

# A fast algorithm for automatic seismic location and quality assessment: Application to the analysis of seismicity and focal mechanism in Taiwan

\*Yen-Ling Chen<sup>1</sup>, Juen-Shi Jiang<sup>1</sup>

1. Central Weather Bureau, Taiwan

With the vast amounts of data recorded by the Central Weather Bureau (CWB) seismic networks, a fast and precise algorithm for near real-time earthquake locations as well as fundamentally urgent source and hazard studies of large damaging earthquakes in Taiwan becomes increasingly important. The currently active orogeny in Taiwan as a result from the arc-continent collision is accompanied by two nearly-orthogonal subduction zones to the northeast and south of Taiwan. Such a complex tectonic setting makes the island suffer from frequent earthquake activities and potential risks of great subduction-zone megathrust events. Real-time monitoring of seismicity and fast determination of accurate source parameters of strong earthquakes and their aftershock distributions are of urgent importance for both scientific and societal concerns. Since the early 1990s, the CWB of Taiwan has operated dense seismic networks including short-period instruments, and later-added strong motion and broadband stations, to monitor restless earthquakes in and around Taiwan. One of the major and challenging tasks is to provide timely and accurate earthquake source information to help the community repond appropriately to possible seismic hazards. In this study, we present an efficient and stable algorithm of automatic phase picking and event identification suitable for the current seismic data acquisition and processing systems at CWB. The temporal and spatial distributions of the detected aftershocks provide the timely and first-hand information to estimate the aftershock decay rate and verify the orientation of the fault plane and rupture extent of the foreshock and disastrous mainshock as a guide for fast risk assessment and source characteristics analysis.

Keywords: seismicity, focal mechanism