Interior of an ice stream: NEGIS

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

D. Jansen[1], S. Franke[1], T. Binder[(1)], P. Bons[2], D. Dahl-Jensen[3], O. Eisen[1,4], H. Miller.[1], J. Paden[5], and I. Weikusat[1,2]

(1) AWI Bremerhaven, Germany; (2) Uni Tübingen, Germany; (3) Uni Copenhagen, Denmark; (4) Uni Bremen, Germany; (5) CReSIS, Kansas, USA

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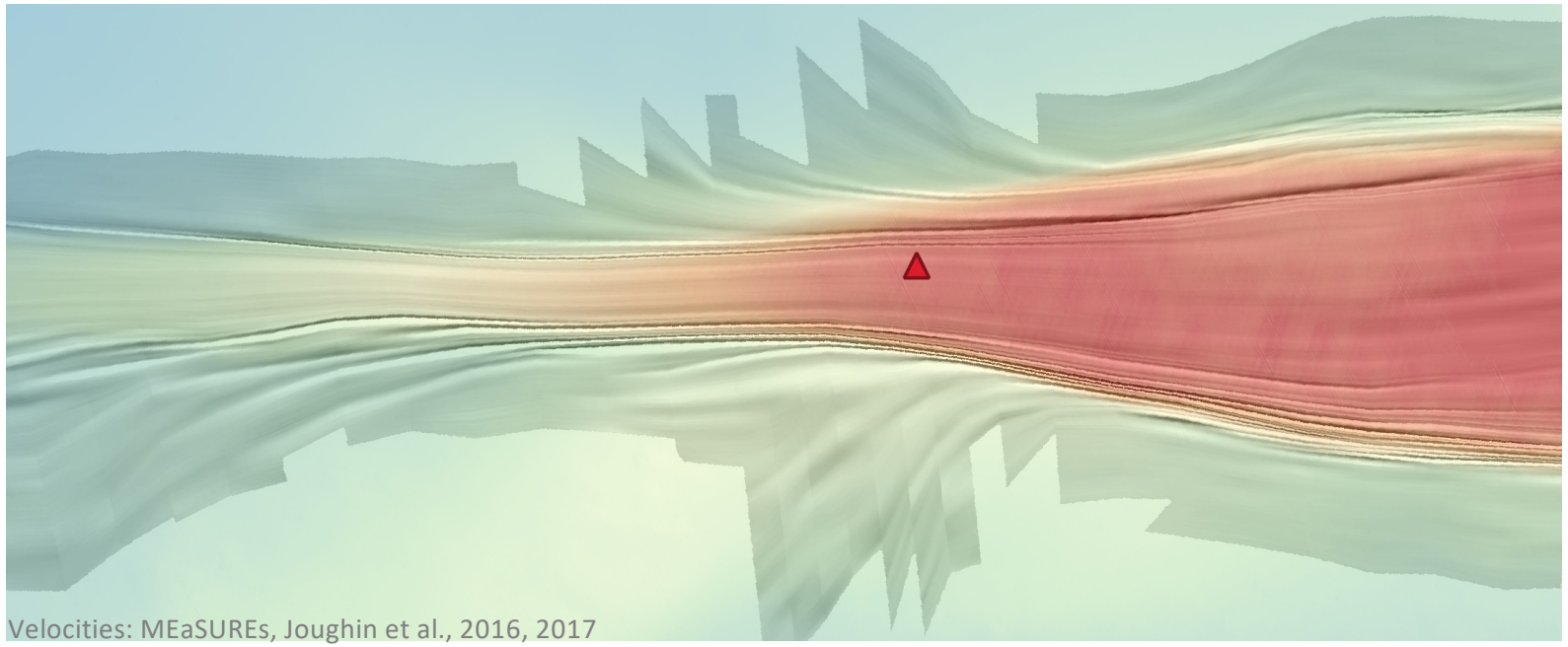

