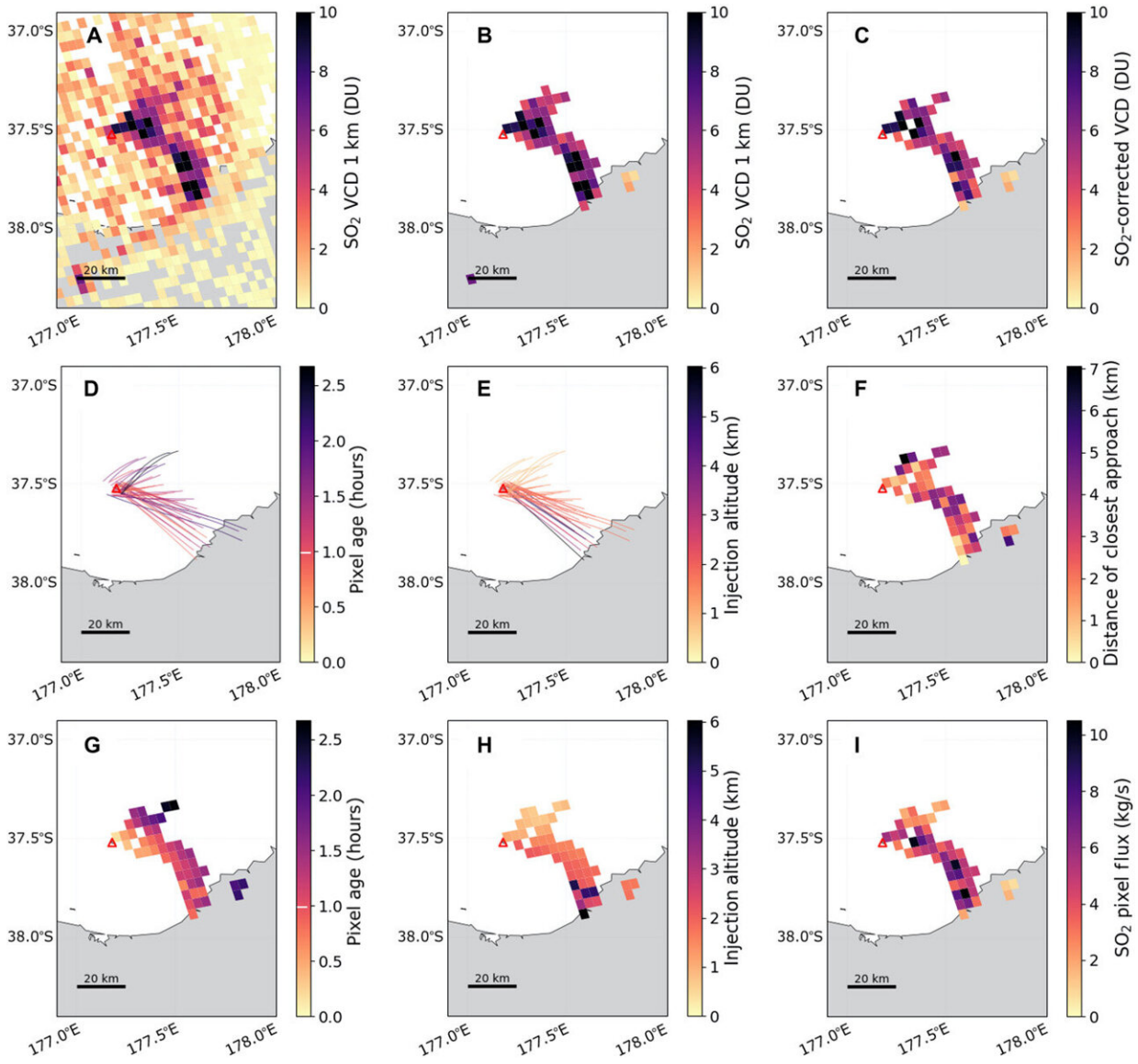
Using satellite data to warn people about volcanic eruptions

June 21 2021, by Bob Yirka



Results from the analysis of the TROPOMI image collected on 9 December

2019 at 02:09 UTC, 58 min after the Whakaari/White Island eruption.Credit: *Science Advances* (2021). DOI: 10.1126/sciadv.abg1218

A team of researchers from the University of Manchester, Wairakei Research Center and National Isotope Center, GNS Science, has found that it is possible to use satellite data to detect the early stages of a volcanic eruption. In their paper published in the journal *Science Advances*, the group describes their study of satellite data that captured the early stages of the New Zealand, Whakaari, eruption on White Island two years ago.

On December 9, 2019, 22 people were killed and 25 were injured when the Whakaari volcano erupted. The researchers note that it was one of several small eruptions that occur periodically. They also note that smaller eruptions tend to kill more people than larger ones because there are many more of them. In this new effort, the researchers obtained data from the Sentinel-5 Precursor satellite, which had passed over Whakaari shortly after it began erupting. By applying an algorithm to the data, the researchers were able to reconstruct the events that had led to the volcano erupting. In so doing, they observed signs that the volcano was going to erupt up to 40 minutes before it did so—enough time to alert people nearby, if a warning system had been in place.

The researchers note that monitoring stations have been put in place on the ground near many active volcanoes—they can detect gaseous emanations (such as sulfur dioxide) that are typically emitted by a volcano before it erupts. They also detect slight tremors that can also provide a warning. In the case of the Whakaari eruption, tremors were recorded prior to the eruption, but tourist agencies running the boats carrying people to the island ignored the warning. Such systems do not provide nearly as much information as satellites passing overhead, the

researchers note.

The researchers suggest that it is possible to detect early signs of volcanic activity for volcanos all around the globe. They note that more satellites would have to be deployed for such a system to be effective and that technology would have to developed for analyzing the data. Such a system would also have to be coordinated with local officials to ensure such warnings are heeded.

More information: Mike Burton et al, Insights into the 9 December 2019 eruption of Whakaari/White Island from analysis of TROPOMI SO2 imagery, *Science Advances* (2021). DOI: 10.1126/sciadv.abg1218