IDENTIFIKASI LOKASI PROSPEKTIF PASIR BESI DI WILAYAH SASAK RANAH PASISIE MENGGUNAKAN DATA GEOMAGNETIK EMM 2017

SKRIPSI

diajukan oleh:

MUHAMMAD FAJRI
2110441008

Dosen pembimbing:
ARIF BUDIMAN, M.Si

DEPARTEMEN FISIKA
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS ANDALAS
PADANG

Agustus, 2025

IDENTIFIKASI LOKASI PROSPEKTIF PASIR BESI DI WILAYAH SASAK RANAH PASISIE MENGGUNAKAN DATA GEOMAGNETIK EMM 2017

ABSTRAK

Pasir besi merupakan sumber daya mineral bernilai ekonomi tinggi yang dimanfaatkan sebagai bahan baku industri besi, baja, dan semen. Sebarannya umumnya terkait dengan endapan pantai atau aluvial yang mengandung mineral magnetit bersifat feromagnetik, sehingga dapat diidentifikasi melalui metode geomagnetik. Kecamatan Sasak Ranah Pasisie, Kabupaten Pasaman Barat, Sumatera Barat, diketahui memiliki potensi pasir besi, namun informasi sebaran lateral dan vertikalnya masih terbatas. Penelitian ini bertujuan mengidentifikasi lokasi prospektif pasir besi menggunakan data geomagnetik sekunder dari Enchanted Magnetic Model (EMM) 2017. Wilayah penelitian dibagi menjadi grid 0,5 km × 0,5 km, menghasilkan 454 titik data dengan koordinat, elevasi, dan nilai medan magnetik total. Data dikoreksi terhadap *International Geomagnetic Reference Field* (IGRF) untuk memperoleh anomali magnetik, yang kemudian dipisahkan menjadi anomali regional dan residual menggunakan metode *Radial Average Power Spectrum* (RAPS). Hasilnya ditransformasi dengan teknik *Reduce to Pole* (RTP) untuk memperjelas posisi sumber anomali. Nilai anomali magnetik berkisar antara –0,35668 nT hingga 0,43605 nT, dengan nilai tertinggi dominan di barat laut, tengah, dan tenggara wilayah penelitian. Perbandingan peta RTP dan geologi menunjukkan sebaran lateral pasir besi memanjang barat laut–tenggara sejajar garis pantai. Pemodelan 2D lintasan AA’ mengungkap zona potensi pasir besi dengan suseptibilitas magnetik (χm) 0,94 SI, berkesinambungan dari permukaan hingga kedalaman ±500 m. Hasil ini memberikan gambaran awal sebaran lateral dan vertikal pasir besi yang dapat menjadi acuan eksplorasi lanjutan.

Kata kunci: EMM 2017, pasir besi, anomali magnetik, pemodelan 2D, suseptibilitas magnetik

PROSPECTIVE IRON SAND LOCATION IDENTIFICATION IN THE SASAK RANAH PASISIE AREA USING EMM 2017 GEOMAGNETIK DATA

ABSTRACT

Iron sand is a mineral resource with high economic value, utilized as raw material in the iron, steel, and cement industries. Its distribution is generally associated with coastal or alluvial deposits containing magnetite minerals with ferromagnetic properties, allowing them to be identified through geomagnetic methods. Sasak Ranah Pasisie District, West Pasaman Regency, West Sumatra, is known to have potential iron sand deposits; however, information on their lateral and vertical distribution remains limited. This study aims to identify prospective iron sand locations using secondary geomagnetic data from the Enhanced Magnetic Model (EMM) 2017. The study area was divided into a 0.5 km × 0.5 km grid, resulting in 454 data points containing coordinates, elevation, and total magnetic field values. The data were corrected against the International Geomagnetic Reference Field (IGRF) to obtain magnetic anomalies, which were then separated into regional and residual anomalies using the Radial Average Power Spectrum (RAPS) method. The results were transformed using the Reduce to Pole (RTP) technique to clarify the position of anomaly sources. Magnetic anomaly values range from –0.35668 nT to 0.43605 nT, with the highest values predominantly in the northwest, central, and southeast parts of the study area. Comparison between RTP maps and geological maps shows that the lateral distribution of iron sand extends northwest–southeast, parallel to the coastline. Two-dimensional modeling along profile AA' revealed a potential iron sand zone with magnetic susceptibility (χm) of 0.94 SI, continuous from the surface to a depth of approximately 500 m. These results provide an initial depiction of the lateral and vertical distribution of iron sand, serving as a reference for further exploration.

*Keywords**:** EMM 2017, iron sand, magnetic anomaly, modeling 2D, susceptibility magnetic.*