IODP Proposal Cover Sheet

969 - Pre

Huatung Basin Mesozoic Ocean Relics

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Title	The Huatung relic Mesozoic ocean and its interaction with adjacent Cenozoic marginal seas in Western Pacific
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Abstract

East Asia geology and plate reconstruction modeling imply a great Mesozoic ocean existed before formation of the Cenozoic marginal seas in the Western Pacific, but the Mesozoic ocean was generally believed to have been subducted entirely beneath the Eurasian continent during its subsequent evolution. A series of evidence from recent geochronological and land-sea geologic investigations, however, suggest that a remnant part of this Mesozoic ocean is still preserved in the Huatung Basin between the Cenozoic South China Sea and the West Philippine Basin. Sampling the basement and the overlying sedimentary succession of the Huatung Basin will provide a unique opportunity to understand the Mesozoic ocean and its tectonic, sedimentary and paleoceanographic evolution, particularly its tectonic interactions with the adjacent Cenozoic marginal seas in the Western Pacific.

We propose to drill in the Huatung Basin 1) to confirm and understand the relic Mesozoic ocean by age-dating and various geological and geochemical measurements of the basement samples, and 2) to reconstruct the tectonic interactions between the Huatung Basin and adjacent Cenozoic marginal seas (South China Sea and West Philippine Basin) by investigating the sedimentary and paleoceanographic evolution of the Huatung Basin linked to major plate tectonic events. To achieve these goals, we propose to drill at five sites (three primary and two alternate) to acquire required samples from the oceanic basement and overlying sediments in the abyssal plain, an intra-basin ridge and the deep-fractured Gagua Ridge which constitutes the eastern plate boundary of the Huatung Basin.

969 - Pre

Scientific Objectives

This pre-proposal seeks to confirm the Late Mesozoic oceanic crust of the Huatung Basin and to investigate its plate tectonic interactions with adjacent Cenozoic marginal seas including the South China Sea and the Western Philippine Basin.
The specific objectives are as follows:
(1) To sample the basement rocks in the abyssal plain and the up-thrusted intra-basin ridges to confirm the age and understand the geologic properties of the relic Mesozoic ocean in the Huatung Basin.
(2) To sample the basement rocks in the Gagua Ridge to understand the origin and role of the ridge as the plate boundary between the Huatung and the Western Philippine basins.
(3) To sample the Cenozoic sediments in the abyssal plain to investigate the sedimentary and paleoceanographic evolution of the basin linked to transitioning of the Western Pacific from a Late Mesozoic open ocean to the Cenozoic marginal seas setting.
(4) To sample the shallow-water carbonate buildups in the Gagua Ridge and nearby buried intra-basin ridges to understand the occurrence and later catastrophic sinking of the carbonate buildups possibly related to tectonic interactions between the relic Huatung Mesozoic ocean plate and the Western Philippine Basin.
(5) To sample the hemipelagic sediments overlying the carbonate buildups in the Gagua Ridge to capture possible signals on the origin and paleoceanographic evolution of the Kuroshio currents in response to the topographic and plate-tectonic adjustments in the Western Pacific.

Non-standard measurements technology needed to achieve the proposed scientific objectives

969 - Pre

Proposed Sites (Total proposed sites: 5; pri: 3; alt: 2; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
HT-01A (Primary)	22.00139 122.21250	4818	1250	200	1450	Sample the basement rocks in the abyssal plain to determine the age and geologic properties of the relic Mesozoic oceanic crust; sample the sediments to understand the sedimentary and paleoceanographic evolution linked to the transition of the Western Pacific from a Mesozoic open ocean to the Cenozoic marginal seas setting
HT-02A (Primary)	22.00333 122.49278	4865	447	200	647	Sample the reef carbonates and overlying hemipelagic to pelagic sediments to understand the occurrence and subsequent catastrophic sinking of the carbonate buildups in the up-thrusted intra-basin ridges; sample basement rocks to determine the age and geologic properties of the relic Mesozoic oceanic crust
HT-03A (Primary)	21.45333 122.94778	3752	576	200	776	Sample the reef carbonates and overlying hemipelagic sediments to understand the occurrence and subsequent catastrophic sinking of the carbonate buildups in the Gagua Ridge and to capture possible signals on the origin and paleoceanographic evolution of the Kuroshio currents in response to the topographic and plate-tectonic readjustments in the Western Pacific; sample the basement rocks to understand the origin and role of the Gagua Ridge as the plate boundary between the Huatung Basin and the WPB
HT-04A (Alternate)	21.45722 122.53333	4790	1376	200	1576	Alternate to HT-01A. Sample the basement rocks in the abyssal plain to determine the age and geologic properties of the relic Mesozoic oceanic crust; sample the sediments to understand the sedimentary and paleoceanographic evolution linked to the transition of the Western Pacific from a Mesozoic open ocean to the Cenozoic marginal seas setting
HT-05A (Alternate)	21.18250 122.88417	2352	318	200	518	Alternate to HT-03A. Sample the hemipelagic sediments to capture possible signals on the origin and paleoceanographic evolution of the Kuroshio currents in response to the topographic and plate-tectonic readjustments in the Western Pacific; sample the basement rocks to understand the origin and role of the Gagua Ridge as the plate boundary between the Huatung Basin and the WPB