

Impact of Sea-Level Change on Sedimentary Environments and sediment provenance of the Sunda Shelf Since the Last Glacial Maximum

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The Sunda Shelf, located in the western South China Sea, is the largest continental shelf in the world outside of polar regions. During glacial periods when sea levels were low, the Sunda Shelf was exposed as new land. The types of vegetation on this newly exposed land and the weathering processes on its surface are of great significance for understanding the fate of carbon during glacial times. Currently, our understanding of the sources of sediments on the Sunda Shelf and the contributions of surrounding islands to the shelf sediments is still limited, which affects our reconstruction of the paleoenvironment and paleoweathering of the shelf. To address this, this paper utilizes core 17964 located on the east slope of the Sunda Shelf to conduct elemental and Sr-Nd-U isotopic studies, aiming to understand the impact of sea-level changes since 23 ka on the provenance of the core sediments and the weathering processes they record. The research results show that the sedimentary environment of the Sunda Shelf has experienced three stages since 23 ka. In the first stage (23.0–18.0 ka), when the sea level was low and most of the shelf was exposed, the sediments in the core mainly originated from the exposed shelf, with low Sr isotopic values and high Nd isotopic values. In the second stage (18.0–11.8 ka), as the sea level rose rapidly, the contribution of materials from surrounding islands gradually increased, especially from the Mekong River. In the third stage (since 11.8 ka), with the continuous rise of the sea level and the complete submergence of the Sunda Shelf, sediments from the northern South China Sea, influenced by changes in the East Asian monsoon and ocean circulation, also began to be transported to and deposited in the core location, in addition to contributions from surrounding islands. Overall, the changes in the sedimentary environment and the shifts in sediment sources recorded in the Sunda Shelf slope core over the past 23 ka are of great significance for future interpretations of the paleoenvironmental and paleoweathering evolution of the core.