Development of mangrove sediment quality index in Matang Mangrove Forest Reserve, Malaysia: a synergetic approach

ABSTRACT

Sediment is an important part of heavy metal cycling in the coastal ecosystem, acting as a potential sink and source of inorganic and organic contaminants as environmental conditions change. The productivity of mangroves is utterly dependent on sediment enrichment. Moreover, mangrove sediment can trap pollutants discharged by households, industries, and agriculture activities. In this regard, it is essential to assess sediment quality in the presence–absence of heavy metals that are toxic to most living organisms. Thus, the question of how sediment quality is used as an index in the mangrove domain has arisen. Due to the many complex characteristics such as seasonal zones, tidal patterns, flora and fauna, and water, no specific method is used in Malaysia for assessing and monitoring mangrove sediment quality. Thus, the current study intended to develop a mangrove sediment quality index (MSQi) in the Matang mangrove forest in Perak, Malaysia. An area was selected based on the distinct level of mangrove disturbances. At 1.5 m depth, sediments were sampled in five segments (0–15, 15–30, 30–50, 50–100, and 100–150 cm). All the sediment physicochemical properties were then analysed. Fourteen variables were chosen and included in MSQi. This index categorises mangrove sediment levels as I = Very Bad, II = Bad, III = Moderate, IV = Good, and V = Excellent. MSQi will be used as a guideline in monitoring mangrove sediment pollution. In conclusion, the data analysis showed that the Sepetang River (SR) was highly disturbed, followed by the Tinggi River (TR) (moderately disturbed), and the Tiram Laut River (TLR) (least disturbed).

Keyword: Mangrove sediment quality index (MSQi); Environmental factors; Mangrove forest; Perak