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Spatiotemporal evolution of deep seismicity beneath the central Himalayas

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The Himalayan orogen, formed by the continental collision between the Indian and Eurasian plates, is a unique geological structure that has been extensively studied over the past few decades. These previous studies highlighted the occurrence of earthquakes in the orogen's roots beneath the central Himalayas. However, the characterization of these deep earthquakes remains limited. Here, we compiled a detailed, long-duration catalog, which we use to investigate the spatiotemporal characteristics of seismicity beneath the Himalayan orogen.

To create this catalog, we collected all available continuous seismic data acquired during the last two decades in the central Himalayas region (i.e., 2001-2005). We applied a systematic, semi-automatic processing routine to obtain absolute earthquake locations using a 1-D velocity model. Using high-quality picks, ~8,000 preliminary earthquake locations have been determined, at least 1,000 of which have hypocentral depths >50 km. We plan to refine the preliminary locations and calculate local magnitudes for the intermediate-depth lithospheric earthquakes. Using this refined catalog, we will analyze the spatiotemporal evolution pattern and properties of the Himalayan deep seismicity. This analysis is expected to provide us with insights into the processes and mechanisms that control seismogenesis beneath the orogen. For example, is seismicity driven by earthquake stress transfer (mainshock-aftershock sequences), or is it caused by external processes like fluids or aseismic slip, or both?