



## **Characterization of a Potential Seismic Source: a field based study from Peninsular India**

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Identification of active tectonic structures in the Stable Continental Region (SCR) is difficult, owing to the low preservation potential of its evidence due to the rapid erosional process and long return period of causative events. The Peninsular India is considered as SCR, which is known for slow deformations and low-level seismicity, through reactivation of preexisting weak zones. However, there is appreciable increase in damaging earthquakes in Peninsular India during the last few decades, which necessitates the need for identifying potential seismic source zones.

The present study area lies in the south western terminus of the Palghat gap in Thrissur district of Kerala State, India. NW-SE trending Periyar and Idamalayar lineaments are the pre-identified major structures in the area. Low level seismicity, reported south of Bharthapuzha river, since 1989 are falling in the region of Wadakkancheri and Thrissur. In the present study, an attempt has been made using remote sensing, qualitative and quantitative analysis for the various elements of tectonic geomorphology to delineate active tectonic elements in the area. The results were further validated through the field investigations.

Detailed remote sensing study revealed that Periyar lineament branched into three sub parallel segments as it enter into the study area. Majority of the anomalous zones demarcated from the critical analysis of geomorphic and morphometric parameters are located in the vicinity of the NNW-SSE trending northern most branched segment of Periyar lineament. Anomalous deflection in the major river courses across this segment is observed. Thus segment appears to merge with the NW-SE trending Idamalyar lineament towards its northern continuity. Field studies in the anomalous zones have identified well developed fault zones (having damage zones and fault core) at several locations along this segment. Damage zones are found associated with slicken lines indicate a consistent north-directed reverse movement of respective hanging wall blocks. Presence of fresh gouge within the fault core indicate the deformation in the near surface conditions. The association of ongoing seismicity in the region with NW-SE trending lineaments further confirms tectonic disturbance along the north western side of the Periyar lineament. The overall observation may indicate that the northern segment of Periyar lineament, which is connected far north with Idamalayar lineament is showing neotectonic signatures and micro earthquake activities along it, may be indicating the subtle tectonic adjustments in the present stress regime.

**KEYWORDS:** Neotectonic, Fault, Periyar Lineament, Seismicity