Development of deformational regimes and microstructures in the deep sections and overall layered structures of the Dome Fuji ice core, Antarctica

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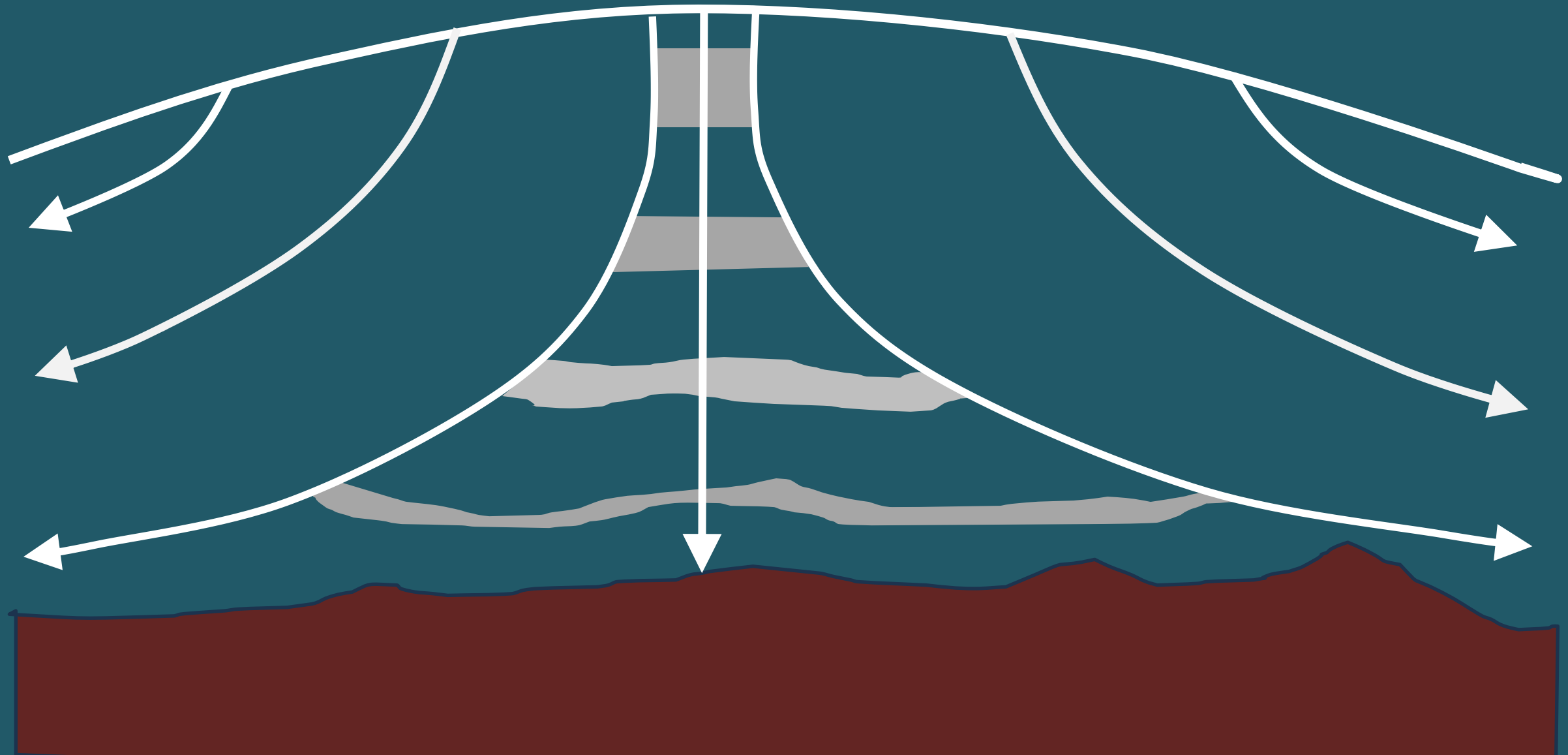
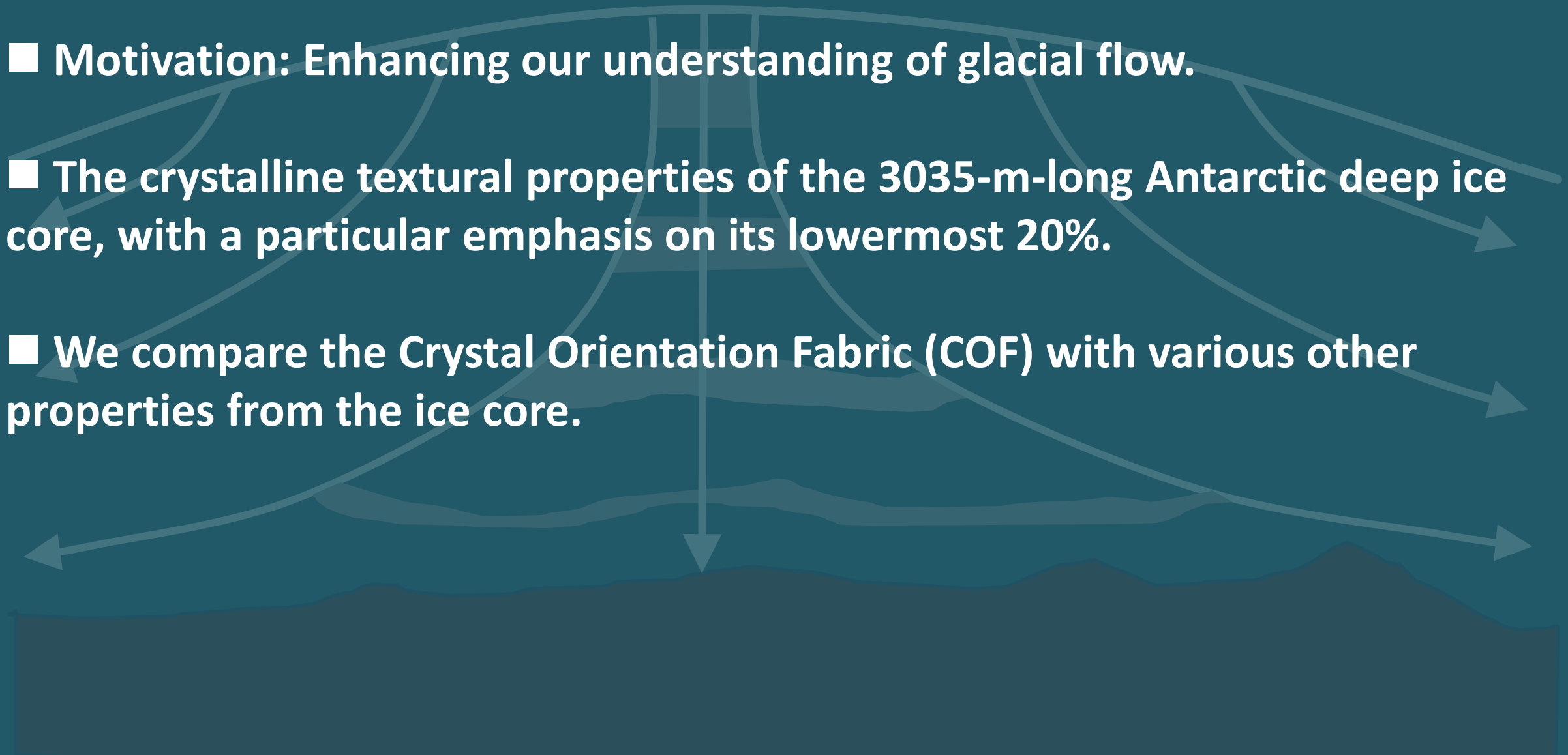
Layered deformation of ice at dome sites



