



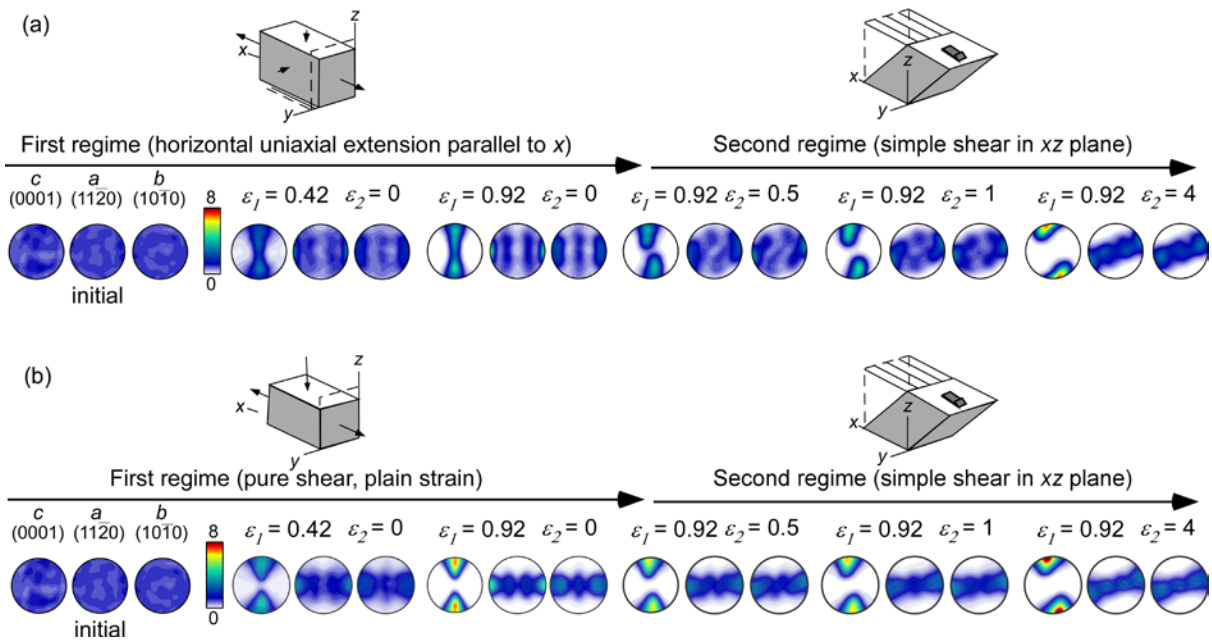
*Supplement of*

## **Can changes in deformation regimes be inferred from crystallographic preferred orientations in polar ice?**

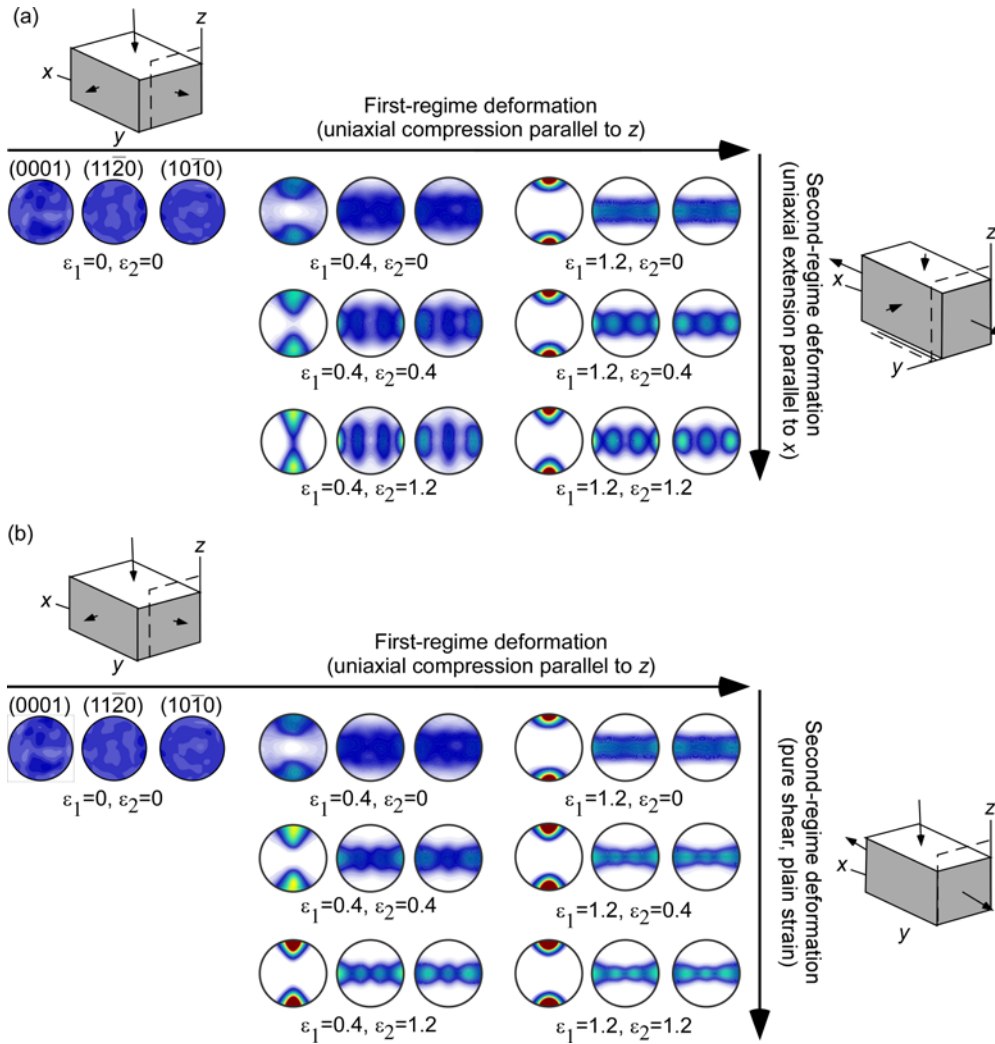