EASTGRIP ice core

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UNIVERSITY OF COPENHAGEN

CReSIS

Airborne radar survey

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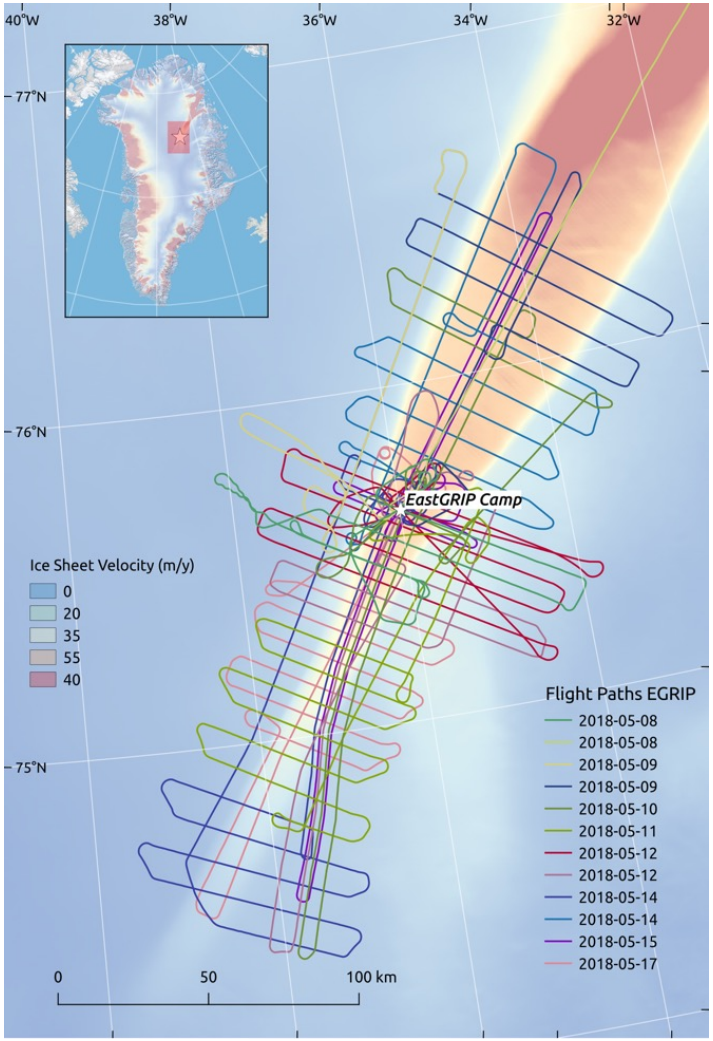

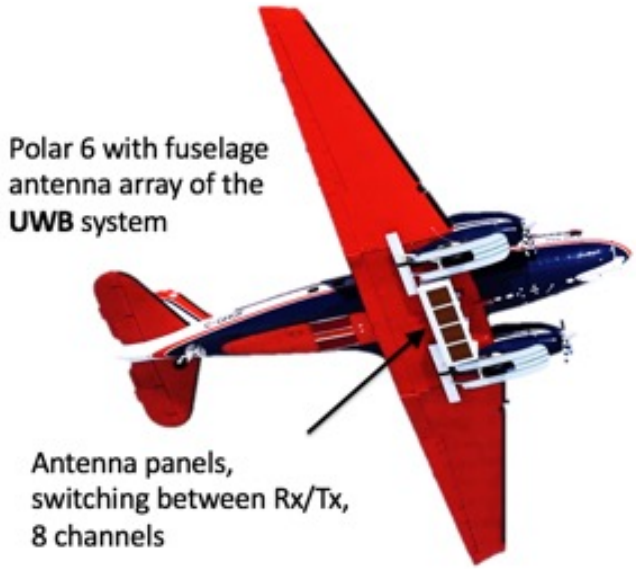

Aims:

- Map the stratigraphy with the focus on **shear margins**
- Use radar stratigraphy as passive tracer to reconstruct deformation history of the ice

