

# **Characteristics and Tectonic Implications of the 1951**

## **Longitudinal Valley Earthquake Sequence, Eastern Taiwan**

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### **Abstract**

The Longitudinal Valley Fault (LVF) in eastern Taiwan is an extremely active fault with 3-4 cm of displacements consumed each year along its length. The fault forms the suture zone between the Philippine Sea and Eurasian plates as a result of an oblique arc continental collision.

From Oct 22 to Dec 5, 1951, four earthquakes ( $M_s > 7$ ) shook the LVF. We used trilateration (from ca. 1916 to ca. 1976) and intersesimic GPS (from 1990 to 1995) data to estimate coseismic displacements of the 1951 earthquake sequences. Coseismic displacement progressively decreases from north to south and the azimuth changes from N to NE, then to a NW direction. According to the inverted faulting mechanism, the Longitudinal Valley fault can be separated into 3 segments. Both the northern and central segments have a high dipping angle to the east but the southern segment is of listric fault geometry. The northern segment exhibits left lateral strike-slip faulting while the middle exhibits thrusting with left-lateral motion, and the southern segment thrusting with left-lateral motion associated with a smaller coseismic displacement. In addition, this three-segment deformation model can explain the pattern of recent crustal deformation along the LVF and Coastal Range.