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Coseismic fault slip distribution of the 2006 Taitung Earthquake (Mw 6.1), South-East Taiwan

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The orogen of Taiwan emerges east of the Pacific seaside of Mainland China. This ongoing mountain building is the result of the active collision between the Eurasian Plate to the West and the Philippine Sea Plate to the East. In the eastern part of the island, the plate boundary lays inside a narrow North-South valley, the Longitudinal Valley. In this convergent context happened on April, the 1st, 2006, the Taitung earthquake. This event of MW 6.1 is located in the southern-end of the Longitudinal Valley and displays an intriguing strike-slip focal mechanism while most of its aftershocks are reverse in type.
In the epicentral area two major North-South fault systems take place on both sides of the Longitudinal Valley with the Pinanshan Massif between. To the East, the Longitudinal Valley Fault system (LVF) dips eastward. This orogen main active structure makes up the effective plate boundary. To the West, the Central Range Fault system (CNF) is poorly active compared to the East one but some seismic cluster let supposed a westward dipping in good agreement with the North-South nodal plane geometry of the focal mechanism. In addition to those two main elements, secondary East-West faults (EWF) are described in the Massif and could also easily correspond to the East-West nodal plane of the Taitung earthquake.
Consequently, two different causative structures can be associated to the main event of the Taitung (2006) crisis, the CNF as well as the EWF, and this ambiguity onto the generative structure geometry build up an important part of our study interest.
To solve this problem we perform a joint inversion of two kind of seismological data (teleseismic and strong-motion) in order to retrieve the coseismic fault slip distribution in space and time. We select the fault plane by comparing the adjustment between computed and observed waveform given by different fault geometries (issue notably from the two nodal planes of the focal mechanism), the selected model corresponding to the best data fit. In addition to seismological data we also consider that the best plane should contain the highest proportion of early aftershocks.
We find that the West dipping North-South plane include most of the aftershocks and give the best waveform adjustment especially for stations located near the epicenter (at about 10 km). Since the CNF displays a geometry close to the selected model we can consider it as the generative structure of the main event. The Taitung earthquake (2006) is then the first manifestation of a large event (MW 6.1) ever instrumented for this fault, indeed, the crisis of April 2006 form an interesting proof of the CNF activity, a structure for which even the existence is still controversial in the southern-end part of the Valley.