

Spatial distribution and sill complexes of the offshore basalt in Taiwan Strait

**Pei-Chen Lin¹, Sung-Ping Chang¹, Liang-Fu Lin², Yi-Ping Chen³, Yu-Xuan Lin¹,
Ho-Han Hsu³, Song-Chuen Chen⁴**

¹ Department of Earth Sciences, National Cheng Kung University

² Ocean Center, National Taiwan University

³ Institute of Oceanography, National Taiwan University

⁴ Geological Survey and Mining Management Agency, MOEA

Penghu Island, situated within the Taiwan Strait, is surrounded by various rift basins that originated during the Cenozoic, and the islands predominantly consist of basaltic formations resulting from volcanism in the Late Miocene. Previous studies, leveraging multichannel seismic (MCS) data and industrial drillings, have unveiled significant basaltic accumulations in the offshore Penghu. Despite these findings, the comprehensive understanding of the offshore basalt's spatial distribution within the Taiwan Strait remains unclear. This study employed 101 high-resolution multichannel seismic profiles, obtained using a GI gun (with a dominant frequency approximating 100-150 Hz), extending from Penghu to the offshore Hsinchu. With the interpretation delineating up to four distinct stratigraphic layers, the basal foreland unconformity (BFU) served as the benchmark for the topmost layer. The basaltic formations manifest a pronounced elongated distribution along the northeast-southwest orientation, measuring approximately 210 kilometers in length and 73 kilometers in width. The basaltic formations can be bifurcated into two distinct sectors: the southern sector around the Penghu Islands and the northern sector off the coasts of Hsinchu and Miaoli. Upon detailed stratigraphic analysis, these basaltic formations can be further stratified into four distinct layers based on the variance in basaltic sequences. These layers, arranged from the deepest to the shallowest, are designated as Layer 1 through Layer 4. Layer 1 is characterized by its dispersed nature and discontinuous presence. In contrast, Layer 2, which is predominantly situated in the northern region of Penghu, showcases a more contiguous formation. Layer 3, with its extensive distribution, primarily envelops the northern sector of Penghu and its adjacent islands. Conversely, Layer 4, localized around the Penghu Islands, exhibits the most substantial continuity among the layers. This systematic approach facilitated the precise identification of the primary basalt distribution of each layer, thereby providing insights into the geological processes that have shaped the Taiwan Strait's subsurface structure.

Keywords: basalt, Taiwan Strait, sill complexes, plumbing system