

台灣東北部鼻頭及龍洞地區的正斷層

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報告日期：2023/03/10

摘要

台灣東北部為雪山山脈與西部麓山帶地質過渡帶，地體構造複雜，前人研究證實該區域已進入造山運動後的垮山機制，從壓縮環境改變為伸張環境，在外海形成一系列的正斷層。許多研究指出東北外海的正斷層似乎能與陸域斷層相對應，但對於陸域沿岸的正斷層研究相對較少。本研究在鼻頭及龍洞地區野外露頭上觀察到一系列正斷層所組成的地壘及地塹，這些正斷層的成因及與海外正斷層的關聯性是本研究感興趣的課題。

本研究透過無人飛行載具建立三維模型，藉由高地面解析度(GSD)正射及立面影像分析裂隙分佈情形，並經野外調查查核及分析，瞭解鼻頭及龍洞地區裂隙關係及趨勢差異。初步結果顯示，鼻頭及龍洞地區發育數條正斷層及走向滑移斷層，並分別可觀察到四組裂隙(F1~F4)及六組裂隙(Fr1~Fr6)。鼻頭地區多數斷層走向約為 N16°W，大致與裂隙組 F4 平行，離距(separation)介在數公分至三公尺之間；龍洞地區多數斷層走向約為 N70°W，大致與裂隙組 Fr4 平行，主要斷層離距可大於三公尺。未來希望能透過調查斷層特性及裂隙分析了解研究區正斷層成因，期望能有助於台灣東北部地質構造演化進一步的解釋。

關鍵字：正斷層、無人機測繪、裂隙分析

Normal faults in Bitou - Longdong area, northeastern Taiwan

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Abstract

Northeastern Taiwan is a geological transition zone between the Hsuehshan Range and Western Foothills, with complex plate tectonics. Previous studies have concluded that northern Taiwan is being subject to post-collisional collapse, and under an extensional regime, a series of normal faults have been developed offshore. Many studies have indicated that the offshore normal faults can be corresponded to the inland faults, however, there are relatively few studies that focus on the normal faults along the terrestrial coastal areas. A series of horsts and grabens which are composed of normal faults can be observed in the Bitou and Longdong areas. The evolution of these normal faults and their relationship with offshore normal faults are interesting for us.

In this study, the three-dimensional model will be established through an unmanned aerial vehicle (UAV), and the distribution of fractures will be analyzed by high-resolution orthoimages and facade images. Based on the field inspection and analysis, we aim to understand the relationship and trend differences of fractures in the Bitou and Longdong areas. Preliminary results show that several normal faults and strike-slip faults were developed in the Bitou and Longdong areas, and four fracture sets (F1-F4) and six fracture sets (Fr1-Fr6) can be observed respectively. The strike of most faults in the Bitou area is about N16°W, roughly parallel to fracture set F4, and the separation ranges from a few centimeters to three meters. Most of the faults in the Longdong area strike about N70°W, roughly parallel to fracture set Fr4, and the separation of the main faults can be larger than three meters. In the future, we want to understand the development of normal faults in the study area through the investigation of fault characteristics and fracture analysis, which could contribute to the further interpretation of the structural evolution in northeastern Taiwan.

Keywords : normal fault, Unmanned Aerial Vehicle (UAV) , fracture analysis