



Summary

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PhD Thesis entitled: **Diatoms in the Northwestern South China Sea continental margin sediments: reconstruction of Late Pleistocene and Holocene paleoenvironments**

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Summary

The tropical continental shelves and adjacent areas exemplified by the northwest South China Sea (SCS), located in the low latitude East Asian Monsoon area, are places with varied impacts from the weathering of continents, from fluctuations of the open ocean, and combined with a strong increase in human activities. In the geological time scale, rapid and complex land-sea interactions and paleoecological processes have interfered with rapid sea level changes as shown in the thesis and were especially visible in the late Quaternary.

This study provides a comprehensive view on the sub-fossil diatom biogeography, distribution pattern and oceanographic environmental controls with the support of multivariate statistical methods. The samples taken from the Beibu Gulf surface sediments were analyzed and their diversity in response to the recent changes in environmental factors were applied as a key for the interpretation of the fossil diatom record in core sediments and paleoenvironmental reconstructions. The fossil diatom assemblages in sediment cores clearly illustrate changes in diatom biofacies through the local diatom assemblage zones (LDAZ). The distinction of LDAZs shows the potential of the fossil diatom assemblages in their biostratigraphic application. Six LDAZs from a deep-water core profile have been recognized as crossing two Terminations over the last 160 kyr that correspond to glacial - interglacial interval cycles in the monsoon climate realm, and show the instability of the climate and sedimentary environment in this continental margin and changes in the geographical pattern that result from sea-level fluctuations. Diatoms were absent in deltaic sediment profiles in a nearby shelf break in the last glacial period of MIS 4/3 transition in Failed Termination, but abundant in the slope core profile with a considerable abundance of coastal-neritic species. This linkage offers the perspective of a crossed shelf and slope matter lateral transport and response mechanism, and a clue to the regional summer monsoon enhancing Hainan Island erosion and transformed matters for the paleo "Hainan Delta" origin.

Seven LDAZs from the coastal zone of the inner Beibu Gulf revealed that sea-level fluctuations had a strong influence on the evolution of the hydrographic system along with a rapid sea-level rise and sea-level high-stand from the early to middle Holocene. This is followed by regression in the late Holocene, which has been recorded as a condensed sediment section. The early and late Holocene diatom species and abundance may record a strong summer monsoon climate. In addition, higher abundances and reasonably high diatom diversity in this local coastal record, especially in the last 800 years, may be the result of an overlap with an anthropogenic impact.

To sum up, this study demonstrates the effectiveness of using diatoms as an ecological proxy for understanding regional paleoenvironment change driven by both global climate and sea-level changes, and recent enhanced anthropogenic impacts on the continental margin of the NW SCS.

Keywords: South China Sea, Beibu Gulf, sub-fossil, fossil diatom assemblages, Late Pleistocene, Holocene, East Asian Monsoon, sea level change, paleoenvironmental, paleoclimatic reconstructions

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