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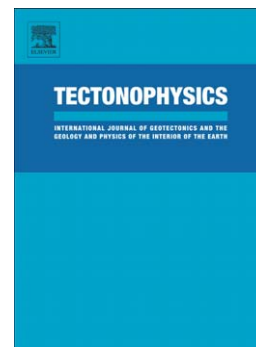
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Late Cenozoic evolution of the East China continental margin: Insights from seismic, gravity, and magnetic analyses¹

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ABSTRACT

Seismic reflection profiles reveal the structural characteristics beneath the East China Sea shelf margin and the Okinawa Trough, and provide new constraints on the Late Cenozoic evolution of the East China continental margin. The Frontal Shelf Basin between the Taiwan-Sinzi Uplift and the trough axis occupies the western half of the Northern-Middle Okinawa Trough. In this basin, the Middle-Late Miocene sediments are confined to grabens or half-grabens dominated by listric faults, whereas the overlying Pliocene-Quaternary sequence is characterized by a uniform thickness and dense planar-type faults, suggesting that rifting of the Northern-Middle Okinawa Trough initiated during the Middle Miocene but slowed down during the earliest Pliocene. Since that time, the opening of the Okinawa Trough has been dominated by diffuse rifting. The Southern Okinawa Trough is predominately filled by Quaternary sediments, indicating that its back-arc rifting began during the earliest Pleistocene. Contractional structures identified in the pre-Quaternary sequence beneath the continental slope, along with an erosional Pleistocene-pre-Pleistocene unconformity in the Southern Okinawa Trough, demonstrate the existence of pre-rifting compression and uplifting in this region. We use this evidence and previously published results, to propose an evolutionary model of the East China continental margin during the Late Cenozoic. The Northern-Middle Okinawa Trough began rifting during the Middle Miocene on a paleo-uplift. The Luzon Arc initially impinged upon the Eurasian continental margin during the Late Miocene near the southeastern end of the Miyako Fault Belt and activated the proto-Taiwan Orogeny in today's Southern Okinawa Trough and adjacent regions. During the Late Miocene-Pliocene, the orogeny quickly propagated southwestward along with the west-northwest-moving Philippine Sea Plate. Subsequently, the rifting of the Southern Okinawa Trough was initiated during the earliest Pleistocene and propagated southwestward following the post-collisional collapse of the proto-Taiwan Orogen. This geodynamic scenario resembles that of present-day northern Taiwan.

Keywords:

Okinawa Trough, East China continental margin, structures, Late Cenozoic, geodynamic evolution

1. Introduction

The East China continental margin between Kyushu and Taiwan is a typical Western Pacific-type active margin (Fig. 1) characterized by a back-arc basin (the Okinawa Trough) lying

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