Stress Map of Taiwan 2022

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Knowledge of the present-day crustal stress field is a key for the understanding of geodynamic processes such as global plate tectonics and earthquakes. It is also essential for the management of geo-reservoirs and underground storage sites. Since 1986, the World Stress Map (WSM) project has systematically compiled the orientation of maximum horizontal stress (S_{Hmax}). It is a collaborative project between academia and industry that aims to characterize the stress pattern and to understand the stress sources and it is maintained at the German Research Centre for Geosciences GFZ. All stress information is analysed and compiled in a standardized format and quality-ranked for reliability and comparability on a global scale. Further information on the WSM project, its services and software are available on the project website at http://www.world-stress-map.org. The stress map of Taiwan 2022 is based on the WSM database release 2016. However, all data records have been checked and we added a large number of new data from earthquake focal mechanisms from the national earthquake catalog and from publications. The total number of data records has increased from n=401 in the WSM 2016 to n=6,498 (4,234 with A-C quality) in the stress map of Taiwan 2022 The update with earthquake focal mechanims is even larger since another 1313 earthquake focal mechanism data records beyond the scale of this map have been added to the WSM database. The digital version of the stress map is a layered pdf file generated with GMT (Wessel et al., 2019). It also provide estimates of the mean S_{Hmax} orientation on a regular 0.1° grid using the tool stress2grid (Ziegler and Heidbach, 2019). Two mean S_{Hmax} orientations are estimated with search radii of r=25 and 50 km, respectively, and with weights according to distance and data quality. The stress map and data are available on the landing page at http://doi.org/10.5880/WSM.Taiwan2022 where further information is provided. The earthquake focal mechanism that are used for this stress map are provided by the Taiwan Earthquake Research Center (TEC) available at the TEC Data Center (https://tec.earth.sinica.edu.tw).
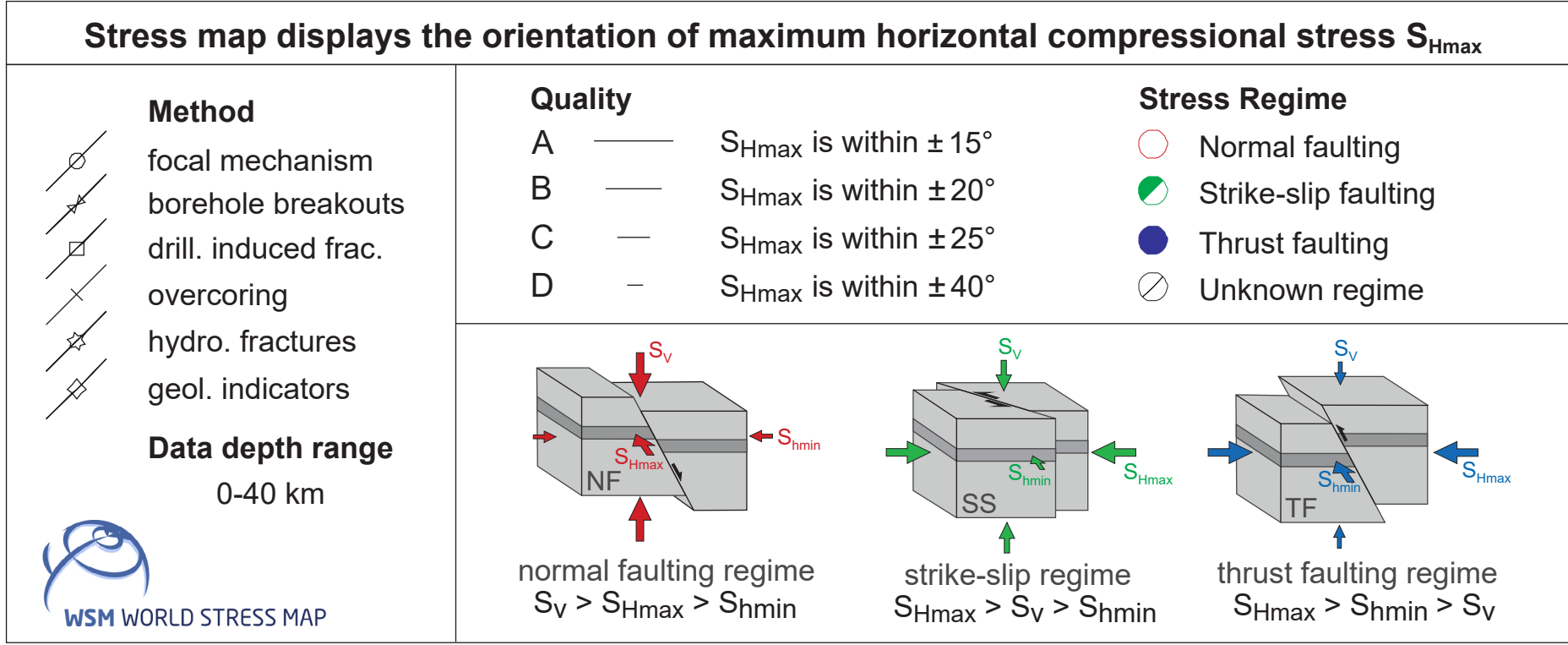
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Citation of this map

Stress map displays the orientation of maximum horizontal compressional stress S_{Hmax}

Method
- focal mechanism
- borehole breakouts
- drill. induced frac.
- overcoring
- hydro. fractures
- geol. indicators

Data depth range
0-40 km

Quality
- A S_{Hmax} is within ± 15°
- B S_{Hmax} is within ± 20°
- C S_{Hmax} is within ± 25°
- D S_{Hmax} is within ± 40°

Stress Regime
- Normal faulting
- Strike-slip faulting
- Thrust faulting
- Unknown regime

normal faulting regime
$S_V > S_{Hmax} > S_{hmin}$

strike-slip regime
$S_{Hmax} > S_V > S_{hmin}$

thrust faulting regime
$S_{Hmax} > S_{hmin} > S_V$

WSM WORLD STRESS MAP