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The late Quaternary study and Implications for recent Environmental changes in the Segara Anakan Lagoon, Southern Java

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The Segara Anakan Lagoon at the south coast of Java is a unique lagoon that is separated from the Indian Ocean by a barrier island, Nusakambangan Island. Recently, the ecosystem of the lagoon has been affected by significant changes because the lagoon is becoming increasingly shallow. These changes have considerable socio-economic impact on the region. The goal of this study is to explore the natural development of the lagoon during the Late Quaternary, and to point out trends in the recent development, which may deviate from these long-term natural trends due to anthropogenic impact.

Sedimentological, foraminiferal and palynological analyses of a sediment core and surface sediments from the lagoon indicate noticeable changes in the development of the lagoon during the Late Quaternary. The foraminiferal assemblages and palynological zones in this area reflect environmental changes ranging from shallow-water to fluvial sedimentary systems.

The ancient changes, particular those related to changes in water depth, sediment provenance and sediment supply, appear to resemble the recent changes observed in this area. Today, human activities such as logging in the upper parts of the rivers have resulted in a decrease of vegetation, which has caused erosion and high sediment input to the lagoon. Furthermore, heavy metals pollution, mainly derived from farming activities in the land areas surrounding the lagoon had caused a decline of the environmental quality of this lagoonal area, which also endangered the natural habitat for marine organisms, i.e. fish, mangroves. We explore how these natural and anthropogenic factors influence the ecosystem of the lagoon at present and possibly also in the future.

Keywords: Segara Anakan, lagoon, sediments, foraminifera, palynology, Quaternary