

Improvement of focal depth estimations from combination of local and teleseismic data
Application to Far-Western Nepal

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Hypocentral locations of shallow moderate-sized earthquakes are often used to characterize the seismic behaviour of tectonic structures. However, a great accuracy in depth estimation is required while confronting hypocenters and regional or local seismogenic structures. Deployment of dense seismological networks above seismic clusters provides an adequate solution to resolve focal depths and thus has become a classical technique in seismotectonic studies. Unfortunately, most regions are covered by sparse seismological stations which are in most cases distant from the source. For those cases, hypocentral depth estimations are challenging and can sometimes even be better determined using depth phases (sP and pP) picked in the signal recorded at teleseismic distance (30°-90°). Here I thus combine two approaches for depth estimations: 1. an automatized technique based on a cepstral analysis devoted to the retrieval of these teleseismic depth phases and 2. relying on a dense catalogue of earthquakes constrained by a dedicated regional network (HiKNet, Nepal). It allows me to evaluate the depth estimations and their uncertainties associated to 37 events of Far-Western Nepal recorded at both regional and teleseismic distances.

Systematic combination of the high quality global network of the IMS (International Monitoring System) allowing teleseismic detections of moderate magnitudes events with the high resolution regional seismic catalogues acquired in Nepal should allow a better characterization of biases and uncertainties associated to the determination of focal depths at teleseismic distances (depth-phases identification, topographic corrections, complexities related to the radiation diagram).