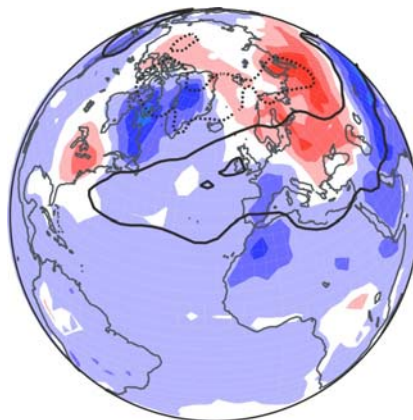


## Model-aided climate reconstructions

Scientists from University of Bern present the first monthly resolved three-dimensional global climate reconstruction for the past 400 years. It is based on combining historical measurements, documentary reports, and tree-ring data with a large set of climate model simulations. „We have adapted a technique that has long been used in weather forecasting to the problem of climate reconstruction“ says Jörg Franke, who led the study. „This shows the potential of blending ideas from different fields in a fruitful way.“ Although the reconstruction is mainly based on surface temperature information, the final product contains information about various variables, e.g. precipitation, air pressure or wind even in the higher atmosphere. With this additional information, the new reconstruction allows much more detailed studies of climatic variations such as droughts, severe winters or volcanic eruptions. The latter, for instance, was so far almost exclusively studied in models because only very few major eruptions occurred since the state of the atmosphere is measured by a dense observational network. With this new, freely available data, which is now published in the Nature journal „Scientific Data“, science will gain new insights into climate variability, its causes and consequences.



The winter 1809/1810 was unusually warm over northeastern Europe due to a volcanic eruption a year earlier (solid and dashed lines indicate positive and negative air pressure anomalies). The new reconstruction of the University of Bern allows studying this winter in detail.

**Reference:** Franke, J., S. Brönnimann, J. Bhend & Y. Brugnara (2017) A monthly global paleo-reanalysis of the atmosphere from 1600 to 2005 for studying past climatic variations. *Scientific Data* **4**, 170076.