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Evidence of 8.2-ka event in Southeast Asia inferred from marginal marine sediments off Kallang River Basin, Singapore

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The Maritime Continent (MC) is located within the Indo-Pacific Warm Pool, which is known as the largest area of warm sea surface temperatures with the highest rainfall on Earth that drives the global atmospheric and hydrologic circulation. The complex climatic system of the MC is controlled by large-scale phenomena such as the seasonal migration of the Intertropical Convergence Zone which causes the northwest and southeast monsoon circulation in the region as well as tropical Indo-Pacific climate phenomena, the Indian Ocean Dipole in the west and the El Niño-Southern Oscillation operating to the east of the MC. In addition to interactions of these climate phenomena, their influence varies across the region due to island topography and ocean–atmosphere fluxes. Despite dedicated efforts, a comprehensive picture of the impacts of abrupt climate events such as the '8.2 ka event' during the Holocene on the MC has proved elusive. Here we use sedimentology and stable isotopes of benthic foraminifera collected from the marginal marine sediments off the Kallang River Basin, Singapore to reconstruct paleoenvironmental history of the early-mid Holocene. Owing to the high sedimentation rate (~4.4 mm/yr), the timing and nature of the '8.2 ka event' was examined in detail in this region making this an invaluable and unique archive to study up to sub-centennial changes. Comparison of the Kallang record with other high-resolution marine and absolutely dated terrestrial archives speleothems revealed that the timing of the onset of '8.2 ka event' in the western IPWP region lags the cooling in the North Atlantic and that of Asian and Indian monsoon failure, by ~100years possibly implying a north-south signal propagation. The termination of the '8.2 ka event', however may have occurred near synchronously between high and low tropical regions at ~7.96ka BP possibly linked via both atmospheric and oceanic processes.