

## SARI

### ANALISIS GEOKIMIA SEDIMEN SUNGAI DAN PENENTUAN PROVENAN PADA SUNGAI SERAYU KABUPATEN CILACAP, PROVINSI JAWA TENGAH

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Daerah Sungai Serayu, Kabupaten Cilacap merupakan sistem *fluvial* yang berkembang dalam pengaruh tektonik busur aktif Jawa bagian selatan akibat interaksi konvergen Lempeng Indo-Australia dan Eurasia, sehingga sedimen yang terendapkan berpotensi merekam dinamika energi pengendapan dan karakter litologi sumbernya. Penelitian ini bertujuan untuk mengetahui karakteristik sedimen sungai berdasarkan analisis granulometri, mengetahui kandungan unsur geokimia sedimen menggunakan metode *X-Ray Fluorescence* (XRF), dan menentukan provenan berdasarkan parameter geokimia. Metode penelitian meliputi pengambilan sampel sedimen permukaan secara sistematis di sepanjang aliran sungai, analisis ukuran butir untuk memperoleh parameter statistik (*mean*, sortasi, *skewness*, dan kurtosis), analisis geokimia unsur utama menggunakan XRF, serta interpretasi provenan melalui statistik deskriptif, korelasi unsur, dan plot diskriminan bivariat Roser dan Korsch (1988). Hasil granulometri menunjukkan dominasi fraksi pasir dengan sortasi sedang hingga buruk yang mengindikasikan lingkungan pengendapan *fluvial* berenergi sedang sampai relatif tinggi dengan proses transportasi selektif. Secara geokimia, sedimen didominasi unsur silikat dengan kandungan Fe dan Ti relatif tinggi, mencerminkan kontribusi material mafik. Analisis korelasi antar unsur menunjukkan hubungan genetik unsur litogenik yang konsisten dengan suplai dari batuan beku mafik. Plot diskriminan provenan menempatkan seluruh sampel pada afinitas *mafic igneous provenance*, yang sejalan dengan kerangka tektonik busur magmatik aktif di Jawa bagian Selatan. Hasil ini konsisten dengan penelitian sejenis pada sistem *fluvial* di zona konvergen aktif yang menunjukkan dominasi material vulkanik sebagai sumber sedimen utama. Secara keseluruhan, karakteristik sedimen sungai dan geokimia sedimen Sungai Serayu merefleksikan sistem *fluvial* aktif yang dikontrol oleh suplai material vulkanik mafik dalam kerangka tektonik busur magmatik, sehingga penelitian ini memperkuat keterkaitan antara proses sedimentasi permukaan dan dinamika tektonik regional.

**Kata Kunci:** Granulometri, Geokimia Sedimen, Provenan, Sungai Serayu, Antropogenik.

## **ABSTRACT**

### **GEOCHEMICAL ANALYSIS OF STREAM SEDIMENT AND DETERMINATION OF PROVENANCE IN SERAYU RIVER CILACAP REGENCY, CENTRAL JAVA PROVINCE**

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*The Serayu River area in Cilacap Regency is a fluvial system that developed under the influence of the active tectonic arc of southern Java due to the convergent interaction of the Indo-Australian and Eurasian plates, so that the deposited sediments have the potential to record the dynamics of deposition energy and the lithological characteristics of their source. This study aims to determine the characteristics of river sediments based on granulometric analysis, determine the geochemical content of sediments using the X-Ray Fluorescence (XRF) method, and determine their provenance based on geochemical parameters. The research methods included systematic sampling of surface sediments along the river flow, grain size analysis to obtain statistical parameters (mean, sorting, skewness, and kurtosis), geochemical analysis of major elements using XRF, and provenance interpretation through descriptive statistics, element correlation, and Roser and Korsch's (1988) bivariate discriminant plot. The granulometry results show a dominance of sand fractions with moderate to poor sorting, indicating a moderate to relatively high energy fluvial depositional environment with selective transport processes. Geochemically, the sediments are dominated by silicate elements with relatively high Fe and Ti content, reflecting the contribution of mafic material. Element correlation analysis shows a genetic relationship between lithogenic elements consistent with supply from mafic igneous rocks. The provenance discriminant plot places all samples in the mafic igneous provenance affinity, which is in line with the tectonic framework of the active magmatic arc in southern Java. These results are consistent with similar studies on fluvial systems in active convergent zones, which show the dominance of volcanic material as the main sediment source. Overall, the characteristics of the Serayu River sediments and their geochemistry reflect an active fluvial system controlled by the supply of mafic volcanic material within a magmatic arc tectonic framework, thus strengthening the link between surface sedimentation processes and regional tectonic dynamics.*

**Keywords:** *Granulometry, Sediment Geochemistry, Provenance, Serayu River, Anthropogenic.*