

# The Neo-tectonic structure of the southwestern tip of the Okinawa Trough

Chia-Yen Ku<sup>1</sup>, Shu-Kun Hsu<sup>1,\*</sup>, Jean-Claude Sibuet<sup>2</sup>,

and Ching-Hui Tsai<sup>1</sup>

*1 Institute of Geophysics, National Central University, Chung-Li, Taiwan, ROC*

*2 Institute of Applied Geosciences, National Taiwan Ocean University, Keelung, Taiwan, ROC*

*\*Corresponding author: Prof. Shu-Kun Hsu (hsu@ncu.edu.tw)*

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## ABSTRACT

The Ilan Plain is located at the southwestern tip of the Okinawa Trough backarc basin, which propagates westward into the Taiwan orogen. From three moderate earthquakes which occurred near the coastline of the Ilan Plain, one of magnitude 6.2 on May 15, 2002 and the other two of magnitudes 5.51 and 5.49 on March 5, 2005, we attempted to understand the relationship between the earthquake mechanisms and the geological context. Seven seismic reflection profiles collected roughly parallel to the coastline of the Ilan Plain were used in this work. A structural fault, with a significant normal faulting component trending approximately ENE-WSW, has been identified to the east of the doublet earthquakes of March 5, 2005. Because this fault follows the ENE-WSW trend of the aftershock seismicity, we named it the Ilan Shelf Fault, which might extend to the east beyond the Ilan continental shelf spur. However, the centroid seismic moment tensor solutions for the doublet earthquakes of March 5, 2005 are of a left-lateral strike-slip faulting type which are consistent with onland GPS observations, such that the Ilan Shelf Fault may have a left-lateral strike-slip component. Based on GPS data, we suggest that the northern Central Range block, bounded in the west by the Lishan Fault and in the north by the Ilan Shelf Fault, rotates clockwise. This rotation is ascribed to the northwestward collision of the Luzon Arc against Taiwan. Thus, there is a left-lateral strike-slip and an extensional motion along the Ilan Shelf Fault. The northern Central Range block is tilting northward which may also induce the normal faulting component of the Ilan Shelf Fault. In short, the Ilan Shelf Fault could be a major tectonic and structural feature bounding the southern end of the Okinawa Trough backarc basin.

**Key words: Okinawa Trough, Seismic reflection, Ilan Plain, Ilan Shelf Fault, Seismicity**

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