

UPDATE 4 Saba - November 2019

Webpage

In the past months KNMI has developed a webpage dedicated to the volcanoes of St. Eustatius and Saba. You can find this webpage at: <http://www.knmidc.org/volcanoes/>. It contains information about the monitoring and setting of the volcanoes and the monitoring data can also be viewed. Please feel free to make suggestions for improvements!

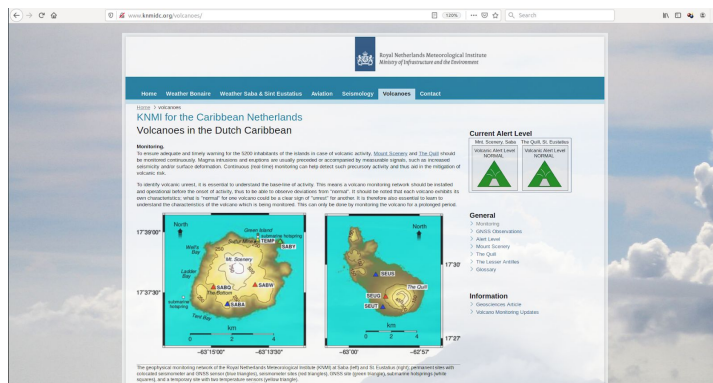


Figure 1. Screenshot of knmidc.org/volcanoes

Seismic data

KNMI is working on a system to automatically locate earthquakes in the Caribbean region, similar to the automatic earthquake detection in Groningen. In the meantime it would help us greatly if you could ask residents to fill in this form when they have felt an earthquake:

(<https://www.knmi.nl/nederland-nu/seismologie/aardbevingen/melden>).

Thanks to the continuous support of SATEL the three seismometers (called “SABA”, “SABQ” and “SABW”) are functioning well and produce data of good quality for the purpose of detecting earthquakes. As an example, a magnitude 6 earthquake north-west of Puerto Rico on September 24, 2019, around 03:23:40 UTC, was recorded by all stations with measured ground velocities up to 0.5 mm/s (see Figure 2).

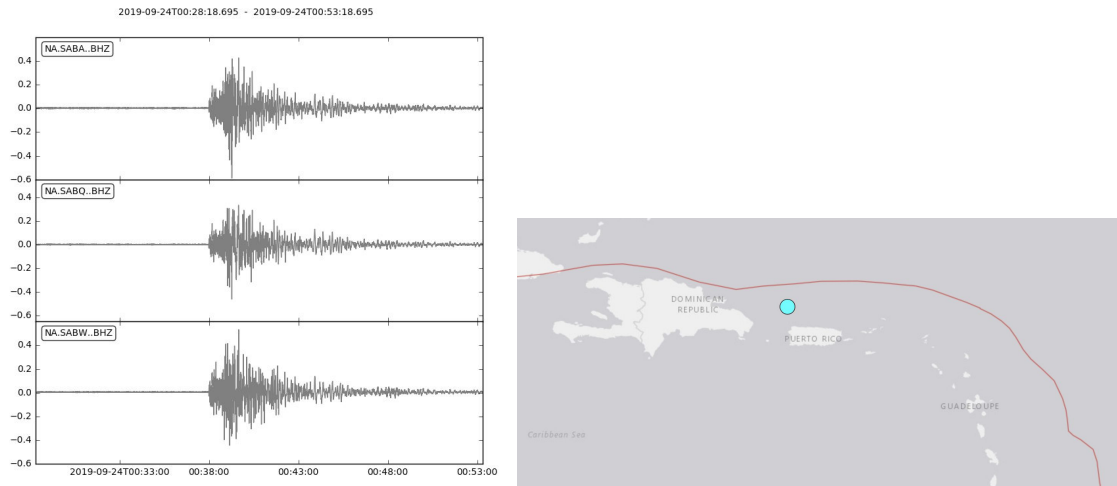


Figure 2: Seismic recordings of the vertical ground velocity in mm/s measured by seismic stations SABA, SABW and SABQ, due to an earthquake near Puerto Rico (source: USGS).

GNSS data

The two GNSS stations at St. Johns (called “SABA”) and at the airport (called “SABY”) have been functioning as expected. For each instrument we calculate the daily position very precisely. The result is plotted in a graph as a point, and by adding a new data point to the graph each day a time series is formed (see Figure 3). Station SABA has been operational since January 2018 and hence has a longer time series than station SABY, which became operational in February 2019.

Changes through time can be viewed in the time series for three components:

1) horizontal East-West, 2) horizontal North-South and 3) vertical Up-Down.

Uncertainties for each point are a few mm for the East and North component and up to a few cm for the Up component. The data show a horizontal movement towards the NE for both stations. This movement is due to well-known plate tectonics whereby the North and South American plates subduct underneath the Caribbean Plate.

