



Precise GNSS Positioning Helps Researchers better anticipate volcanic unrest and/or eruption.

Measurements using Trimble's CenterPoint® RTX correction service
Earns Improved Understanding and Predictability of Active Volcanoes.



Challenge

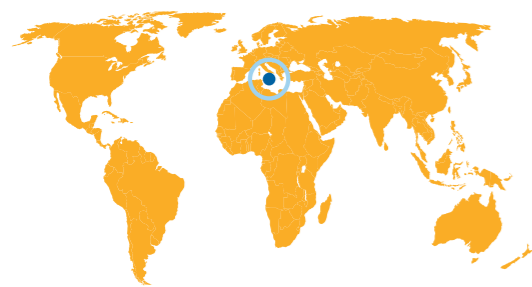
Monitoring the behavior of Italy's Mount Etna, one of the world's most active volcanoes, requires accurate GNSS positioning in difficult and sometimes dangerous environments. Juraj Papčo, a Mount Etna researcher, constantly seeks improvements in predicting volcanic unrest or eruption. He relies on accurate positioning data to enable his research in this challenging and remote location.

Measuring vertical gradients on the slopes of Mount Etna helps forecast volcanic hazards. While Mount Etna is surrounded by geodetic control points, conducting real-time GNSS observations is challenging, and quite dangerous. The dynamic and volatile work environment, paired with inconsistent cellular service, makes connecting to Italy's real-time GNSS network difficult. Further, constraints on radio licensing rule out conventional survey approaches.

Solution

To ensure reliable GNSS performance, Papčo turned to Trimble CenterPoint RTX positioning service. Papčo uses CenterPoint RTX to capture data at 17 locations where gravity data is collected. At each gravity point, he measures additional ground points to provide check data for the elevation models.

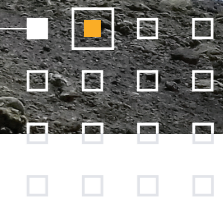
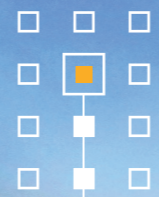
For each profile and gravity point, Papčo collects real time positions as well as approximately 25 minutes of static observation. He processes the static data using Trimble Business Center™ (TBC) software and compares the results with Trimble CenterPoint RTX and previous measurements by INGV. Data collected using CenterPoint RTX produces vertical accuracy of four to five centimeters.



Mt. Etna, Italy



John Houston chats with an albatross. Living on the isolated island, the birds have not developed fear of humans.

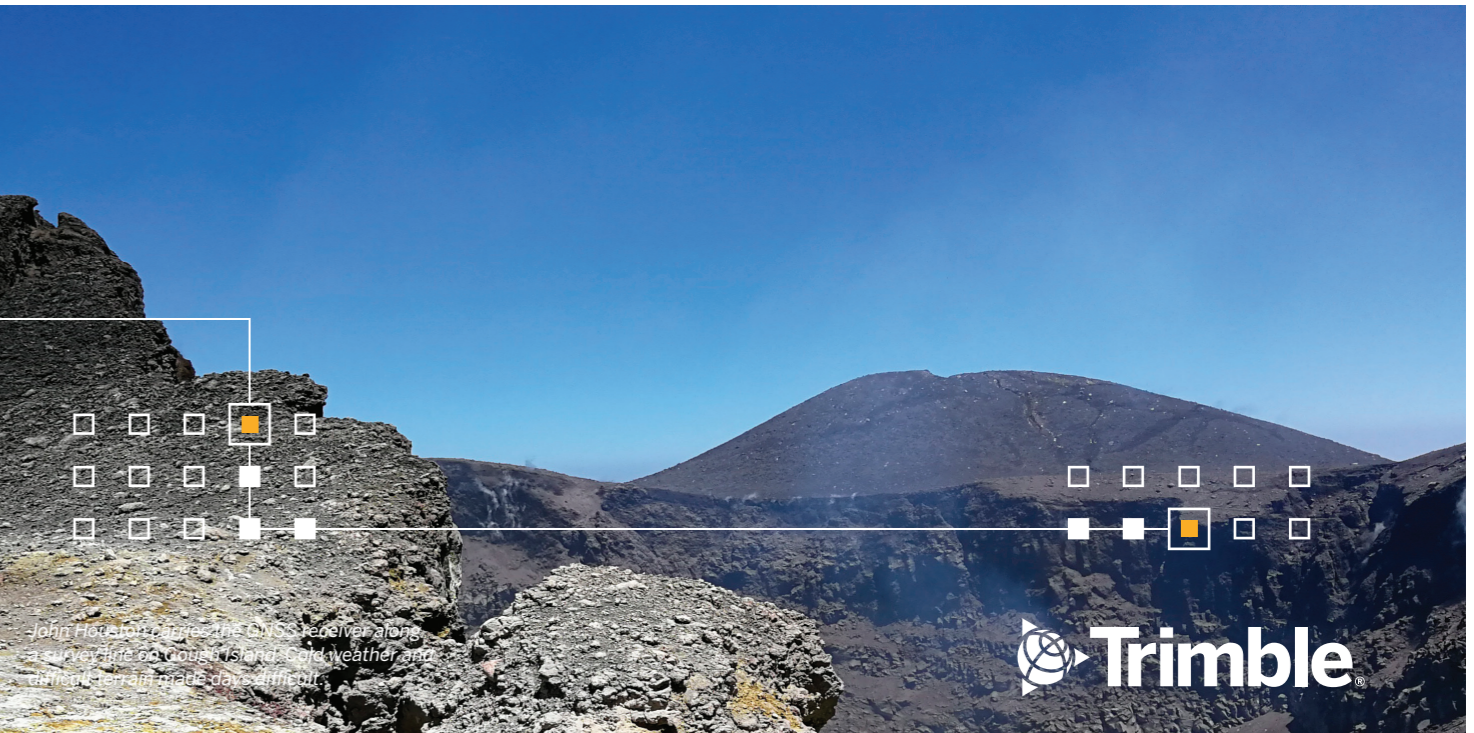
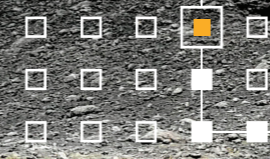