**Maria-Gema Llorens et al.**

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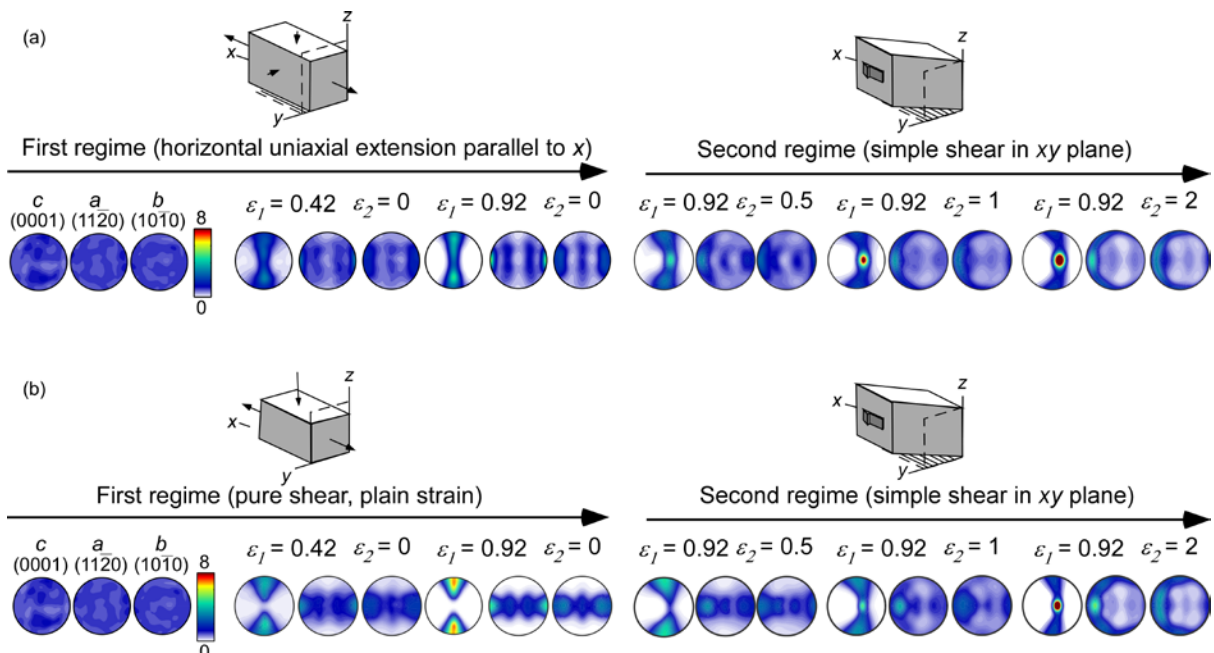
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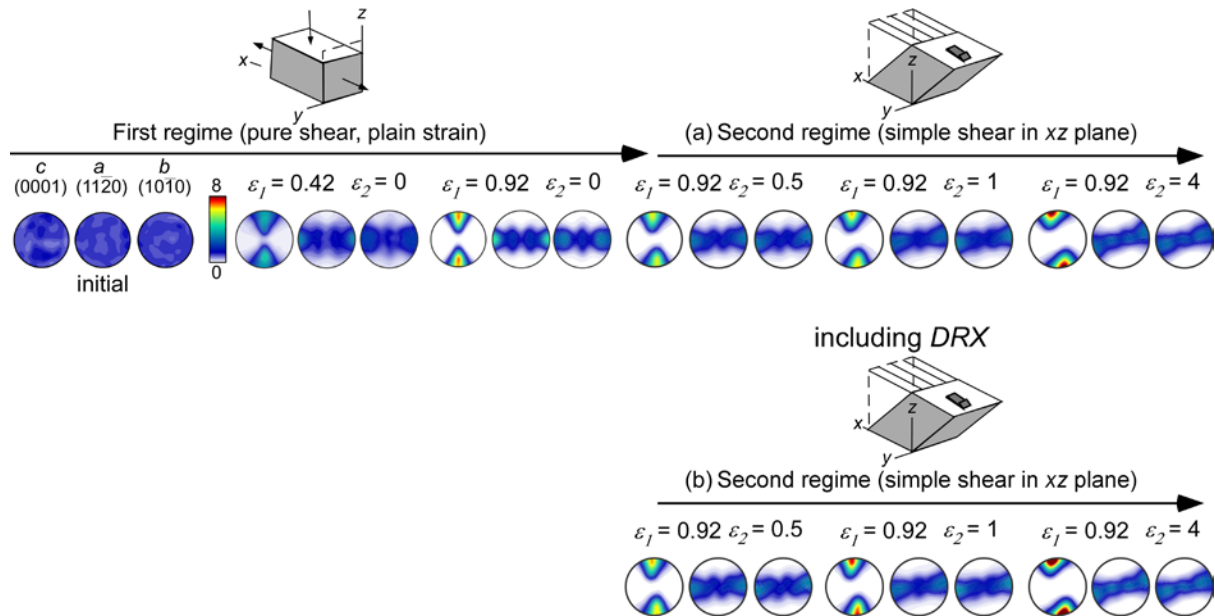
**Supplementary figure S1.** Comparison between series B deformed by (a) horizontal uniaxial extension ( $V_3$  in table 1) or (b) pure shear, plane strain ( $V'_3$  in table 1) during the first regime. No significant difference in CPO is observed between scenarios  $V_3$  and  $V'_3$ .



