Ice fabrics in natural flows: moving away from pure and simple shear

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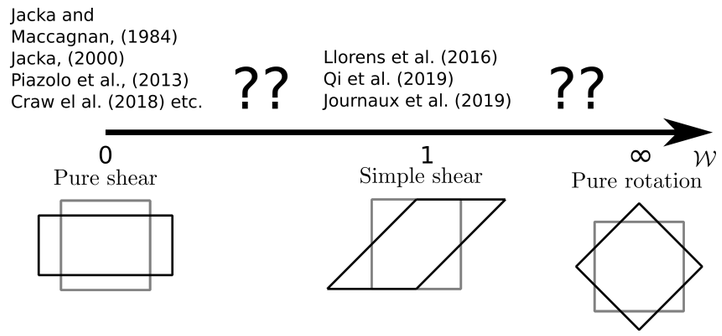
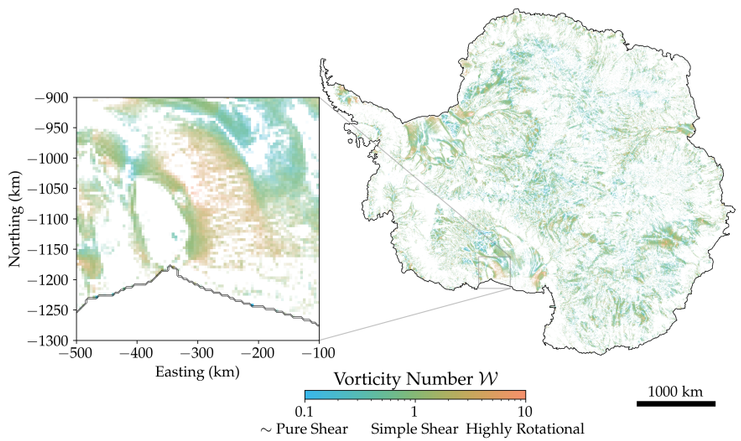
1. Motivation

$$\text{Vorticity Number } \mathcal{W} = \frac{\text{Vorticity Magnitude}}{\text{Strain-rate Magnitude}}$$

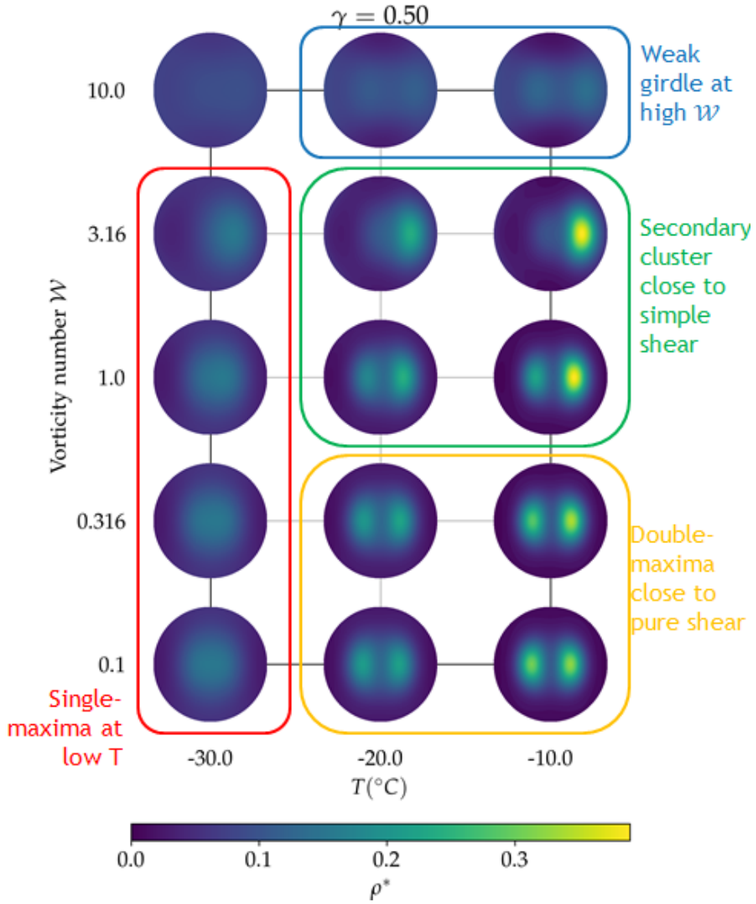




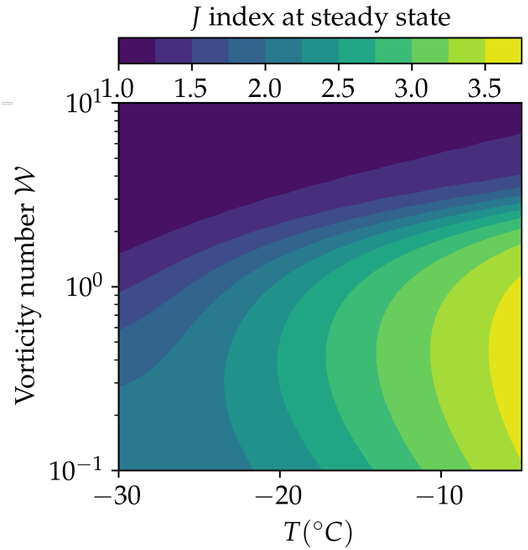
- Deformations away from pure and simple shear are common in the natural world

2. Pole Figures & Regime Diagram

- We use SpecCAF (Richards et al., 2021) to explore ice fabrics for general deformations and temperatures



3. Fabric Strength



4. Key Results & Outlook

- We explore ice fabrics for general 2D deformations
- We define a regime diagram of fabric patterns for each strain
- This regime diagram can be used to understand the deformation and temperature history of ice cores.

References

Jacka et al. 1984, Cold Regions Science and Technology, 8, 269. Jacka, T. H. 2000, Physics of Ice Core Record. Piazolo et al. 2013, Geochemistry, Geophysics, Geosystems, 14, 4185. Craw et al. 2018, Journal of Structural Geology, 115, 152. Llorens et al. 2016, Earth and Planetary Science Letters, 450, 233. Qi et al. 2019, The Cryosphere, 13, 351. Journaux et al. 2019, The Cryosphere, 13, 1495. Richards et al. 2021, Earth and Planetary Science Letters, 556, 116718.