Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.27985

# Spatial Variations in Sediment Characteristics, Organic Carbon, and Porewater Salinity in the Jeungdo Getbol: Insights from a UNESCO World Heritage Korean Tidal Flat

**DR. JUNHO LEE, PHD**, HOI-SOO JUNG AND HAN JUN WOO

Korea Institute of Ocean Science & Technology

The Getbol (Korean Tidal Flats), recognized as a UNESCO World Heritage site, represents a vital coastal ecosystem with significant ecological and geochemical functions. This study investigates the spatial variability of surface sediment properties —precisely, sediment particle size, total organic carbon (TOC), dry bulk density, porosity, and porewater salinity—in the Ujeon tidal flat of Jeungdo, South Korea. 124 surface sediment samples were collected in June 2023, with corresponding altitude measurements derived from drone-based digital elevation models (DEMs).

The results reveal that the average TOC content (0.44%; range: 0.00–1.42%) and C/N ratios (12.5; range: 9.9–30.3, excluding sandy sediments) are notably lower than those typically recorded in European and North American salt marshes. Mean particle size, porewater salinity, and altitude were measured at 4.98 Φ (1.06–9.75), 48.09 psu (0.00–93.82), and 1.27 m (-0.38–+3.15), respectively. Strong correlations ($R^2$ values of 0.77, 0.81, and 0.71) were identified between particle size, TOC, porewater salinity, and altitude.

Spatial patterns highlight that TOC concentrations peak in mud-dominated zones, while significantly lower values are observed near sandbars at the tidal flat's entrance. This variation reflects the influence of sediment grain size distribution, with finer clay-rich sediments supporting higher TOC accumulation. These findings suggest that organic carbon properties in diverse sedimentary environments of tidal flats like Jeungdo Getbol may have been previously underestimated.

This study enhances our understanding of sedimentary processes in UNESCO-designated Korean tidal flats and provides a foundation for future coastal ecosystem management. The research underscores the ecological importance of protecting and sustainably managing these globally significant tidal flat systems by emphasizing the interplay between organic carbon dynamics, salinity, and sediment characteristics.