Results

The ability to process all the aerial and ground data using a single software and service provides an added benefit, making transformations and point classification a seamless and efficient effort. The work on Mount Etna helps scientists understand how surface deformations and gravity changes indicate the magma redistribution, thus providing better prediction and characterization of volcanic unrest or eruption activity.

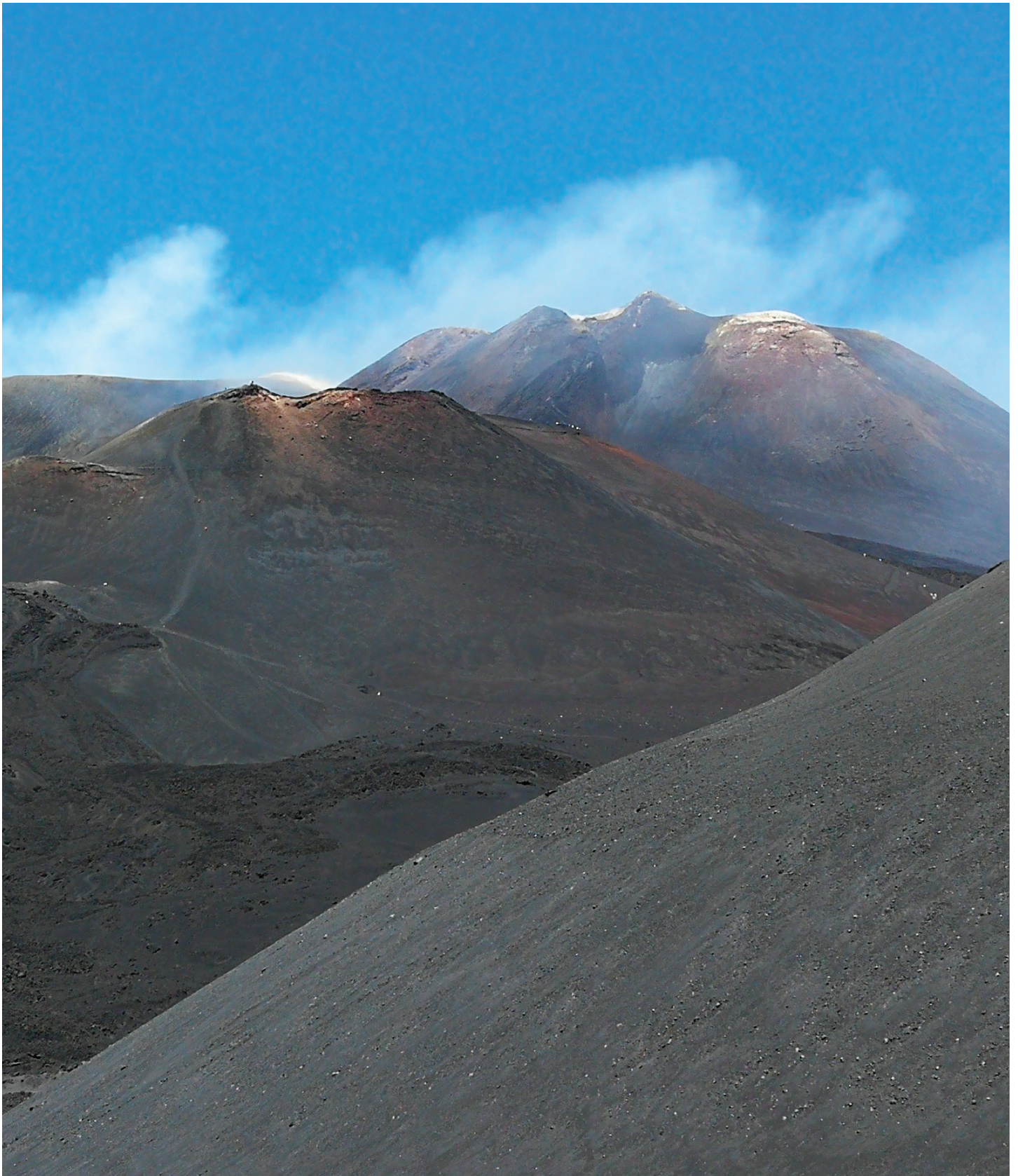
“Using [Trimble] RTX corrections is very exciting. On many points, especially the higher part of the volcano, internet signals were poor or none at all. Only by using RTX were we able to collect real-time data. Without RTX, it would have been very difficult and complicated to navigate to the desired points.”

– Juraj Papčo



John Houston places the GNSS receiver along a survey line on Gough Island. Cold weather and difficult terrain made days difficult.





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