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Cold seep benthic foraminiferal assemblages as indicator to methane venting events in the northern South China Sea

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Benthic foraminiferal assemblages in two gravity piston cores (Core 973-4 and Core 973-5) from two cold seep areas (Jiulong Methane Reef and Haiyang 4 area) on northern continental slope of the South China Sea were studied. Based on AMS 14-C dating analysis on plankton foraminiferal shells, an age of about 52 ka was estimated for the bottom sediments (13.65 m) in Core 973-4, and an age of about 50 ka for the sediments (9.25 m) in Core 973-5, thus these sediment sequences in these two cores represented Holocene and very late Pleistocene sediment deposits. Marine oxygen isotope stages (MIS) I, II and III were further subdivided based on the dating results. The assemblages were characterized by high diversity with about 210 species, and were dominated by infaunal species (about 25%), such as *Bulimina aculeata*, *Bolivina cochei* and *Uvigerina vadescens*. Variations in main composition and ecological group of the assemblages showed good correlation to the glacial/interglacial cycles since last 50 ka, for example, higher abundance (about 25%) of *Bulimina aculeata* was seen in interglacial periods (MIS I and MIS III than those (about 2%) in the glacial period (MIS II). Negative carbon isotopic values (-0.15 to -1.892‰) of *Uvigerina* shells from these two cores are the clear evidence that the assemblages were infected by methane venting. At least four methane venting events that occurred at 11 ka, 15 ka, 18 ka, 35 ka were indicated by higher abundance of cold seep species *Uvigerina peregrine* and much more negative carbon isotopic values.