Layered deformation of ice at dome sites

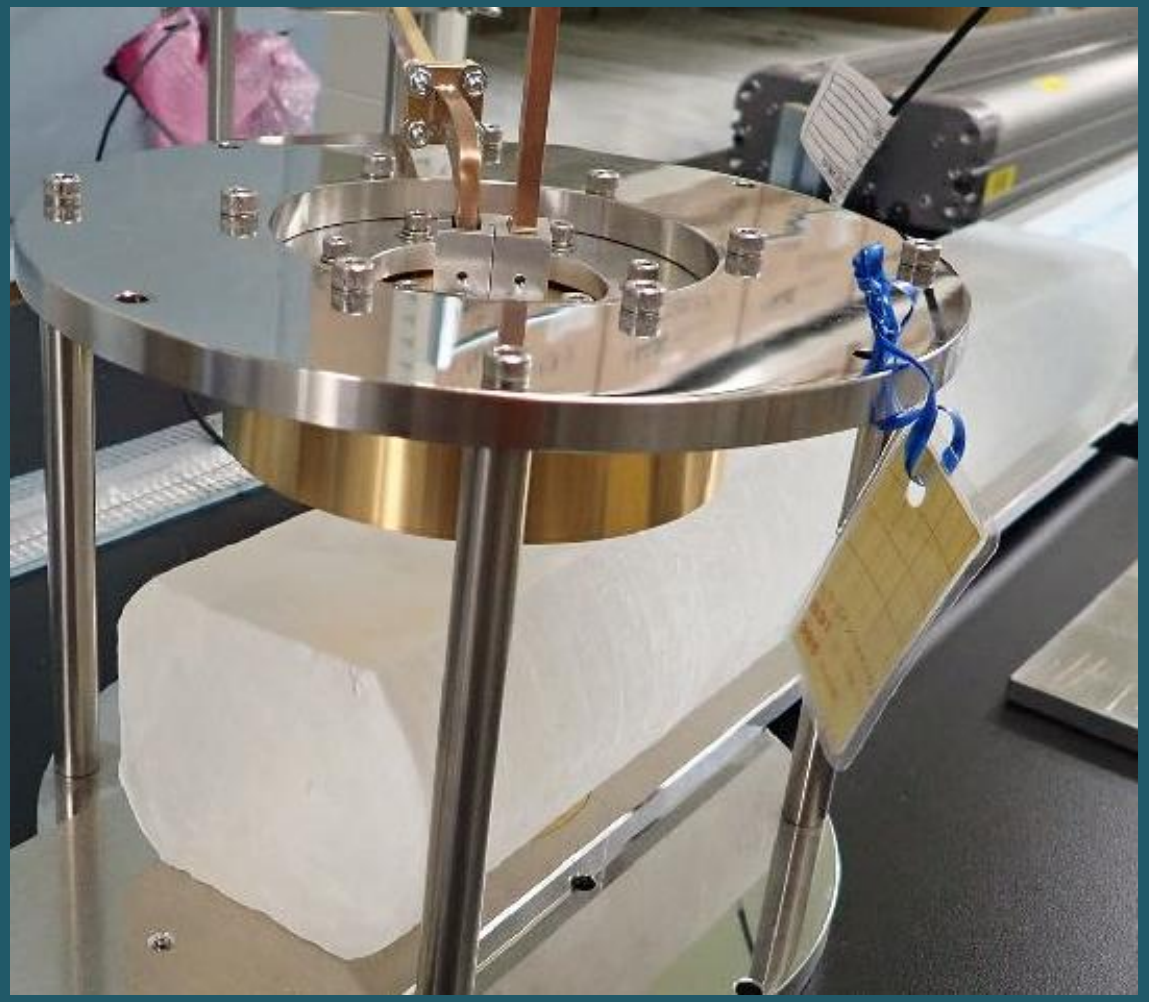
- Motivation: Enhancing our understanding of glacial flow.
- The crystalline textural properties of the 3035-m-long Antarctic deep ice core, with a particular emphasis on its lowermost 20%.
- We compare the Crystal Orientation Fabric (COF) with various other properties from the ice core.



