COMPUTING LPO FOR GEODYNAMIC MODELS IN ASPECT

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## COMPUTING LPO IN MODELS SHOULD BECOME NORMAL

- We want to link models to observations

- Seismic anisotropy is one of the most direct ways to observe mantle flow

- To make this link we need to compute LPO (Lattice Prefered Orientation) in our models

- It should be just an extra value we output so we don't need to rerun our expensive models

- Therefore we implemented D-Rex (a code which computes LPO) into ASPECT (a open source geodynamics code)

  These are preliminary results!

IMPLEMENTATION

- The LPO will be a plugin for ASPECT which computes it on particles

- The plugin structure makes it very modular, you can easily add it to your model

- It can be linked back to the rheology (see Agnes Kiraly presentation in this session)

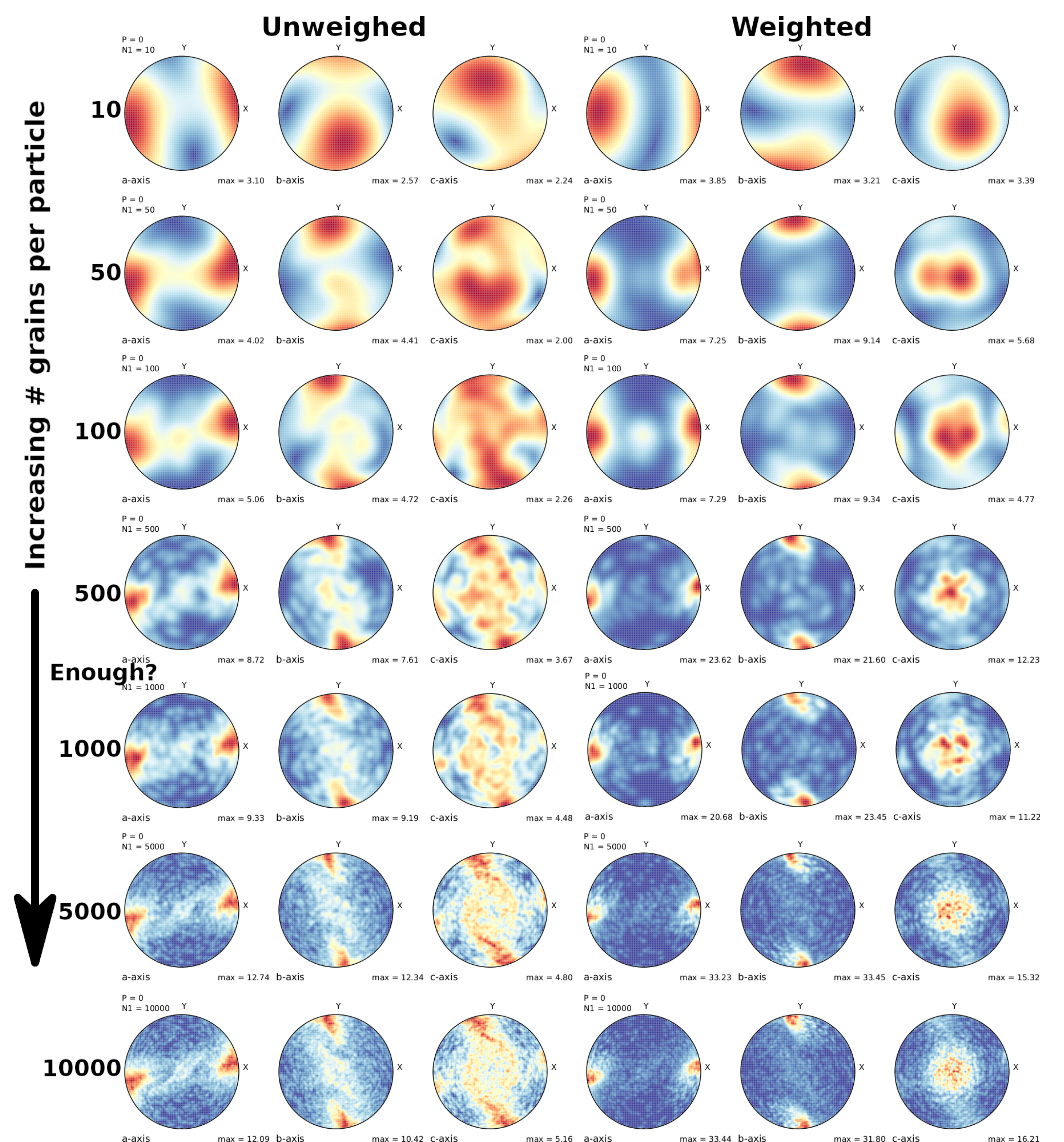- Can output raw LPO data and processed LPO data