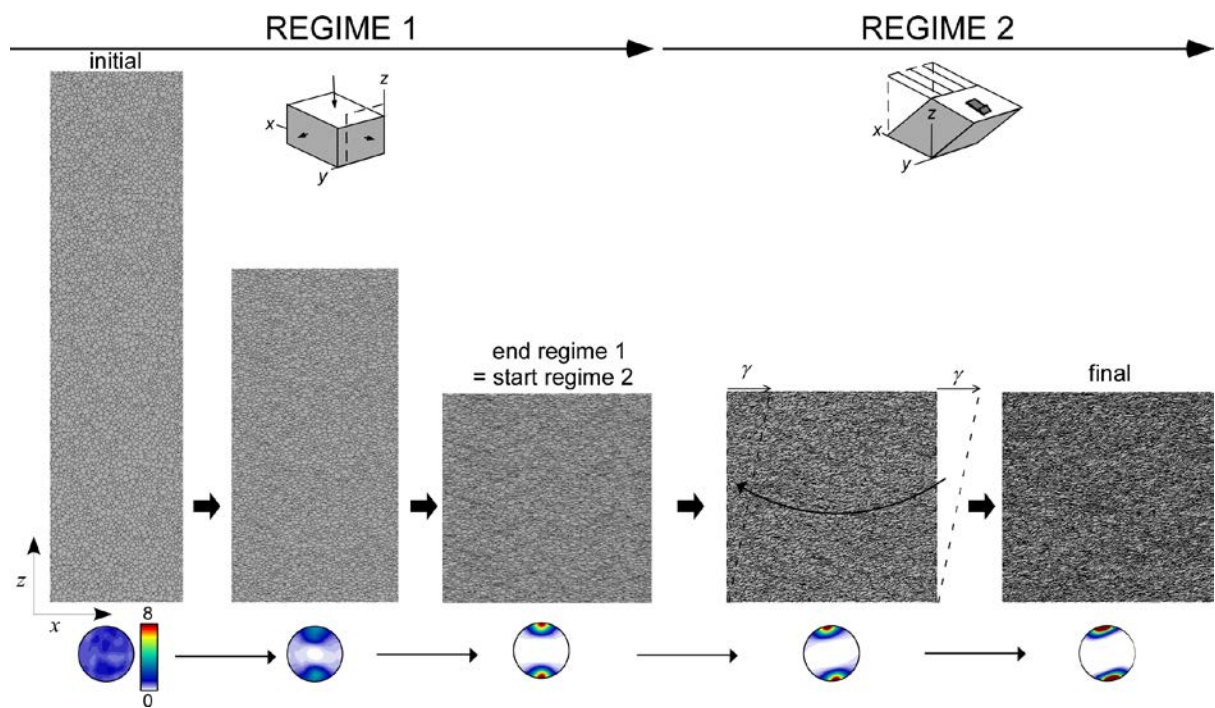
**Supplementary figure S2.** Comparison between series C deformed by (a) horizontal uniaxial extension ( $V_3$  in table 1) or (b) pure shear, plane strain ( $V'_3$  in table 1) during the first regime. No significant difference in CPO is observed between scenarios  $V_3$  and  $V'_3$ .



**Supplementary figure S3.** Comparison between series D deformed by (a) horizontal uniaxial extension ( $V_3$  in table 1) or (b) pure shear, plane strain ( $V'_3$  in table 1) during the first regime. No significant difference in CPO is observed between scenarios  $V_3$  and  $V'_3$ .



**Supplementary figure S4.** Influence of dynamic recrystallisation in series D. In this series the microstructure evolution during deformation and recrystallisation (grain boundary migration, recovery and polygonisation) is explicitly simulated. In (a) CPO evolution during second deformation regime. And (b) CPO evolution when *DRX* modules are included during the second deformation regime, showing that *DRX* only has a minor effect on the CPO development. See Llorens et al., 2017 for a detailed description of the *DRX* modules.



**Supplementary figure S5.** Example of workflow followed in series A. The microstructure is affected by two deformation regimes that are applied in succession. The final microstructure at the end of the first regime is used as initial microstructure in the second regime. Wrapping boundaries allow repositioning the sheared model back into a square unit box.