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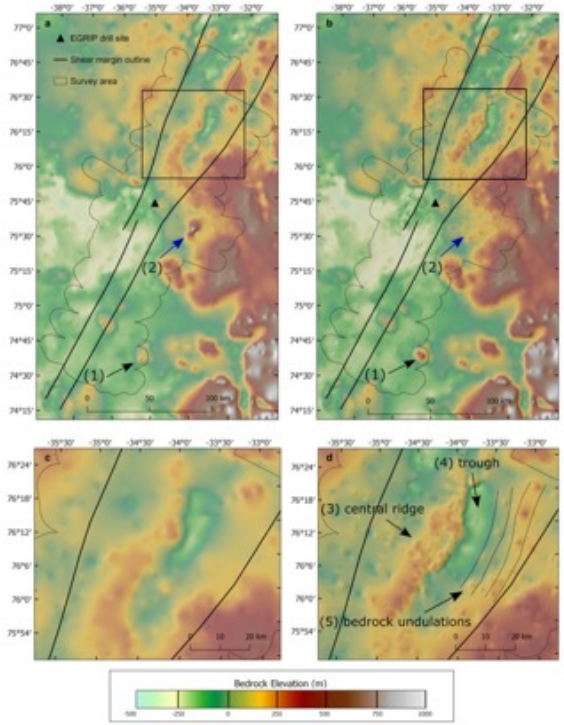
Published results based on this data set so far, and detailed information about processing:

New bedrock data set

Bed topography and subglacial landforms in the onset region of the Northeast Greenland Ice Stream

Steven Franke[1], Daniela Jansen[1], Tobias Binder[1], Nils Dörr[1], Veit Helm[1], John Paden[2], Daniel Steinhage[1] and Olaf Eisen[1,3]

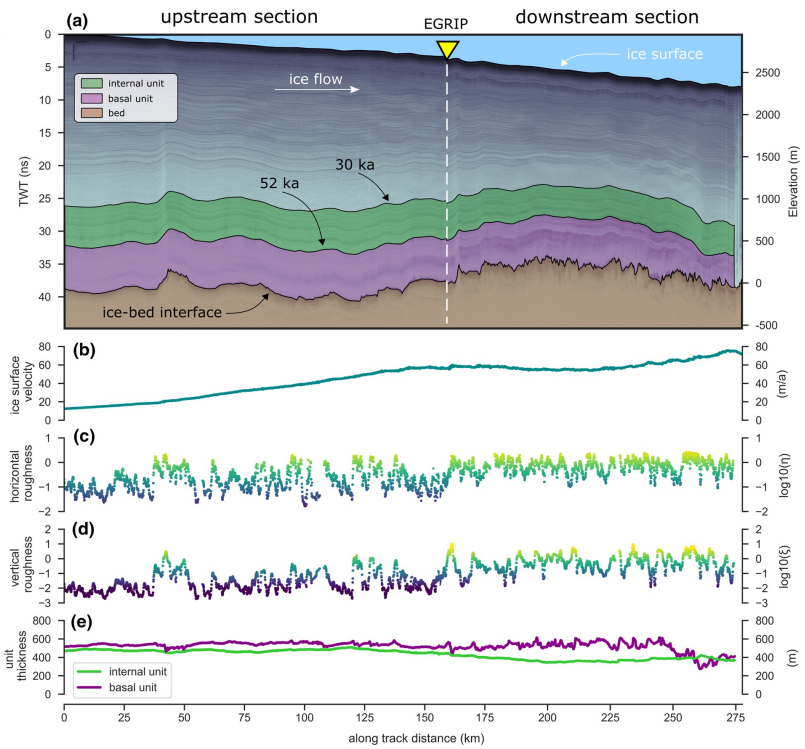


https://doi.org/10.1017/aog.2020.12

Basal conditions & flow

Complex Basal Conditions and Their Influence on Ice Flow at the Onset of the Northeast Greenland Ice Stream

Steven Franke[1], Daniela Jansen[1], Sebastian Beyer[1,2], Niklas Neckel[1], Tobias Binder, John Paden[3], and Olaf Eisen[1,4]



