



時空資料視覺化 期中報告

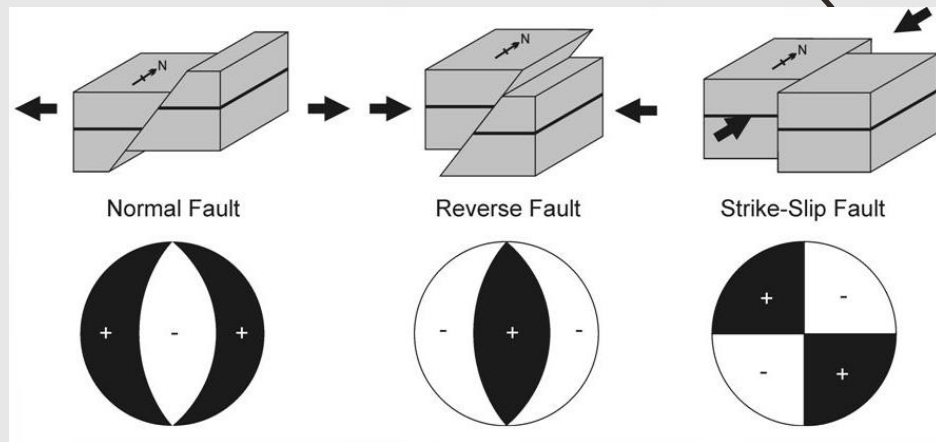
R10228016 邱泰嘉

主題： 地震事件視覺化

台灣地震活動頻繁，每個月皆有許多地震發生，而氣象局的網站無法一次看到地震事件的所有資訊，因此想針對台灣地區發生的地震事件，製作一個台灣地震事件的互動式視覺化shiny網頁。

欲顯示資訊

- 震央位置、震源深度
- 地震規模
- 發震時刻
- 破裂面參數（走向、傾角、滑動角）
- 震源機制
- 測站位置 等等



何謂震源機制(Focal Mechanism)？

地震發生時，在震源地區的破裂過程是以錯動方式進行，可將三維空間中可以分成四個區域，分別是兩個壓縮區和拉張區，其參數主要是由走向角(strike)、傾角(dip)與滑動角(rake)三個數值組成。

資料來源 (一) - 中央氣象局地震活動彙整



<https://scweb.cwb.gov.tw/zh-tw/earthquake/data>

資料來源 (二) – 中研院AutoBATS

(Broadband Array in Taiwan for Seismology)

AutoBATS CMT Home Lastest Help Subscribe Links ▾

AutoBATS CMT Catalog

Data period
: 1996/03/28 ~ 2021/10/31 (Archived)
2013/05/23 ~ 2021/11/17 (Realtime)

Output: Full Format in CSV ▾

Start Time: 2021-10-01 📅

End Time: 2021-10-31 📅

Search Criteria: **ML** Mw Archived Realtime

Min. Magnitude: ML 0-10

Max. Magnitude: ML 0-10

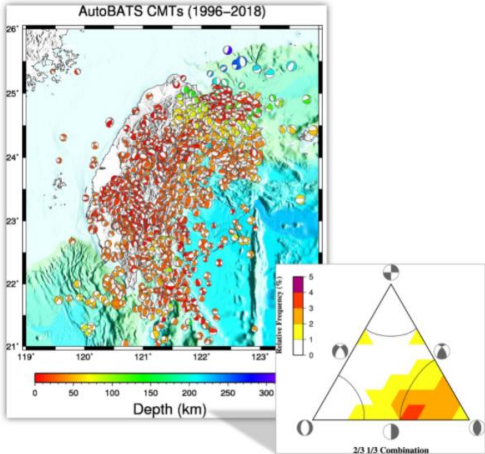
Min. Depth (km):

Max. Depth (km):

P-Axis Plunge*: Min P-axis 0-90 Max P-axis 0-90

B-Axis Plunge*: Min B-axis 0-90 Max B-axis 0-90

T-Axis Plunge*: Min T-axis 0-90 Max T-axis 0-90



The figure displays two related seismic data visualizations. The main plot, titled 'AutoBATS CMTs (1996-2018)', is a map of Taiwan and surrounding regions showing hypocenters (earthquake locations) as colored dots. The dots are color-coded by depth, with a scale from 0 to 300 km shown at the bottom. The map includes latitude and longitude coordinates. To the right of the map is a smaller diagram of a focal mechanism solution, showing a triangular stress field with compressional (P), tensional (T), and null (N) axes, and a color scale for relative frequency (0 to 5).