SHOWING THAT IT WORKS
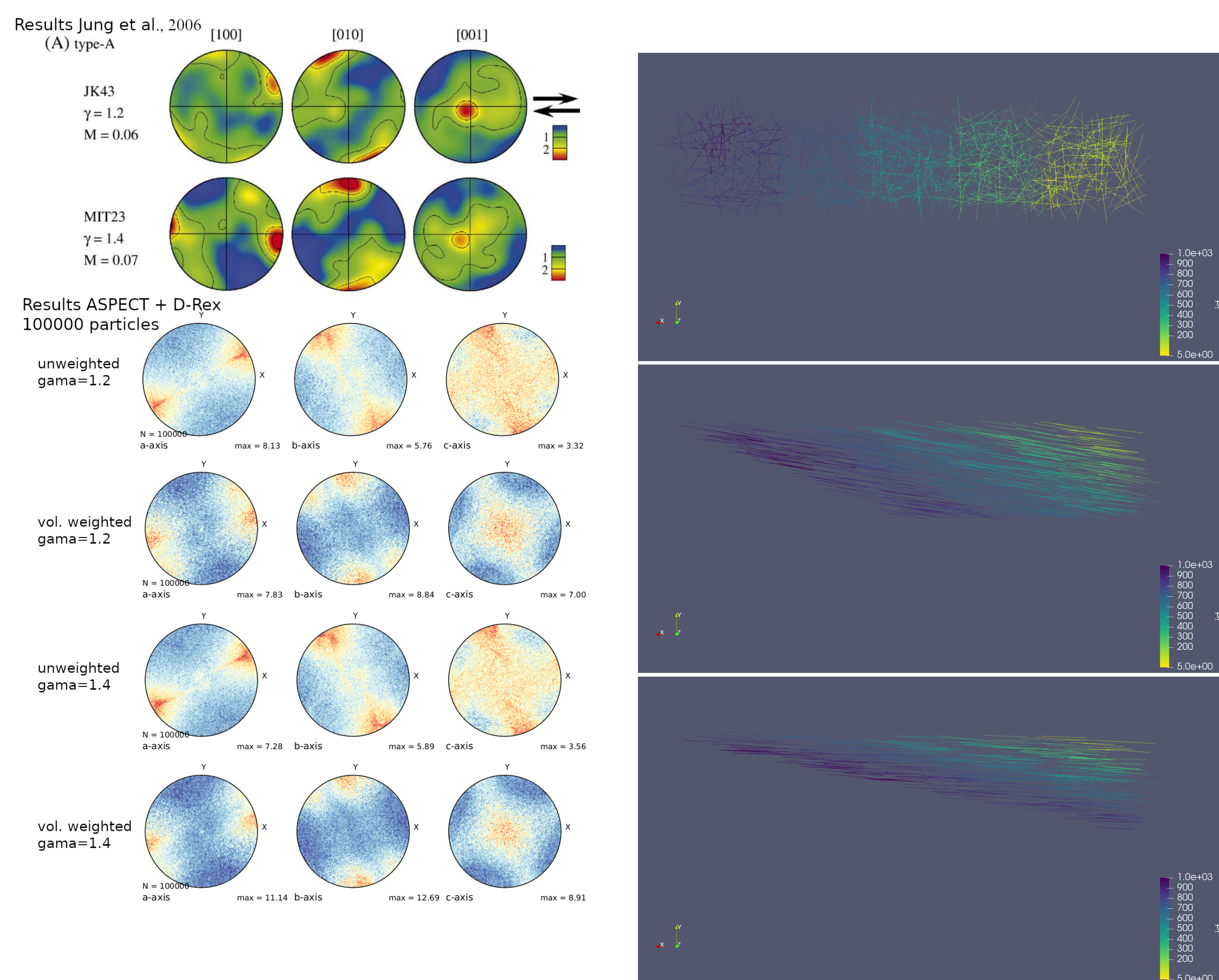
Showing a comparison against real LPO Data. The output of the code has also been directly tested against output of D-Rex.

