The first continuous GNSS stations at Saba and St. Eustatius: site-selection, data acquisition and integration into the seismic monitoring network.

Elske de Zeeuw - van Dalfsen, Reinoud Sleeman, Jan-Willem Schoonderwoerd, and Läslo Evers

KNMI, R&D dept. Seismology & Acoustics, De Bilt, Netherlands (elske.van.dalfsen@knmi.nl)

Continuous Global Navigation Satellite System (GNSS) observations have proven to be effective at detecting the build up towards a volcanic eruption. Current techniques allow (near) real-time data transfer, making it possible to analyse in-situ surface deformation observations from a safe distance. It has been shown that the monitoring of a volcano is most successful when using multiple techniques to assess the state of activity. The addition of continuous GNSS to any operational volcano monitoring network is thus a useful component.

In 2017 potential locations for continuous GNSS instruments were visited and evaluated on the islands of Saba and St.Eustatius in the Caribbean Netherlands. In January 2018, we build the monuments and installed the first two stations in the vicinity of two existing permanent broad-band seismometers (SABA and SEUT). Data are transmitted to the Royal Netherlands Meteorological Institute (KNMI) in (near) real-time and we show the first two months of observations.

The islands of Saba and St Eustatius each host an active volcano, the Quill on St. Eustatius and Mt. Scenery on Saba. The most recent eruptions at these volcanoes probably occurred more than 375 years ago but the existence of heated groundwater at St. Eustatius and hot springs at Saba indicate that both volcanoes are active, but quiet, rather then extinct.

The new GNSS instruments complement the existing network of broadband seismometers (4 at each island). Integrated data analysis will greatly improve the chance to observe the onset and follow the evolution of a future volcanic crisis. Apart from volcano monitoring the data can also be used to study regional tectonics as well as space weather.