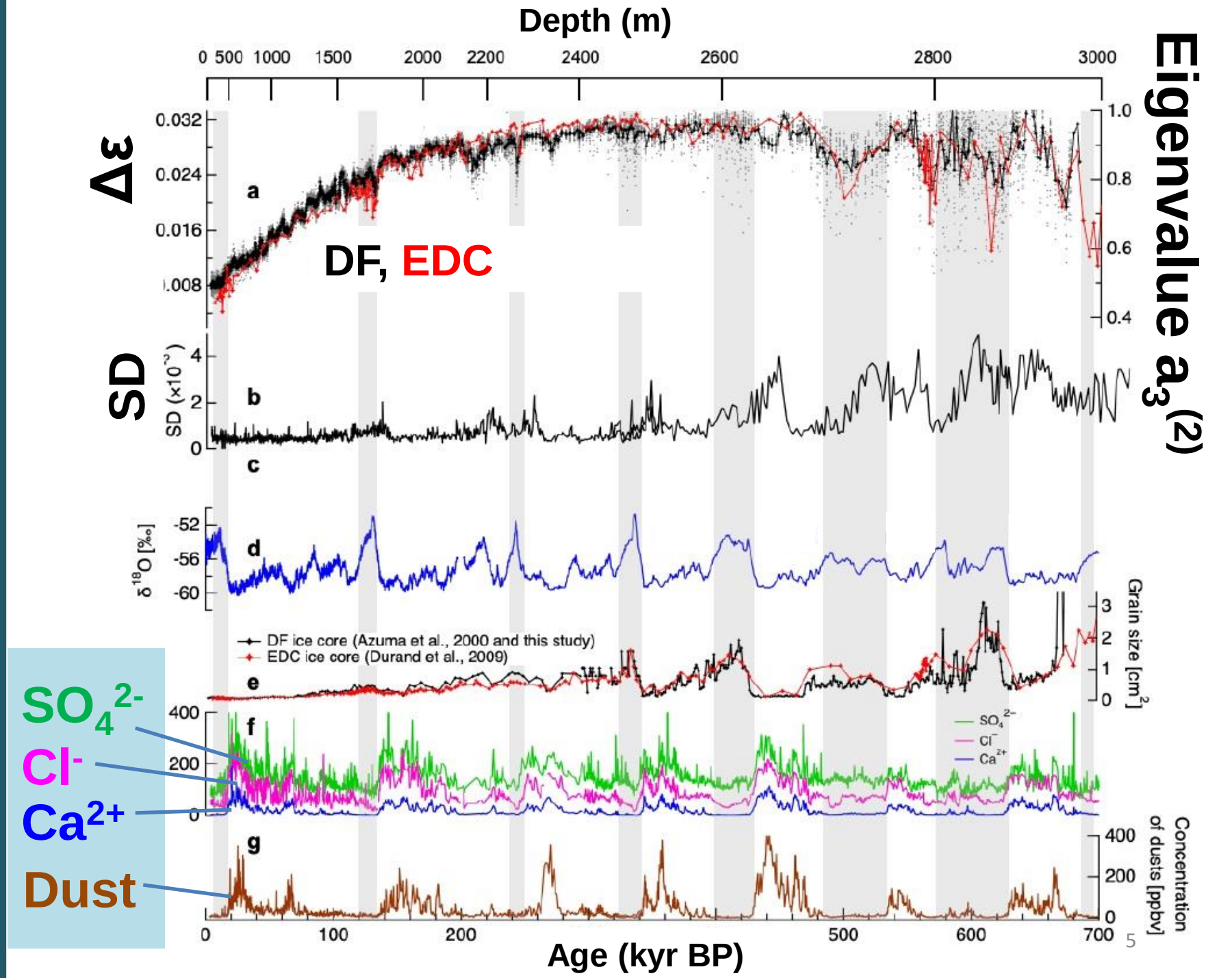
Dielectric Tensor Method: DTM

Open resonator system to measure tensorial permittivity of thick specimens.

