources of 292,295.76 tons of Al_2O_3 .

Keyword : bauxite , inverse distance weighting, kriging efficiency, ordinary kriging, resource