

Press release**Universität Greifswald****Dr. Elisabeth Böker**

04/08/2025

<https://idw-online.de/en/news850373>Miscellaneous scientific news/publications, Organisational matters
Geosciences, Physics / astronomy
transregional, national**Volcanoes, Atmosphere and Climate**

How do volcanoes influence the climate? The DFG Research Unit VolImpact discovered: Aerosols behave differently than expected, the effects of eruptions are seen up to an altitude of 100 km and noctilucent clouds could be caused by water vapor emitted by volcanoes. The research group at the University of Greifswald invites the interested public to a public lecture on 28 April 2025 to discuss the most recent findings in volcanic research.

Prof. Dr. Christian von Savigny and his research colleagues in the DFG Research Unit VolImpact had been waiting for the event that finally took place on 15 January 2022 in the South Pacific: a massive volcanic eruption. This was the date when the Hunga volcano erupted. "A very unusual eruption," explains environmental physicist Christian von Savigny. Together with colleagues from the Universities of Bremen, Hamburg and Leipzig, the Karlsruhe Institute of Technology (KIT), the Max Planck Institute for Meteorology in Hamburg, and the Helmholtz Center for Ocean Research in Kiel, he has been working on volcanoes' impact on the atmosphere and climate since 2019 – so research on "a living object" came at just the right time.

How the size of aerosols in the stratosphere change when a volcano erupts was a central finding of the research group. When a volcano erupts, huge quantities of sulphur are emitted into the stratosphere and the aerosols change. "These aerosols determine the effects on the climate," explains von Savigny. "Usually, the earth's surface temperature drops when volcanic aerosols reach the stratosphere." Whilst it was previously presumed that the particles grow in size, the Research Unit discovered that, in fact, the particles often become smaller. The size of the aerosols plays a decisive role for the physical and chemical effects of a volcanic eruption. The team published the results in the journal *Atmospheric Chemistry and Physics* <https://acp.copernicus.org/articles/23/9725/2023/>. "We first saw the decrease in size of the particles in satellite observations and were able to reproduce them with a climate model. That was a central highlight for the group," says von Savigny.

The ways volcanic eruptions affect the upper atmosphere was at the heart of a further research project. When a volcano erupts, a cloud of aerosols enters the stratosphere. This has a warming effect. The atmospheric temperature fields change and influence the winds. "We were able to observe that waves are responsible for a dynamic coupling that influences the atmosphere up to altitudes of 100 km and more," says von Savigny. The Research Unit investigated this behaviour systematically and also described the processes in the *Atmospheric Chemistry and Physics* journal <https://acp.copernicus.org/articles/23/7001/2023/>.

Thirdly, the Hunga eruption provided other new and important findings on noctilucent clouds that were recently published in the journal *Atmospheric Chemistry and Physics* <https://acp.copernicus.org/articles/25/3635/2025/>. A phenomenon that was seen in the sky following the Krakatoa eruption in 1883 and puzzled humankind at the time. Dr. Sandra Wallis from the University of Greifswald was able to show that the water vapor from the Hunga eruption in 2022 reached the upper polar mesosphere of the southern hemisphere at the beginning of 2024 and slightly raised its H₂O concentration. The postdoc explains that "whilst we were unable to determine a specific influence on noctilucent clouds, the slight increase in their frequency in January and February could be linked to the additional water vapor –

similar to the Krakatoa eruption in 1883.”

Public evening lecture

The Research Unit VolImpact will conclude its activities with an international workshop at the Alfried Krupp Wissenschaftskolleg (Institute of Advanced Studies) Greifswald. As part of the workshop, VolImpact is inviting interested members of the general public to an evening lecture to be held by Prof. Dr. Andrea Burke from the University of St. Andrews. This will take place in the Alfried Krupp Kolleg Greifswald on 23 April 2025, at 7 p.m. Andrea Burke's lecture that will be held in English is titled: "Ice Core Records of Changes in Volcanic Stratospheric Sulfate Aerosols and Climate". Andrea Burke will present results that re-investigate the impact of some of the biggest volcanic eruptions of the last 2500 years and highlight the strong sensitivity of summer temperatures in the northern hemisphere to extratropical eruptions in the northern hemisphere and the profound impact of these events on society.

Contact at the University of Greifswald
Prof. Dr. Christian von Savigny
Institute of Physics
Felix-Hausdorff-Str. 6, 17489 Greifswald
Tel.: +49 3834 420 4720
csavigny@physik.uni-greifswald.de



D