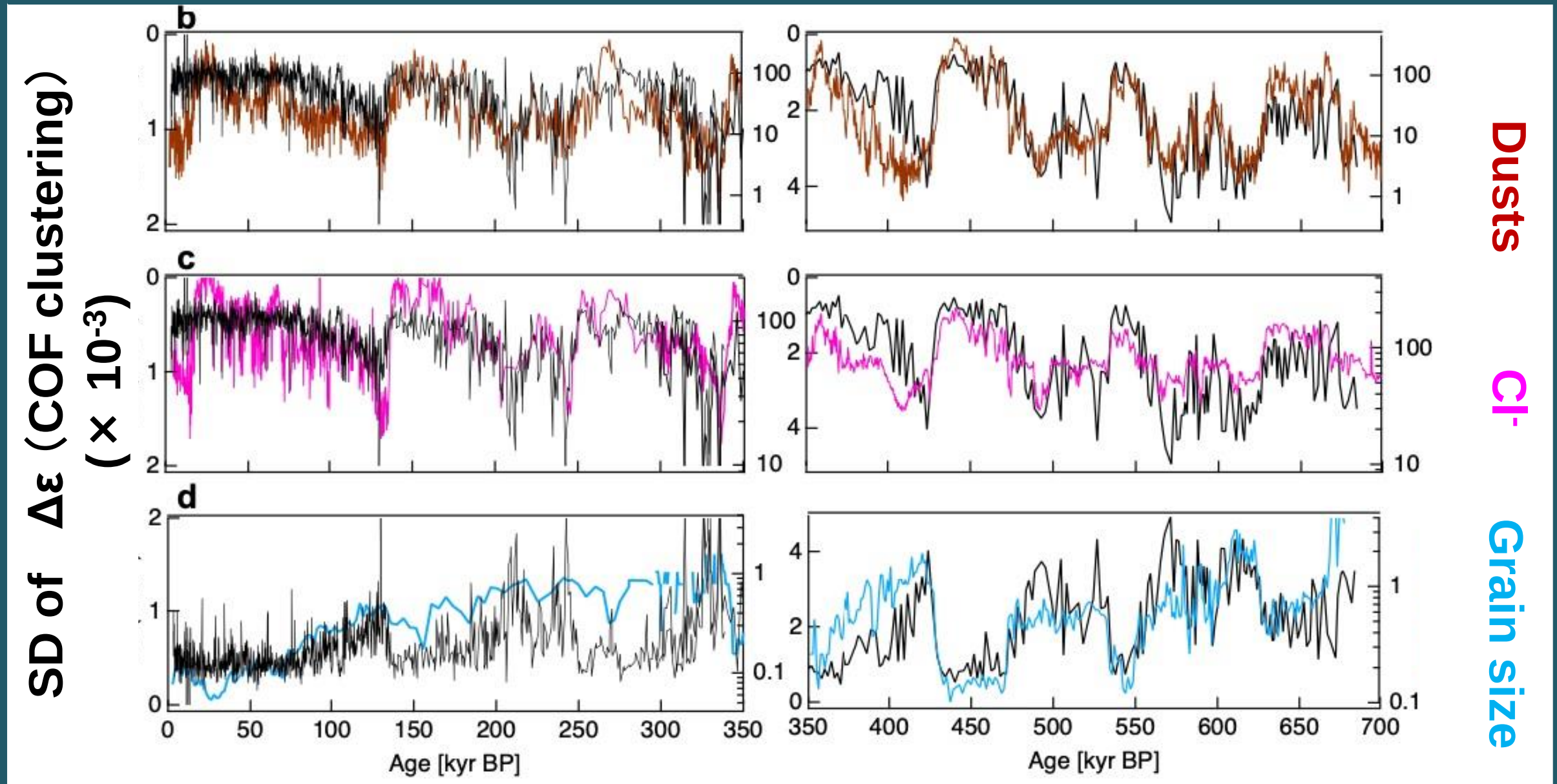
Frequency:
26.5 GHz- 40 GHz
Beam radius:
16 – 38 mm
Sample thickness up to 80mm



Development of COF clustering versus age



SD of COF clustering is correlated to dust, chemistry, and grain size.

