Pressemitteilung

GEOMAR
Helmholtz-Zentrum für Ozeanforschung Kiel

39/2020

On the trail of a volcanic explosion
GEOMAR volcanologists investigate a 6000-year old eruption in Central America

***17. August 2020/Kiel*. Scientists of the GEOMAR Helmholtz Centre for Ocean Research Kiel explored a very special volcanic crater in Nicaragua, the Masaya Caldera. Until now it was not known which eruption formed the special crater, the caldera, of this volcano. Now, the volcanologists have gained new information about the origin of the crater by examining a 6000-year. The study was recently published in the international *Journal of Volcanology Geothermal Research*.**

The Masaya Caldera, as the crater is called, is over eight square kilometres large, which is quite unusual. Normally calderas of this type are rather small and are formed after an eruption by the slow withdrawal of magma at depth. In addition, eruptions occur on the flanks of the volcano, but rarely in the center. In contrast to these basaltic calderas, there are so-called siliceous calderas, which are formed by the sudden withdrawal of large amounts of magma rich in silicate during highly explosive eruptions.

Although the Masaya Caldera is basaltic, it was already suspected for some time that it was formed by a rather silician mechanism, meaning the magma was withdrawn in a short time. Thanks to the research group of the GEOMAR Helmholtz Centre for Ocean Research Kiel, there are first findings about the responsible eruption: Volcanologists have identified and measured a very extensive magma deposit. The volume of magma ejected there about 6000 years ago is approximately nine cubic kilometres. For scale: This is about 90 times as much as there was during the eruption of the Icelandic volcano Eyafjallajökull in 2010.

Apart from the amount, there is something else unusual about the analyzed eruption: Normally basaltic magma is too thin and doesn't contain enough gas to form high eruption clouds, such as those known from Vesuvius around 2000 years ago. However, since the sediments show that the ash cloud in Nicaragua was over 20 kilometers high, the pressure must have been many times greater than in normal basaltic eruptions. The researchers explain this with a higher amount of gas in the magma. "In addition, there was a flat-lying magma chamber which was connected to a deeper magma reservoir. This generated additional pressure, so that the combination of both factors could build up the necessary pressure", explains Dr. Armin Freundt, volcanologist at GEOMAR and author of the study. In total, the mass eruption rate was about 10,000 times higher than in normal basaltic eruptions.

The researchers hope that their understanding of this phenomenon will also help them to better assess other volcanoes: "Although such unusual volcanic events are rare, they are nevertheless important in estimating a volcano's risk potential", says Dr. Freundt.

Scientific Paper:
Perez W., A. Freundt, and S. Kutterolf, 2020: The basaltic plinian eruption of the ~6 ka San Antonio Tephra and formation of the Masaya caldera, Nicaragua. *J. Volcanol. Geotherm. Res*., 106975, https://doi.org/10.1016/j.jvolgeores.2020.106975

Links:
www.geomar.de GEOMAR Helmholtz Centre for Ocean Research Kiel
www.themenspezial.eskp.de/vulkanismus-und-gesellschaft for Earth System Knowledge Platform

Images:
At http://www.geomar.de/n7220 images are available for download.

Contact:
Marie Gundlach (GEOMAR, Communication and Media), Phone: +49 431 600-1816, presse@geomar.de