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Revisiting the 1897 Shillong, Northeast India, earthquake: Implications for regional faulting history

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The 1897 Assam, northeast India, earthquake is a significant event in modern history. Its source zone properties and the earthquake history are still much debated. We review the paleoseismological, archaeological, and historical information to infer the probable timing of the penultimate earthquake at the 1897 source zone. The data suggest ~1200-year- interval between the 1897 earthquake and its predecessor. Our data also indicate the occurrence of another earthquake, probably of similar size, about 200 years before 1897 at an independent source located in the northern part of the Brahmaputra Valley, near the source zone of another great earthquake that occurred in 1950. In this paper, we also explore the available seismotectonic database in conjunction with some of Oldham's insightful coseismic observations from the Brahmaputra Valley, to further constrain the nature of faulting associated with this earthquake and argue for a south-dipping fault, associated with the 1897 earthquake, but it is located farther north and it marks the northern boundary of the plateau, presently concealed under the Brahmaputra alluvium. This structure is evident from the gravity data and geomorphology as well as the subsurface lithology. The overall seismotectonics of the Shillong Plateau implies that the region behaves as an independent entity, rather than an outlier of the proximal Himalayan plate boundary. The historical data imply that the fault on the southern boundary of the plateau (Dauki fault) appears to the most potential seismogenic structure in the region.