

The GANSSER seismological network in Bhutan

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Our project investigates the Geodynamics AND Seismic Structure of the Eastern-Himalaya Region (GANSSER). It aims to reveal the first seismological images beneath Bhutan and as such is a tribute to the late Augusto Gansser, geological discoverer of Bhutan [1].

Project GANSSER builds on the deployment of a temporary broadband seismometer network (Figure 1). This consists of 38 stations deployed across the Kingdom of Bhutan. Two south-north segments in the western and eastern part of the country constitute densely spaced lines of ca. 7 km inter-station distance with respectively 16 and 14 stations. The main technique to apply is receiver functions in order to image the Moho as it deepens from India to Tibet, thus revealing how the crust thickens in the Eastern Himalayas. Further 8 stations are located in-between these lines, in the central part of the country. The main purpose here is to characterize the seismicity of the country in a homogeneous manner. Altogether, the station network will allow the application of different classical seismological techniques, such as teleseismic, local earthquake, ambient noise and attenuation tomography. The dataset will also be exploited to try to locate landslides that cause a significant hazard, especially in and after the summer monsoon season.

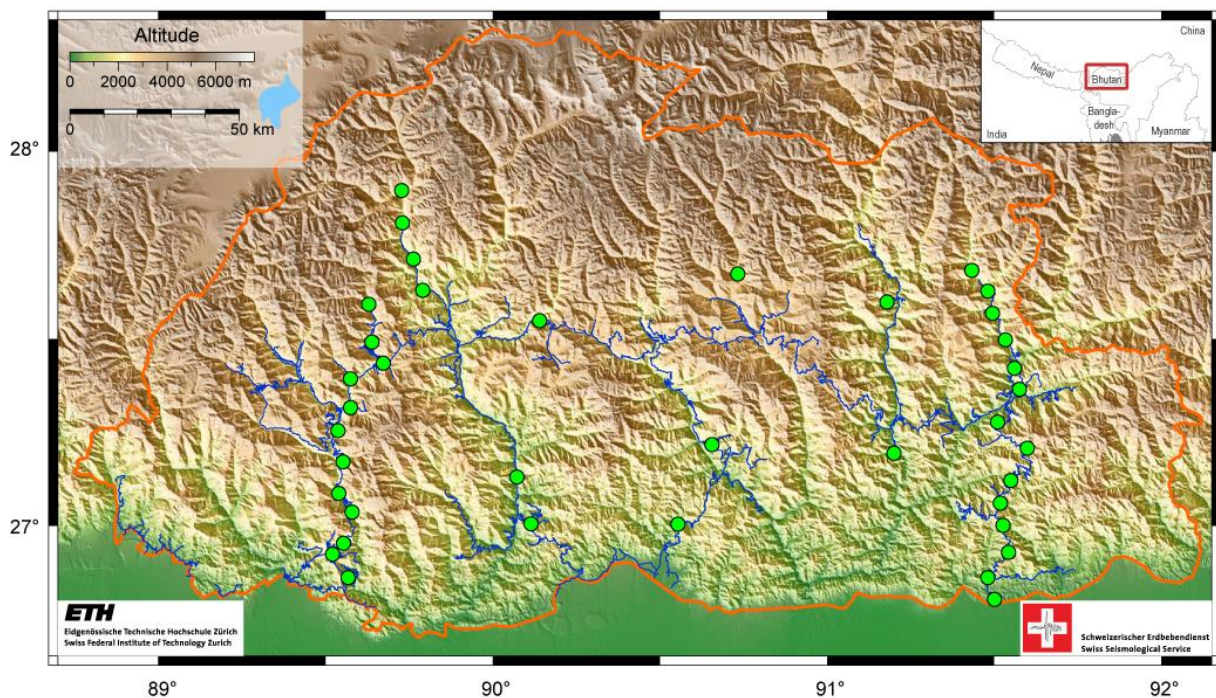


Figure 1: Station geometry of the GANSSER seismological network in Bhutan.

The station network described above has been deployed in January 2013 and is planned to operate until spring 2014. A first visit to the stations in April 2013 found operational conditions better than the average for temporary seismological networks. Data recovery in this time period exceeded 90%. Power spectral density diagrams indicate that the noise levels at our station sites are within the bounds of the Peterson Noise Model bounds [2] and in some cases are significantly less than the high-noise model. Starting April 2013 remote communications pathways with one third of the stations are tested.

The scientific goals of Project GANSSER include: the determination of the structure and physical properties of the crust and the lithosphere; the mapping of seismic activity in the country and its eventual seasonal variation; joint interpretation with gravity data acquired in 2010-2012; landslide and debris flow detection and localization. Among the goals are the preliminary site tests in preparation for the permanent seismic observatory for Bhutan. Seismotectonic studies based on this project will compare different segments of the Himalayas and may shed light on the origin of the apparent seismic gap in Bhutan. The project will also play a role in building the basic knowledge towards mapping the seismic hazard in Bhutan within the next few years.

This poster will present the station geometry, and preliminary information about the seismic data; it will also provide the opportunity to discuss the scientific objectives of the project with conference attendees.

[1] A. Gansser, *Geology of the Bhutan Himalayas* (Birkhäuser, Basel, 1983), p 183.

[2] J. Peterson, *Observations and modelling of seismic background noise* (USGS, Albuquerque, 1993)

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