The broadband seismic network KivuSNet in the Virunga Volcanic Province (Democratic Republic of the Congo): seismicity catalogues and fundamental seismological models after more than 2 years of continuous operation

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Over the course of the past 5 years, the first dense real-time telemetered broadband seismic network in the Kivu Rift region (KivuSNet) was gradually deployed in the frame of several Belgo-Luxembourgish research projects (the most recent one being RESIST: "Remote Sensing and In Situ Tracking of geohazards", funded by the Belgian Science Policy and Luxembourg National Research Fund). The Kivu Rift is located in the bordering region of the Democratic Republic of Congo and Rwanda, in the Western branch of the East African Rift. Here the active volcanoes Nyamulagira and Nyiragongo threaten the city of Goma and neighbouring agglomerations. For many years already, urbanisation in that region undergoes sustained rapid growth, and the region counts 1 million inhabitants today. In 1977 and 2002, eruptions of Nyiragongo caused major disasters. Destructive earthquakes can also affect the region, as was the case in 2002 in Kalehe (Mw 6.2) along the western shore of Lake Kivu, or in 2008 in Bukavu (Mw 5.9), south of Lake Kivu.

While the first stations were already installed in 2012/2013, KivuSNet is fully operational with a sufficient station coverage only since October 2015. Today, KivuSNet is composed of 17 stations delivering continuous real-time data, many of these installed under difficult conditions in a hostile environment. Many KivuSNet stations are co-located with GNSS KivuGNet stations, and three KivuSNet sites are in addition equipped with infrasound arrays. This contribution will present the lessons learned from these more than 2 years of continuous KivuSNet operation as well as the current status of seismological information as deduced from these data, including a robust 1D seismic velocity model and calibrated local magnitude scale for the Kivu Rift region. The complete seismicity catalogue (volcanic and tectonic events) has been relocated, and a spectral inversion carried out on a subset of the data to characterize source, path and site effects.