This shows the development of the fast axes of olivine in a simple shear experiment
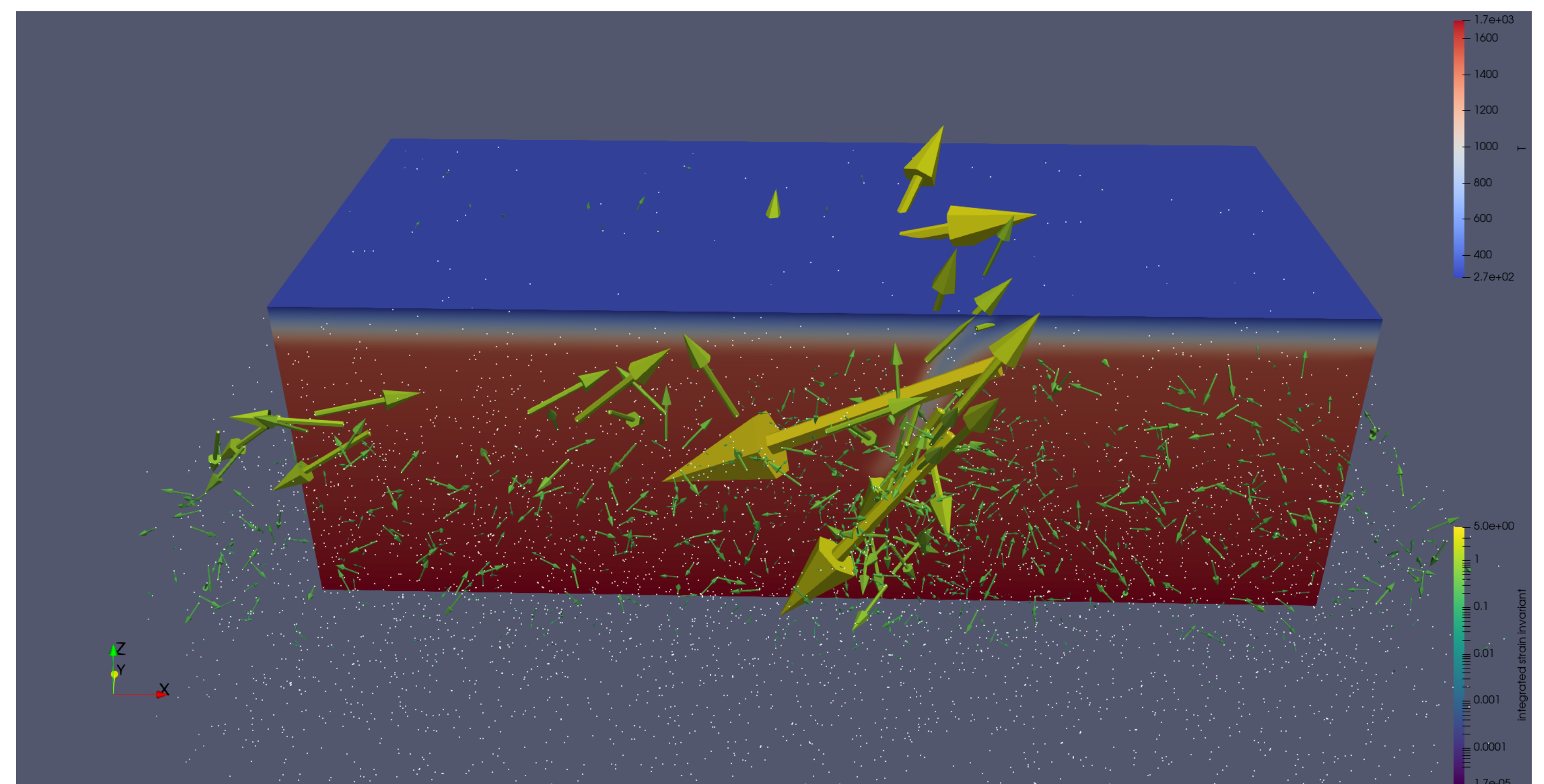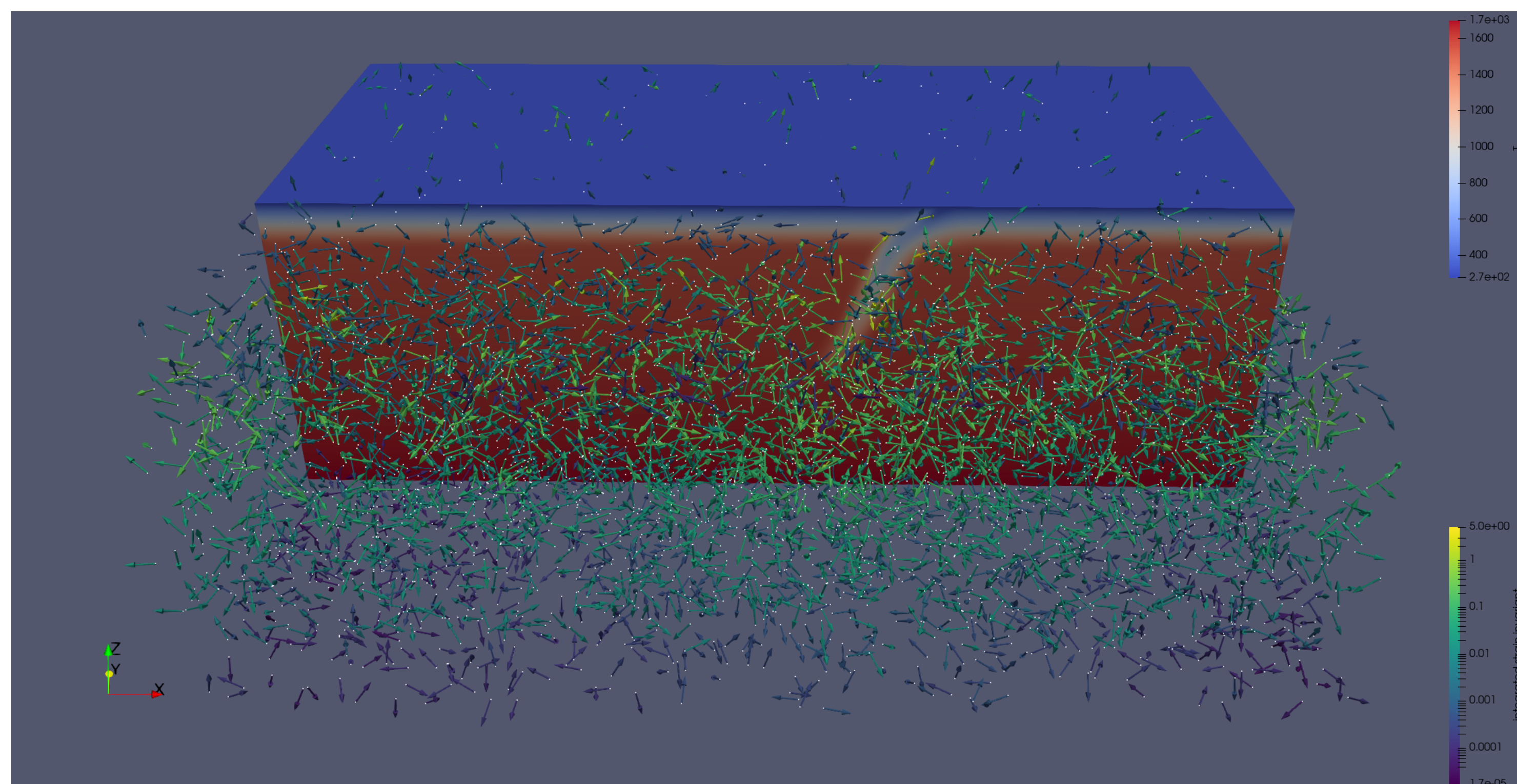
FINDING GOOD PARAMETERS

Using between 500 and 1000 grains per particle gives a good match to expected pole figures without extra cost of using more grains

USING IT!

Open Source so you can already give it a try: https://github.com/MFraters/aspect/tree/add_LPO_visualization
And it will hopefully be part of the next ASPECT release

The figures above show a subduction model where the arrows show the LPO. The larger the arrow, the stronger the alignment. The left figure is the beginning of the model, the right figure after several million years of evolution.