

車瓜林斷層的剪切行為

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摘要

車瓜林斷層為活動斷層，持續發生潛移變形，呈東北-西南走向，北起高雄市內門，向西南延伸經旗山區大廊庭山，西南端在燕巢區崎溜以南進入平原區，長度約 22 公里。景國恩等人(2016)根據 GPS 長期速度場的結果，車瓜林斷層的上下盤相對變形速度量發生改變，中寮隧道一帶為相對左移，車瓜林斷層南段則為相對右移；陳愷風(2024)利用航拍影像相關法(Image correlation)，比較斷層上下盤地表位移量，在中寮隧道一帶仍為相對右移，中寮隧道的北方約四百公尺處才顯示相對左移。根據這兩個研究，發現沿著車瓜林斷層，都有由北到南的相對位移方向改變，並且大致可將相對位移方向轉換帶縮小到中寮隧道南北不到一公里內。因為遙測的大地測量結果僅能代表地表的變形，斷層兩側地表相對變形與斷層實際剪切方向一致與否尚不清楚，因此本研究希望以現地地質調查，以及採集斷層帶中記錄剪切行為的黑色條帶泥岩標本，將標本製成薄片，並以顯微鏡觀察是否帶有能辨識剪切方向的微構造。莊承家(2023)在中寮隧道西北方接近一公里處的薄片結果顯示左移，符合大地測量資料的結果。為了能界定剪切方向改變的位置，將根據從大地測量資料得到的大致範圍進行採樣。

關鍵字：車瓜林斷層、中寮隧道、岩石薄片、活動斷層。

The Shear Sense of the Chegualin Fault

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Abstract

The Chegualin Fault is an active fault, continuously undergoing creeping deformation, and striking NE-SW. It starts in Neimen District, Kaohsiung City, extends southwest through Dabuting Mountain, and reaching the southwestern plain area just south of Qiliu in Yanchao District, with a total length of about 22 kilometers. Past research (Ching et al., 2016) based on long-term GPS velocity field results, indicates that the relative deformation rate between the hanging wall and footwall of the Chegualin Fault varies: in the vicinity of Zhongliao Tunnel, the movement is relative left-lateral, while the southern part of the Chegualin Fault exhibits relative right-lateral movement. Another study by Kai-Feng Chen (2024), used image correlation from aerial photography, to compare the surface displacement between the hanging wall and footwall and found that near the Zhongliao Tunnel, there is relative right-lateral movement. However, about 400 meters north of the tunnel, the movement shifts to relative left-lateral. These two studies reveal a change in relative displacement direction from north to south along the Chegualin Fault, and the transition zone of this shift can be narrowed to within less than a kilometer north and south of Zhongliao Tunnel. Since remote sensing geodetic results only represent surface deformation, it is unclear whether the relative deformation on both sides of the fault aligns with the actual shear direction of the fault. Therefore, this study aims to conduct a field geological survey and collect fault zone samples of black banded mudstone that record shear behavior. These samples will be made into thin sections, and microscopic observation will be used to determine if any microstructures that indicate shear direction are present. The thin section (Chen-Chia Jhuang, 2023) taken approximately one kilometer northwest of the Zhongliao Tunnel showed left-lateral movement, consistent with the geodetic data. To precisely define the location of the shear direction change, sampling will be conducted based on the general area determined from the geodetic data.

Keywords: Chegualin fault, Zhongliao Tunnel, Rock thin section, Active fault.