

# 向東隱沒之南中國海岩石圈扭曲的現象及其地質意義：地震分佈和機制之研究

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## 摘 要

由文獻可知，位於菲律賓海板塊西北角的台灣島可視為一個向西南傳播的孤立波（solitary wave）的波峰。由於台灣南部海域地區會不斷隆起而成為未來台灣島新的主體部份，此隆起的機制（即台灣初期造山運動）是地球科學學者想瞭解的。本文檢視台灣-琉球地區之地震震源分佈和地震機制解，期能瞭解向東隱沒中之南海岩石圈在台灣南部地區有何特殊之行為及其對台灣初期造山運動有何影響。

在台灣-琉球地區，地震震源分佈在 90 公里以下之深處顯示一個明顯而清晰的班氏帶(Beniff zone)，而此班氏帶之淺處部份卻不容易辨識。此清晰的班氏帶僅存在深度 90 公里和 220 公里之間及緯度 19.5 度和 23 度之間，且顯示其對應之隱沒板塊有向下扭曲之現象，即越向北其隱沒之傾角越大。此板塊向下扭曲的現象可能引起板塊後方(即西方)之物質重新分佈而造成向上之推力，將臺灣島南方的增積岩體逐漸抬升而成為台灣島未來新的主體部分。

關鍵字：班氏帶，恆春增積岩體，初期台灣造山運動

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# Twisting of the Eastward-subducting South China Sea Lithosphere and its Geological Implications: A Seismological Study

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## Abstract

From literature, it is known that the Taiwan island, situated at the northeastern corner of the Philippine Sea plate, propagates southwestward as a tectonic solitary wave. The incipient Taiwan orogeny is thus of interest because the offshore area of southern Taiwan will uplifted to be the main part of the Taiwan island. In this paper, hypocentral distribution and focal mechanisms of earthquakes in the Taiwan-Luzon region are examined to understand the relationship of the incipient Taiwan orogeny with the status of the eastward subduction of the South China Sea lithosphere beneath the Philippine Sea plate. In this region, the hypocentral distribution is simple to show a clear Benioff zone below 90 km in depth, while it is too complicated above this depth to clearly identify this seismic zone.

This deeper part of the Benioff zone can only be observed between 90 km and 220 km in depth and between  $19.5^{\circ}$  N and  $23^{\circ}$  N in latitude, beneath the Luzon arc in the Manila subduction zone. It shows that the corresponding subducting slab has been twisted downward, with greater dip angle toward north. The downward twisting of the subducting slab may result in redistribution of material behind the slab to produce upward stress, which may uplift the Hengchun accretionary prism to become the main part of the Taiwan island.

**Keywords: Benioff zone, Subducting slab, Hengchun accretionary prism, Luzon arc, Incipient Taiwan orogeny**

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