https://doi.org/10.1029/2020JF005689

Folded isochrones

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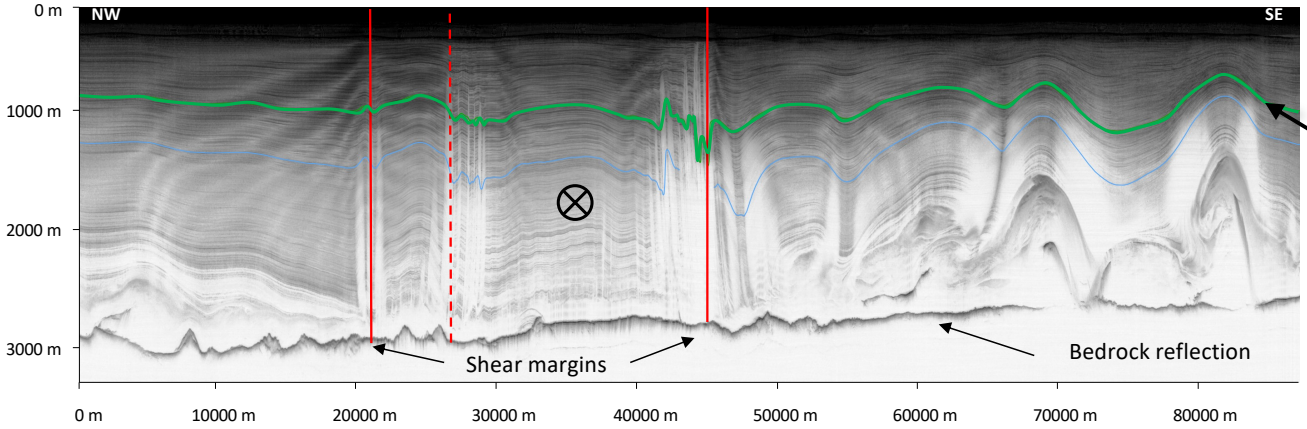
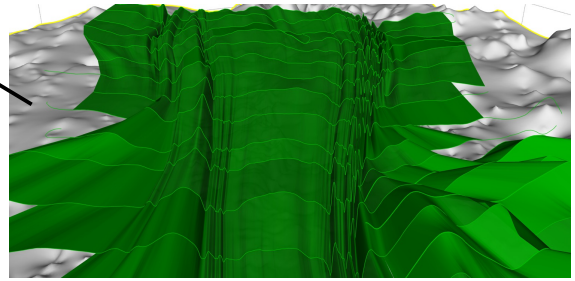
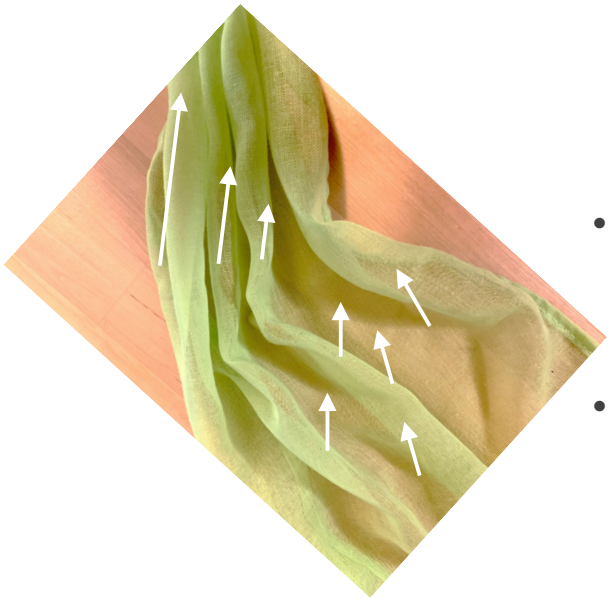
Sample Radar Profile



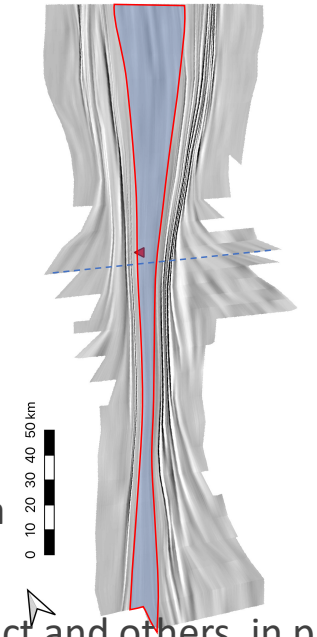
Picked continuous horizon
layer deposited ~ 7300 years BP



"Table cloth folds"



- Folds are formed outside of the stream due to convergent flow regime (Bons et al., 2016)
- Folds are sheared in the margins, leading to a new "apparent wavelength"
- Most fold hinges can be traced over entire survey area



- From this pattern it appears that the fold-free centre of the stream never passed any shear margin
- This area is highlighted in blue on the map

