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ABSTRAK

Pantai Timur Surabaya (Pamurbaya) merupakan kawasan pesisir yang mendapatkan tekanan lingkungan tinggi akibat limbah domestik, industri, pertanian, dan tambak. Penelitian ini bertujuan menganalisis sebaran *Total Suspended Solid* (TSS) menggunakan citra Sentinel-2A multitemporal periode 2022 – 2025 serta membandingkan empat algoritma estimasi TSS, yaitu Budhiman (2004), Liu (2017), Laili (2015), dan Prasetyo (2019). Pengambilan data *in-situ* dilakukan pada 27 November 2025 di 20 titik sampel menggunakan metode gravimetri sesuai SNI 06-6989.3-2004. Hasil pengukuran menunjukkan konsentrasi TSS berkisar antara 30–170 mg/L dengan rata-rata 85 mg/L, melampaui baku mutu yang ditetapkan KepMen LH No. 51 Tahun 2004. Konsentrasi tertinggi secara konsisten ditemukan di wilayah pesisir dan sekitar muara sungai, sementara perairan yang lebih jauh dari daratan menunjukkan nilai konsentrasi TSS yang lebih rendah. Berdasarkan uji validasi menggunakan RMSE, MAE, dan MAPE, Algoritma Budhiman (2004) menghasilkan nilai kesalahan terkecil (RMSE = 50,68, MAPE = 38,24%), sedangkan Algoritma Liu (2017) menunjukkan korelasi tertinggi terhadap data *in-situ* ($r = 0,73$, $R^2 = 0,5366$). Konsentrasi TSS tertinggi tercatat pada tahun 2022 dan berfluktuasi dari tahun ke tahun dipengaruhi oleh curah hujan, debit sungai, pergantian musim, serta aktivitas manusia di kawasan pesisir.

Kata Kunci: *Total Suspended Solid* (TSS), Citra Sentinel-2A, Penginderaan Jauh, Pantai Timur Surabaya, Algoritma Estimasi TSS

Mohammad Sofan Hidayatulloh. NIM 220341100072. Analysis of *Total Suspended Solid* (TSS) Distribution Using *In-Situ* Data and Sentinel-2A Imagery with 4 Different Algorithms in the Coastal Waters of East Surabaya. **Prof. Dr. Zainul Hidayah, S.Pi., M.App.Sc.**

ABSTRACT

The East Surabaya Coast (Pamurbaya) is a coastal area under high environmental pressure due to domestic, industrial, agricultural, and aquaculture waste. This study aims to analyze the distribution of *Total Suspended Solid* (TSS) using multitemporal Sentinel-2A imagery for the period 2022–2025 and to compare four TSS estimation algorithms: Budhiman (2004), Liu (2017), Laili (2015), and Prasetyo (2019). *In-situ* data collection was conducted on November 27, 2025 at 20 sampling points using the gravimetric method in accordance with SNI 06-6989.3-2004. Measurement results showed TSS concentrations ranging from 30–170 mg/L with an average of 85 mg/L, exceeding the water quality standard set by Ministerial Decree of the Environment No. 51 of 2004. The highest TSS concentrations were consistently found in coastal areas and around river estuaries, while waters farther from land showed lower values. Based on validation tests using RMSE, MAE, and MAPE, the Budhiman (2004) Algorithm produced the smallest error values (RMSE = 50.68; MAPE = 38.24%), while the Liu (2017) Algorithm showed the highest correlation with *in-situ* data ($r = 0.73$; $R^2 = 0.5366$). Temporally, the highest TSS concentration was recorded in 2022 and fluctuated from year to year, influenced by rainfall, river discharge, seasonal changes, and human activities in the coastal area.

Keywords: *Total Suspended Solid* (TSS), Sentinel-2A Imagery, Remote Sensing, East Surabaya Coast, TSS Estimation Algorithm