<https://tecws1.earth.sinica.edu.tw/AutoBATS/>

會使用到的套件：RFOC

由北卡羅來納大學所開發，可依照震源參數走向繪製震源機制、震源輻射型態以及斷層面等等

Calculates and plot Earthquake Focal Mechanisms

Description

Graphics for statistics on a sphere, as applied to geological fault data, crystallography, earthquake focal mechanisms, radiation patterns, ternary plots and geographical/geological maps. Given strike-dip-rake or a set of fault planes, RFOC creates structures for manipulating and plotting earthquake focal mechanisms as individual plots or distributed spatially maps.

RFOC can be used for analysis of plane orientation, geologic structure, distribution of stress and strain analyses.

Details

Package: RFOC

Type: Package

Version: 2.0-03

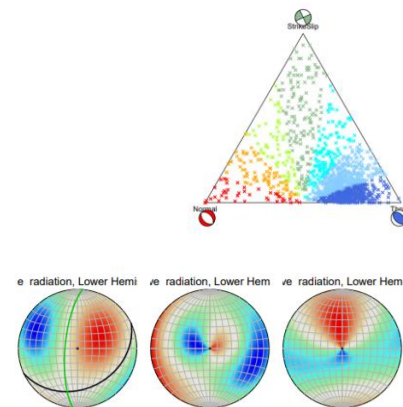
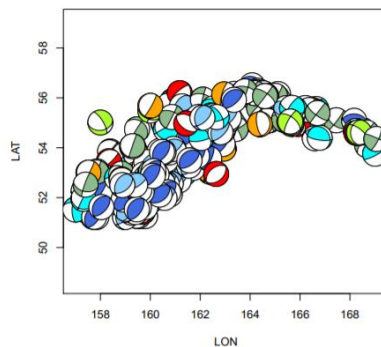
Date: 2012-05-31

License: GPL

Visualize focal mechanisms in a number of modes, including: beachball plots, radiation distribution of spherically distributed data.

Author(s)

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預期成果

台灣地震事件視覺化地圖

選擇年份

2019

選擇月份

全部

☐ 顯示震源機制 ☐ 顯示震度圖

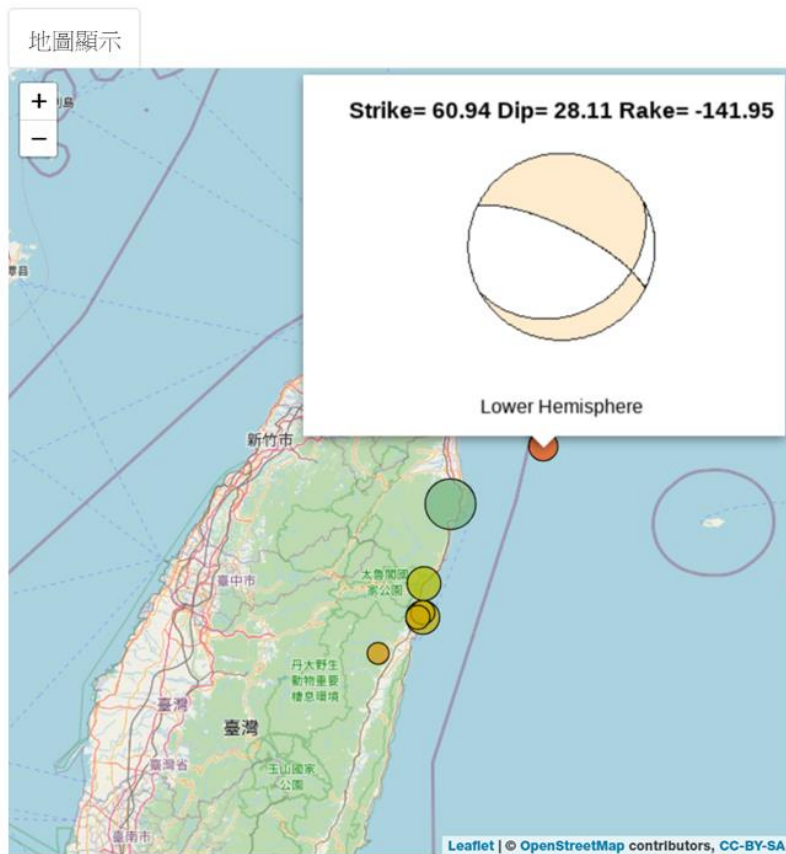
震源深度 (km)