Jansen, coauthors of the abstract and others, in preparation

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Advection of fold hinges

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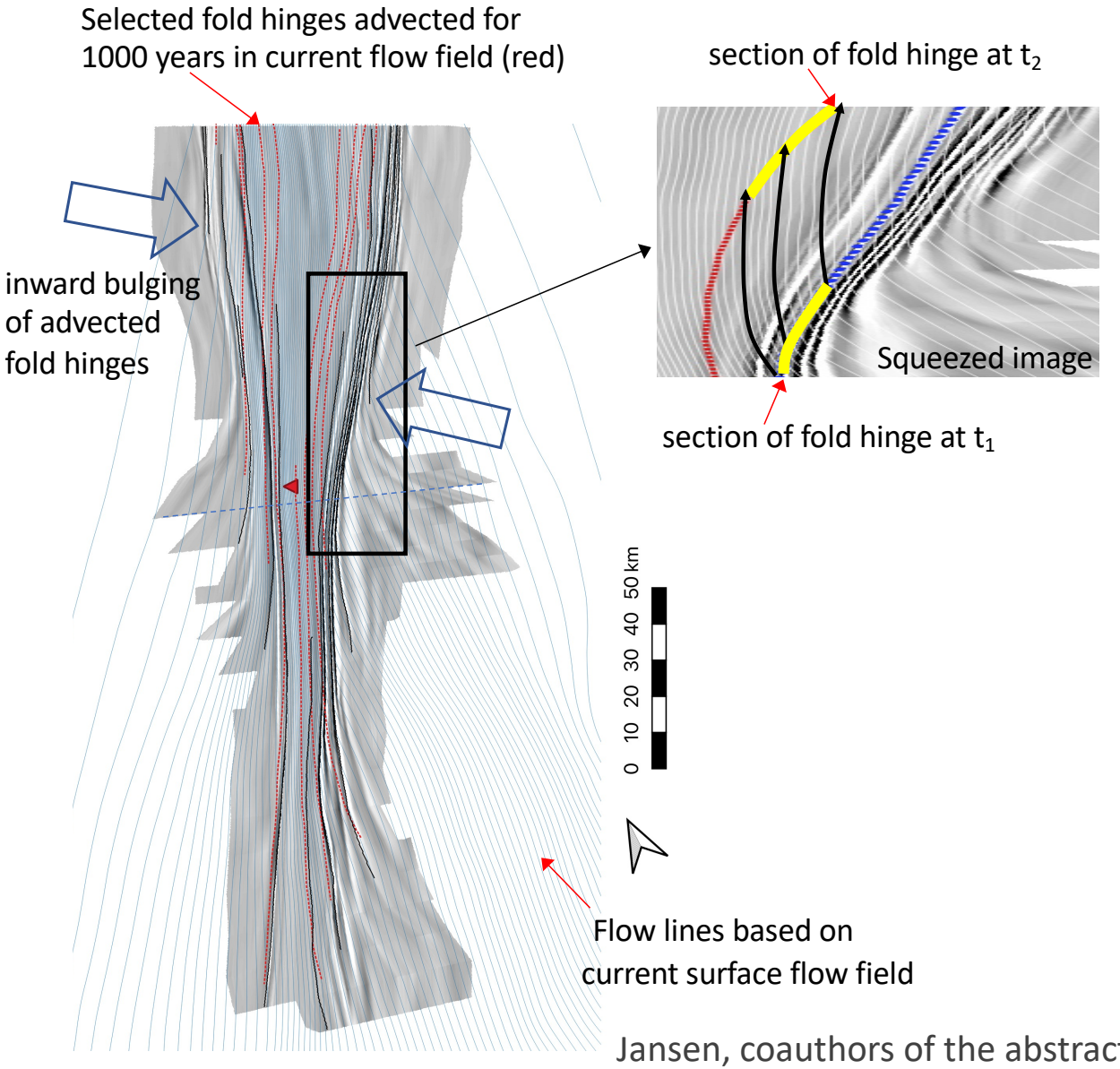

- Advection over 1000 years would lead to folded ice in the centre of the stream, which is not observed
- This indicates, that the flow pattern must have changed over the advection time period, as flow lines only can be seen as trajectories of ice volumes in a steady state system
- we propose that the location and shape of the shear margins has changed over time
- Details on this, and some surprising conclusions about the existence of NEGIS will be published soon!

Jansen, coauthors of the abstract and others, in preparation

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