eVolv2k: Ice core-based volcanic forcing of climate variability for the past 2000 years

A "Temporary Position for Principal Investigator" ("Eigene Stelle") funded through the DFG Priority Programme "SPP 1158 Antarktisforschung".

Abstract

The injection of sulfur into the stratosphere by major volcanic eruptions is a dominant driver of natural climate variability. Understanding past climate variability depends critically on accurate knowledge of volcanic forcing. International climate modeling efforts collected within the Climate Model Intercomparison Project (CMIP) and the Paleoclimate Modelling Intercomparison Project (PMIP), which form the basis for much of the science reported regularly by the Intergovernmental Panel on Climate Change (IPCC), rely upon volcanic forcing histories reconstructed from ice cores from Antarctica and Greenland.

Recent advances in polar ice core research have produced multi-record composites of polar volcanic sulfate deposition extending over the last 2000 years, and represent tangible improvements over past efforts. Moreover, numerical modelling of volcanic aerosol transport and deposition offers the potential for improved translation of ice core deposition records into the radiative forcing data sets needed by the climate models. The eVolv2k project aims to leverage new ice core data and numerical modeling studies to provide much improved volcanic forcing histories – extending over the past 2000 years – to the international climate modeling community. Furthermore, the eVolv2k project will use the new forcing sets in climate model simulations to investigate decadal-scale climate variability related to volcanic forcing, with a special focus on polar processes, e.g., sea ice growth and ocean circulation, which are proposed to act as positive feedbacks, amplifying the impact of volcanic radiative forcing on the Earth's climate system.