0 100

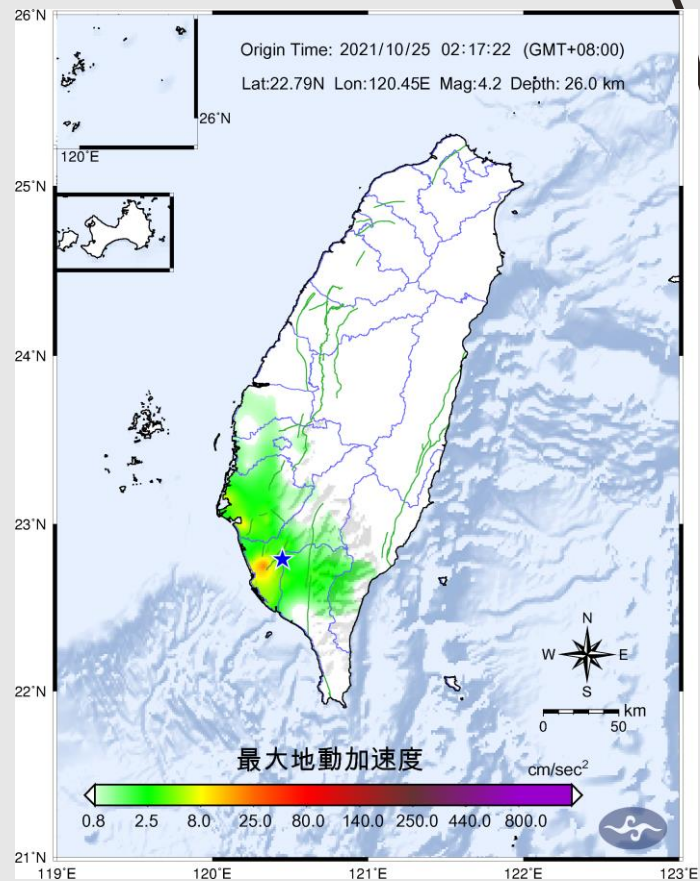
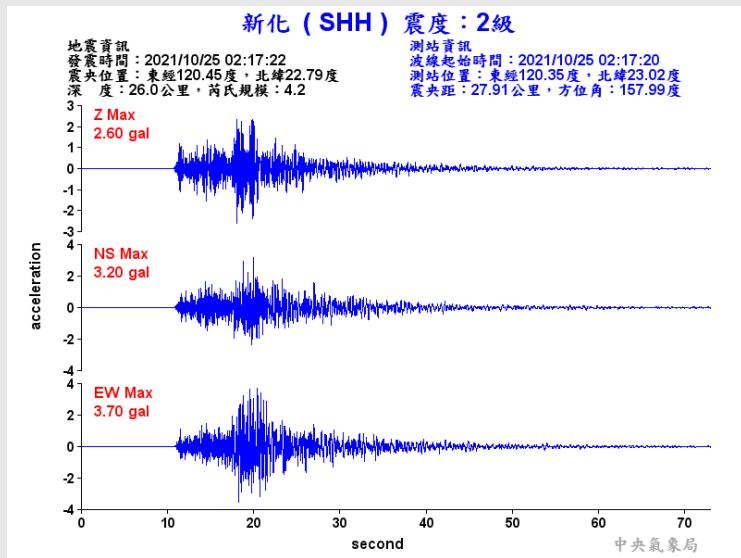
地震規模

0 8

(使用2021年10月的地震資料做示範)



若時間、技術及資料上許可，可能會加入地震波形圖以及地震震度圖(最大地動加速度圖)，讓資訊更豐富些



The image features a light gray background with two dark gray, wavy, hand-drawn style lines in the top corners. One line is on the left, curving upwards and then downwards. The other is on the right, curving downwards and then upwards.

Thank you for your listening!