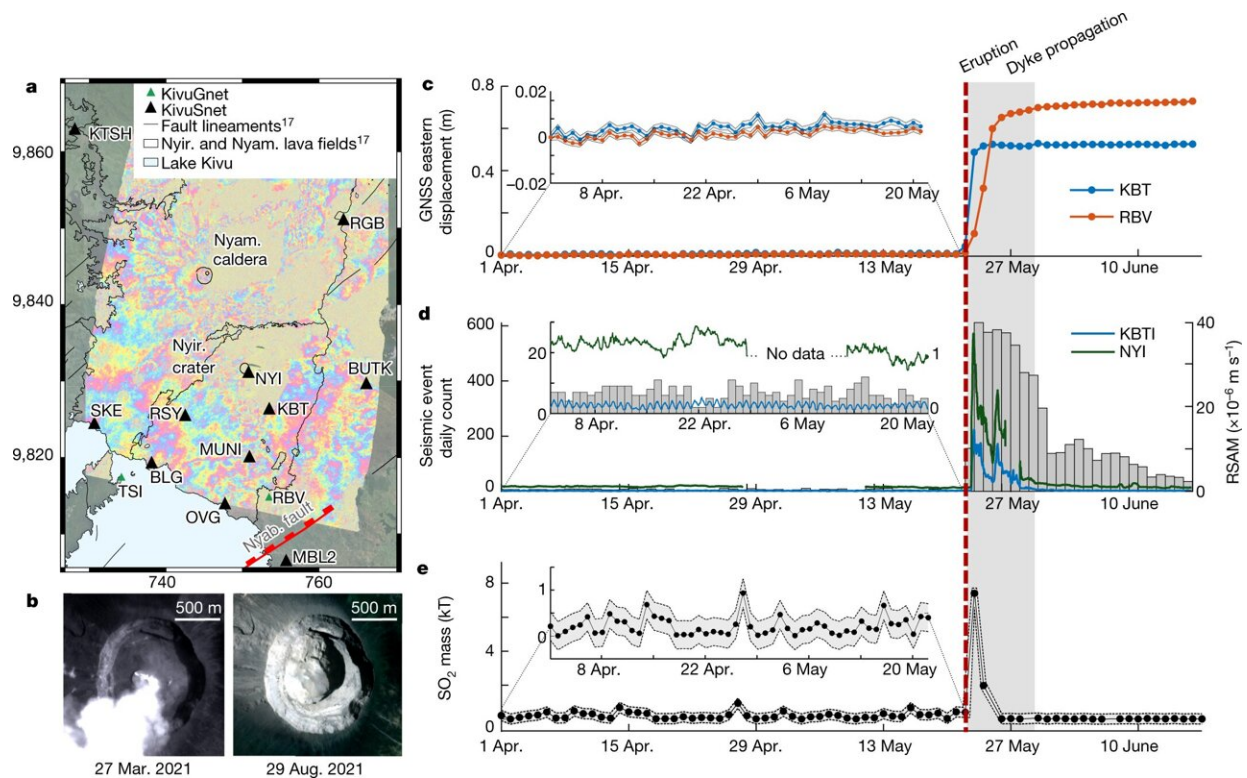


Why the Mount Nyiragongo volcano erupted with little to no warning

September 5 2022, by Bob Yirka



Absence of precursory signals. a, COSMO-SkyMed (CSK) interferogram from 21 May 2021 at 15:37 UTC to 22 May 2021 at 15:37 UTC showing no obvious deformation less than 1 h before the eruption starts. Coordinates are given in kilometers in the WGS 1984 UTM (Zone 35S) system. b, PlanetScope image comparison of Nyiragongo Crater between 27 March 2021 and 9 August 2021. c, Daily eastern displacements recorded at KBT (blue) and RBV (orange) permanent GNSS stations (see location on map a) from 1 April 2021 to 30 June 2021. Error bounds represent 2 standard errors. d, Daily count of seismic events automatically detected and located (fulfilling selection criteria defined in the

Methods) from 1 April 2021 to 30 June 2021 and 12-h moving median of real-time seismic amplitude measurement (RSAM) filtered between 2 Hz and 10 Hz at NYI (green) and KBTI (blue) permanent seismic stations. Note that the KBTI station is co-located with the KBT GNSS station. e, SO₂ mass automatic detection from TROPOMI over the Virunga region. Error bounds represent 2 standard errors. Credit: *Nature* (2022). DOI: 10.1038/s41586-022-05047-8

An international team of researchers found clues that help to explain why the Mount Nyiragongo volcano erupted with little to no warning despite the installation of seismic monitors several years prior. In their paper published in the journal *Nature*, the researchers describe their study of data surrounding the eruption and what they learned from it. Emily Montgomery-Brown with the U.S. Geological Survey has published a News & Views piece in the same journal issue outlining the work.

In May of last year, Mount Nyiragongo's volcano (in the Democratic Republic of the Congo) erupted, spewing lava down its side, killing hundreds of people and injuring hundreds more. The [eruption](#) and [death toll](#) were a surprise because geologists had installed seismic equipment around the volcano just six years prior. It was expected that the equipment would detect warning signs from the volcano, giving officials time to warn people in the vicinity to get out of harm's way. Instead, there was little to no warning. In this new effort, the researchers sought to find out why no [warning signs](#) had been detected.

Prior research found that there was no equipment failure—the seismic sensors had recorded signals from the volcano just fine as it was erupting over the following six hours. Thus, it seemed the volcano had erupted without any warning signals. The researchers noted that the lava lake in the volcano had risen recently, but not in an unusual way. They also

noted that witnesses had described cracks appearing in the sides of the volcano with lava flowing out of them.

The [seismic data](#) just prior to the eruption showed evidence of several small quakes. The researchers also saw a small rise in infrasound waves just 10 minutes before the eruption. They suggest that stress built up in the volcanic core over time due to heat and pressure from the magma below. They also suggest that the point where the magma burst through its cap was likely very close to the surface—thus, the magma did not have to travel far before it started to cascade down the side of the mountain, leaving almost no time for the seismic probes to convey a warning.

The researchers suggest that in the future, [seismic equipment](#) will need to be custom tailored to individual volcanoes to allow for properly processing the data received and hopefully to offer advanced warning of all of the different kinds of eruptions.

More information: D. Smittarello et al, Precursor-free eruption triggered by edifice rupture at Nyiragongo volcano, *Nature* (2022). [DOI: 10.1038/s41586-022-05047-8](https://doi.org/10.1038/s41586-022-05047-8)

Emily K. Montgomery-Brown, The search for eruption signals in volcanic noise, *Nature* (2022). [DOI: 10.1038/d41586-022-02347-x](https://doi.org/10.1038/d41586-022-02347-x)

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