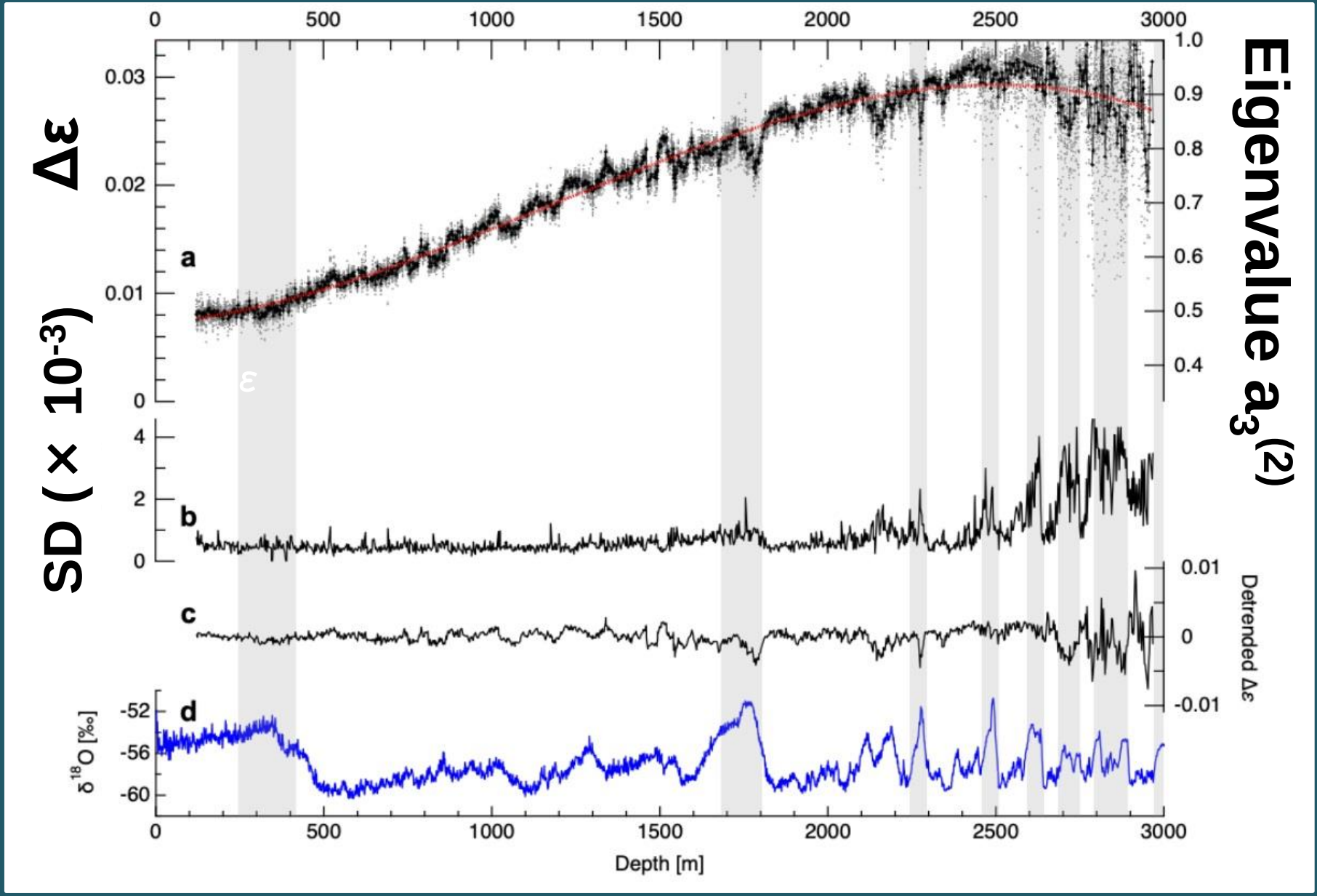


Key takeaways

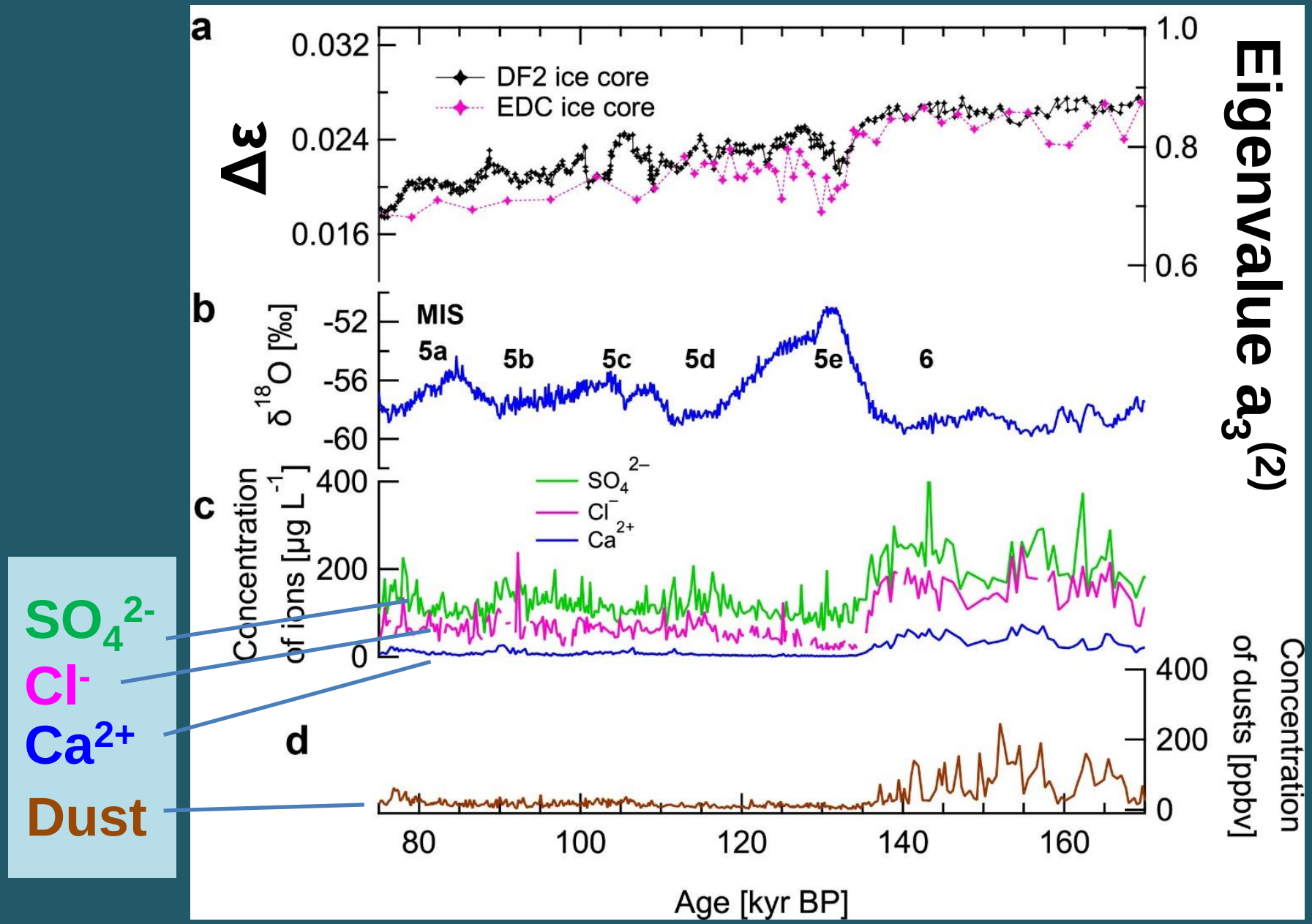
- Continuous and high-resolution measurement of COF with DTM
- COF developments are explained by concentration of ions dissolvable into ice lattice such as Cl^-, and dusts which impede grain boundary migration.
- Weaker clustering of COF at interglacials are due to less concentration of Cl^- in the upper 80% thickness. In the lowermost 20% thickness, recrystallization weaken COF clustering in less impure ice.
- COF layering is basically common in very wide area within each polar ice sheet.

In review at Egusphere-2023-3146.

Development of COF clustering versus depth



“Softening/hardening effects” or “shear” at MIS5 ice?



SO_4^{2-}

Cl^-

Ca^{2+}

Dust