

## RINGKASAN

NOVA RAMASAPUTRI. Distribusi Karbon Organik Sedimen pada Zona Intertidal di Wilayah Teluk Riau. Dibimbing oleh CHANDRA JOEI KOENAWAN dan FADLIYAH IDRIS.

Ekosistem pesisir berperan penting dalam mitigasi perubahan iklim melalui kemampuannya menyerap dan menyimpan karbon organik di dalam sedimen sebagai penyimpanan jangka panjang. Zona intertidal merupakan wilayah yang dipengaruhi oleh dinamika pasang surut sehingga proses sedimentasi, transportasi, dan akumulasi bahan organik berlangsung secara dinamis. Namun, informasi mengenai distribusi karbon organik sedimen berdasarkan kondisi pasang dan surut di wilayah Teluk Riau masih terbatas sehingga diperlukan penelitian untuk memahami pola distribusi dan akumulasi karbon organik sedimen pada zona intertidal. Penelitian ini bertujuan menganalisis distribusi karbon organik sedimen berdasarkan kondisi pasang dan surut, membandingkan kandungan karbon organik sedimen antara titik pasang dan titik surut, serta menilai pengaruh kondisi pasang dan surut terhadap akumulasi karbon organik sedimen di wilayah Teluk Riau. Penelitian dilaksanakan pada April–Juni 2026 di sembilan stasiun pengamatan yang masing-masing terdiri atas titik pasang dan titik surut. Sampel sedimen permukaan diambil pada setiap titik penelitian, kemudian dianalisis menggunakan metode Loss on Ignition (LOI) untuk memperoleh kandungan bahan organik yang selanjutnya dikonversi menjadi kandungan karbon organik. Analisis statistik dilakukan menggunakan uji normalitas Shapiro-Wilk dan dilanjutkan dengan uji Paired Sample t-Test untuk mengetahui perbedaan kandungan karbon organik sedimen antara titik pasang dan titik surut. Hasil penelitian menunjukkan bahwa kandungan karbon organik sedimen berkisar antara 4,97–12,85% dengan rata-rata 9,83%. Kandungan karbon organik tertinggi ditemukan pada stasiun yang berada di kawasan dengan kondisi perairan relatif terlindung dan memiliki masukan bahan organik yang tinggi, sedangkan kandungan terendah ditemukan pada stasiun yang dipengaruhi aktivitas permukiman dan kondisi hidrodinamika yang lebih kuat. Hasil uji Paired Sample t-Test menunjukkan bahwa tidak terdapat perbedaan yang signifikan antara kandungan karbon organik sedimen pada titik pasang dan titik surut ( $p > 0,05$ ). Variasi kandungan karbon organik sedimen lebih dipengaruhi oleh karakteristik lingkungan setempat, seperti masukan bahan organik, kondisi hidrodinamika, dan karakteristik sedimen, dibandingkan oleh perbedaan kondisi pasang dan surut. Penelitian ini menunjukkan bahwa sedimen zona intertidal di Teluk Riau memiliki potensi sebagai penyimpan karbon organik dan dapat menjadi data dasar dalam pengelolaan ekosistem karbon biru serta mendukung upaya mitigasi perubahan iklim di wilayah pesisir.

Kata kunci: Distribusi karbon organik, Loss on Ignition (LOI), sedimen, Teluk Riau, zona intertidal.

## SUMMARY

NOVA RAMASAPUTRI. Distribution of Organic Carbon in Sediments in the Intertidal Zone of Riau Bay. Advised by CHANDRA JOEI KOENAWAN and FADLIYAH IDRIS.

Coastal ecosystems play a vital role in climate change mitigation through their ability to absorb and store organic carbon in sediments as a long-term carbon sink. The intertidal zone is an area influenced by tidal dynamics, resulting in dynamic processes of sedimentation, transport, and accumulation of organic matter. However, information on the distribution of sedimentary organic carbon based on tidal conditions in the Riau Bay region remains limited; therefore, further research is needed to understand the patterns of distribution and accumulation of sedimentary organic carbon in the intertidal zone. This study aims to analyze the distribution of sedimentary organic carbon based on tidal conditions, compare sedimentary organic carbon content between high-tide and low-tide points, and assess the impact of tidal conditions on the accumulation of sedimentary organic carbon in the Riau Bay region. The study was conducted from April to June 2026 at nine observation stations, each consisting of a high-tide and a low-tide point. Surface sediment samples were collected at each study site and then analyzed using the Loss on Ignition (LOI) method to determine the organic matter content, which was subsequently converted to organic carbon content. Statistical analysis was performed using the Shapiro-Wilk normality test, followed by a paired-sample t-test to determine differences in sediment organic carbon content between high-tide and low-tide sites. The results showed that sediment organic carbon content ranged from 4.97% to 12.85%, with an average of 9.83%. The highest organic carbon content was found at stations located in areas with relatively sheltered water conditions and high organic matter input, while the lowest content was found at stations influenced by human settlement activities and stronger hydrodynamic conditions. The results of the paired-sample t-test showed that there was no significant difference between the organic carbon content of sediments at high tide and low tide ( $p > 0.05$ ). Variations in the organic carbon content of sediments are more strongly influenced by local environmental characteristics—such as organic matter input, hydrodynamic conditions, and sediment characteristics—than by differences in tidal conditions. This study shows that intertidal zone sediments in Riau Bay have the potential to serve as organic carbon sinks and can provide baseline data for the management of blue carbon ecosystems, as well as support climate change mitigation efforts in coastal areas.

Keywords: Organic carbon distribution, Loss on Ignition (LOI), sediment, Riau Bay, *intertidal zone*.