Kolloquium:

Developing Regional Tephrostratigraphic Frameworks: Applications and Challenges

Date: Monday, 18 November 2019, 16:15
Location: Institut für Geologie, Baltzerstrasse 3, 3012 Bern, Studer Auditorium, 2. OG
Speaker: Prof. Karen Fontijn
Université Libre de Bruxelles, Belgium

Detailed stratigraphic studies of pyroclastic deposits form arguably the best tool to estimate the frequency and magnitude of past explosive eruptions at volcanoes where limited or no historical records exist. Alternations of soils and pyroclastic deposits however typically only preserve relatively large explosive eruptions, of magnitude 3-4 and above, and therefore almost invariably form a biased view of the eruptive history at a particular volcano. Lacustrine records offer significant potential to obtain a more complete view of the eruptive record, as they often preserve thin fine-grained tephra deposits representing small-scale explosive eruptions not preserved on land, or distal ash deposits from large eruptions. These sedimentary records often also contain material that can be dated to establish a detailed age-depth model that can be used to date the eruptions and estimate the tempo of activity.

Integrating terrestrial and lacustrine data therefore allows developing regional tephrostratigraphic frameworks. Such frameworks provide a view of temporal trends in volcanic activity and mid/long-term eruptive rates on a regional scale rather than at the level of an individual volcano. They also highlight the spatial distribution of deposits from large explosive eruptions, allowing improved estimates of magnitudes of individual eruptions as well as of frequency of impact by volcanic ash in specific regions. Provided such tephra horizons are well characterized and dated they can be used as age marker horizons and help fine-tune age models for palaeoenvironmental studies. In this presentation I will highlight a few key examples from Indonesia, Chile and Ethiopia, and discuss the multidisciplinary applications as well as challenges posed by data acquisition.