Full 3-D shape of large-scale folds in Greenland's ice cap revealed

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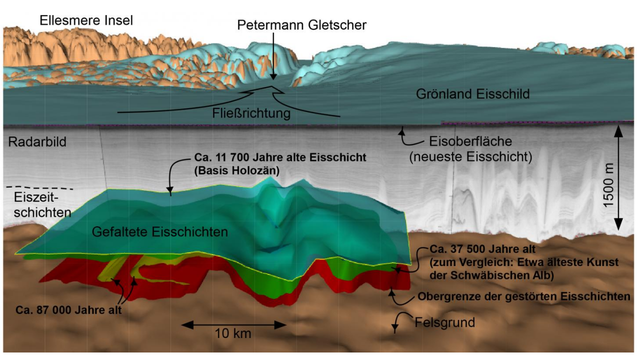
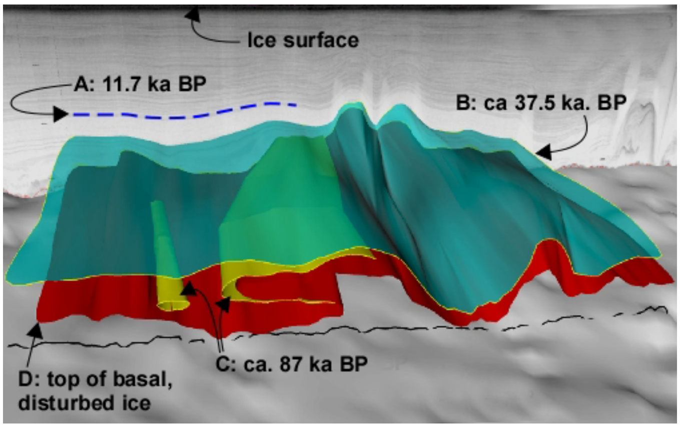


Credit: Paul Bons



Ice layers under the Petermann Glacier, North Greenland. Credit: Paul Bons

The polar ice caps consist of layer upon layer of snow that is compressed to ice that slowly flows towards the sea. Airborne radar has indicated folds in layers that date back to the ice ages.

Scientists from Tübingen University and the Alfred Wegener Institute in Bremerhaven, Germany, have now revealed the three dimensional structure of large, 10 km wide and over 500 m tall folds deep inside the North Greenland ice cap. The folds are aligned parallel to the flow and the authors show that this is due to lateral convergence as the ice flows towards the Petermann Glacier.

Contrary to existing models for folding in ice, the authors argue that the folds form because of the anisotropy of ice. This means that the ice is relatively soft when sheared parallel to the bedrock, but hard when constricted horizontally. This highlights the importance of improved models to determine the effect of climate change on ice flow in the polar ice caps.

More information: Paul D. Bons et al. Converging flow and anisotropy cause large-scale folding in Greenland's ice sheet, *Nature Communications* (2016). DOI: 10.1038/ncomms11427