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Probing the Tectonic Evolution of the South China Sea: International Ocean Discovery Program Expedition 349

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Expedition 349, South China Sea (SCS) Tectonics, was the first voyage of the *JOIDES Resolution* under the new International Ocean Discovery Program. The objectives of this expedition were to: 1) determine the timing, mechanisms, and sequence of the opening and closing of different subbasins of the SCS by coring and directly dating the oceanic crust; 2) investigate the tectonic history of the SCS by conducting biostratigraphic and magnetostratigraphic investigations on the sedimentary sequences to help constrain the timing and sequence of geologic events and the sedimentary responses to tectonic evolution of the basin; 3) measure the geochemical composition, magnetization, and physical properties of the oceanic crust and seamount volcanic products to understand crustal accretion and deep mantle processes associated with the tectonic development of the basin; and 4) test the different proposed driving mechanisms that led to continental breakup and seafloor spreading. To attain these objectives, we cored near the ocean-continent boundary (U1432 and U1435) inferred to be underlain by the oldest oceanic crust, and near the fossil spreading centers in the East Subbasin (U1431) and the Southwest Subbasin (U1433 and U1434) where the youngest crust formed. The main scientific outcomes of Expedition 349 include 1) in-situ SCS oceanic crust was recovered for the first time, providing critical control on the timing of termination of spreading in the SCS; 2) the cessation age of spreading in both the East and Southwest Subbasins are similar (˜16 Ma), based on shipboard biostratigraphy from reddish-brown clays overlying and within the oceanic crust at Sites U1431 and U1433; and 3) determination of the nature of the structural high at Site U1435, where a sharp, possibly rift-related unconformity was recovered, providing indirect evidence for the onset of seafloor spreading at ˜33 Ma. In addition, 4) the nature of post-spreading seamount volcanism will be examined from the volcaniclastic sediments recovered at Sites U1431 and U1434; and 5) the past environmental, climatic, and oceanographic conditions related to the tectonic evolution of the SCS will be gleaned from studies of the 1524 m of sedimentary deposits recovered from all sites.

Keywords: South China Sea, tectonic evolution, seafloor spreading, International Ocean Discovery Program, Expedition 349, oceanic crust drilling