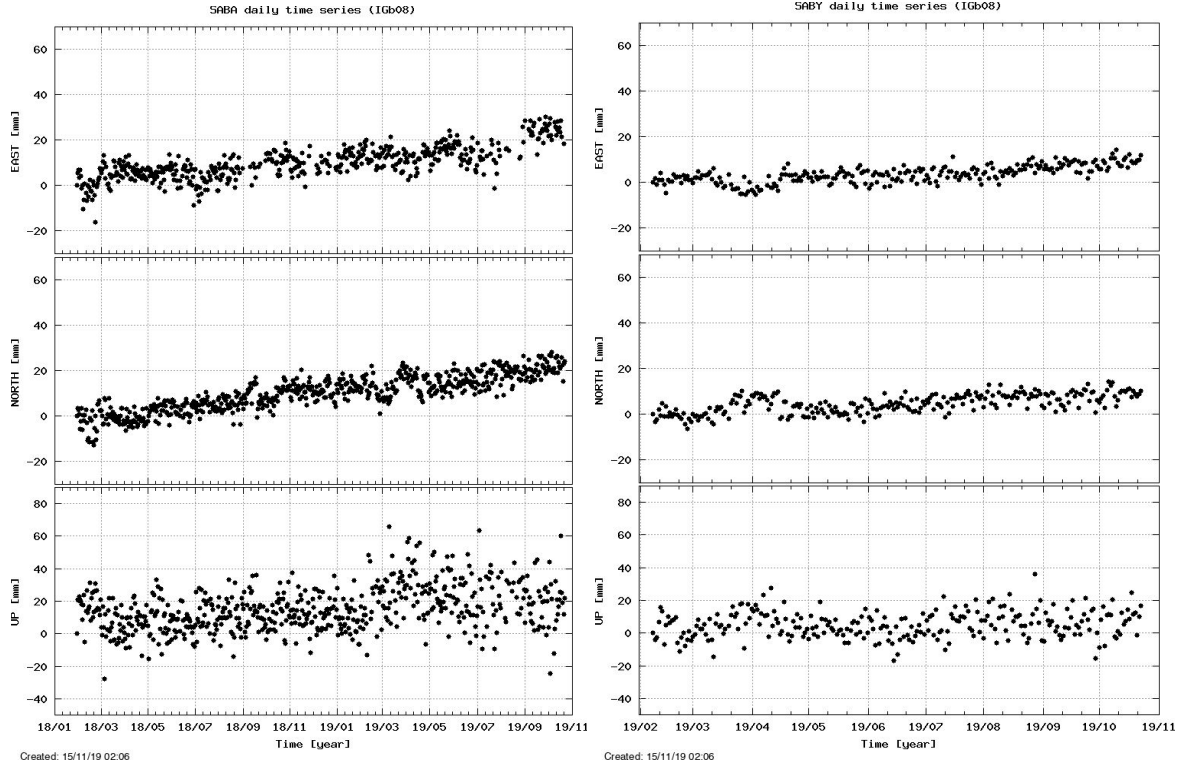


Figure 3: GNSS data from stations SABA and SABY.

Temperature data

Continuous temperature data were collected from the hotspring opposite Green Island in February 2019. Both temperature probes recorded data for 3 months, although 1 probe started to fail after the first month (See Figure 4). The maximum temperature of the hotspring is around 82 degrees Celsius. This temperature fluctuates due to heavy mixing with seawater. Analysis of these data together with pressure gauge data from the harbour of Saba suggest the temperature fluctuations correlate with the tides.

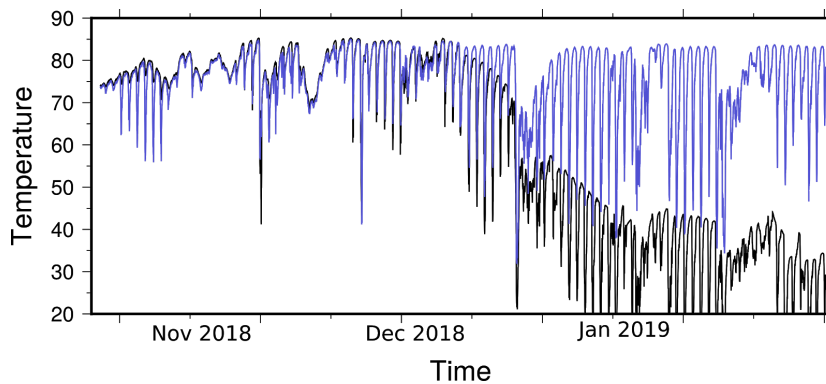
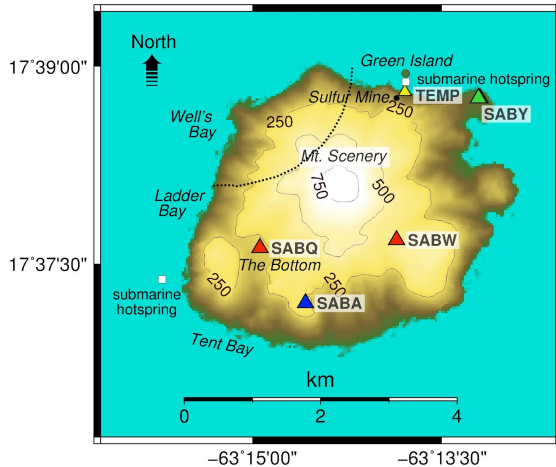


Figure 4: Recorded temperature (in degrees Celsius) at the hotspring opposite Green Island. Blue line depicts good data, black line shows compromised data quality with time due to failure of the temperature probe.

New site?

KNMI is looking for a good location for a third GNSS combined with a seismometer. We would like to request the help of the islanders in finding a suitable location.



This location should be:

- 1) In the NW section of the island (see Figure 5)
- 2) Have a sky view
- 3) Have solid ground, preferably rock
- 4) Accessible within 45 minutes on foot
- 5) Minimum 150 m from the sea
- 6) Minimum 150 m from a vertical cliff

Figure 5: Saba island. Dotted line marks the NW section of the island where the instrument should be located.

Anybody who has an idea for a location is encouraged to contact us via email. When a team from KNMI visits Saba in January 2020 we can then check these options. We hope to see you then!