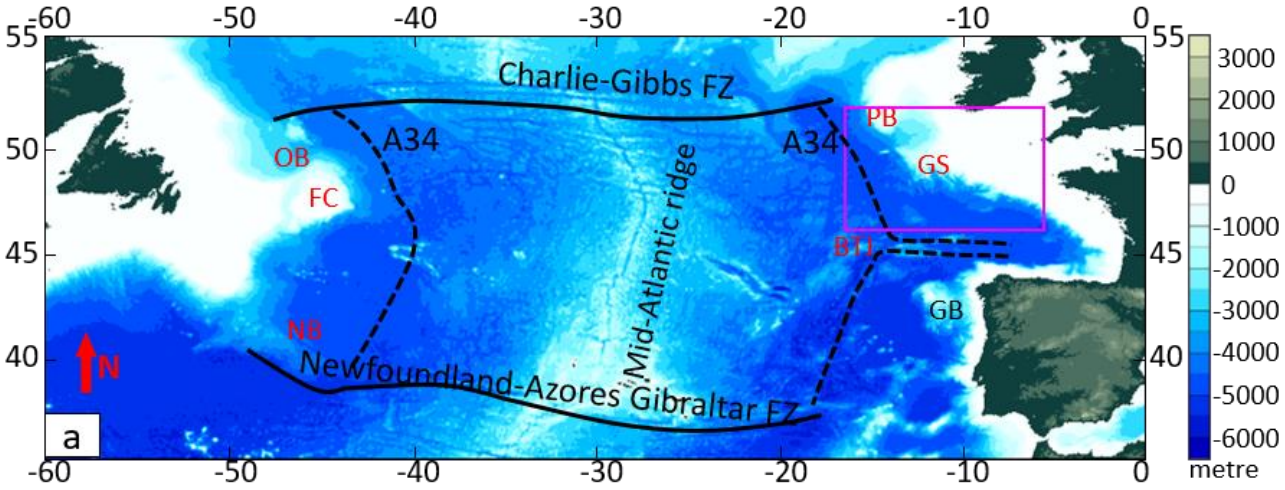
Revealing tectonic evolution across the Northeastern Flemish Cap-Goban Spur margin

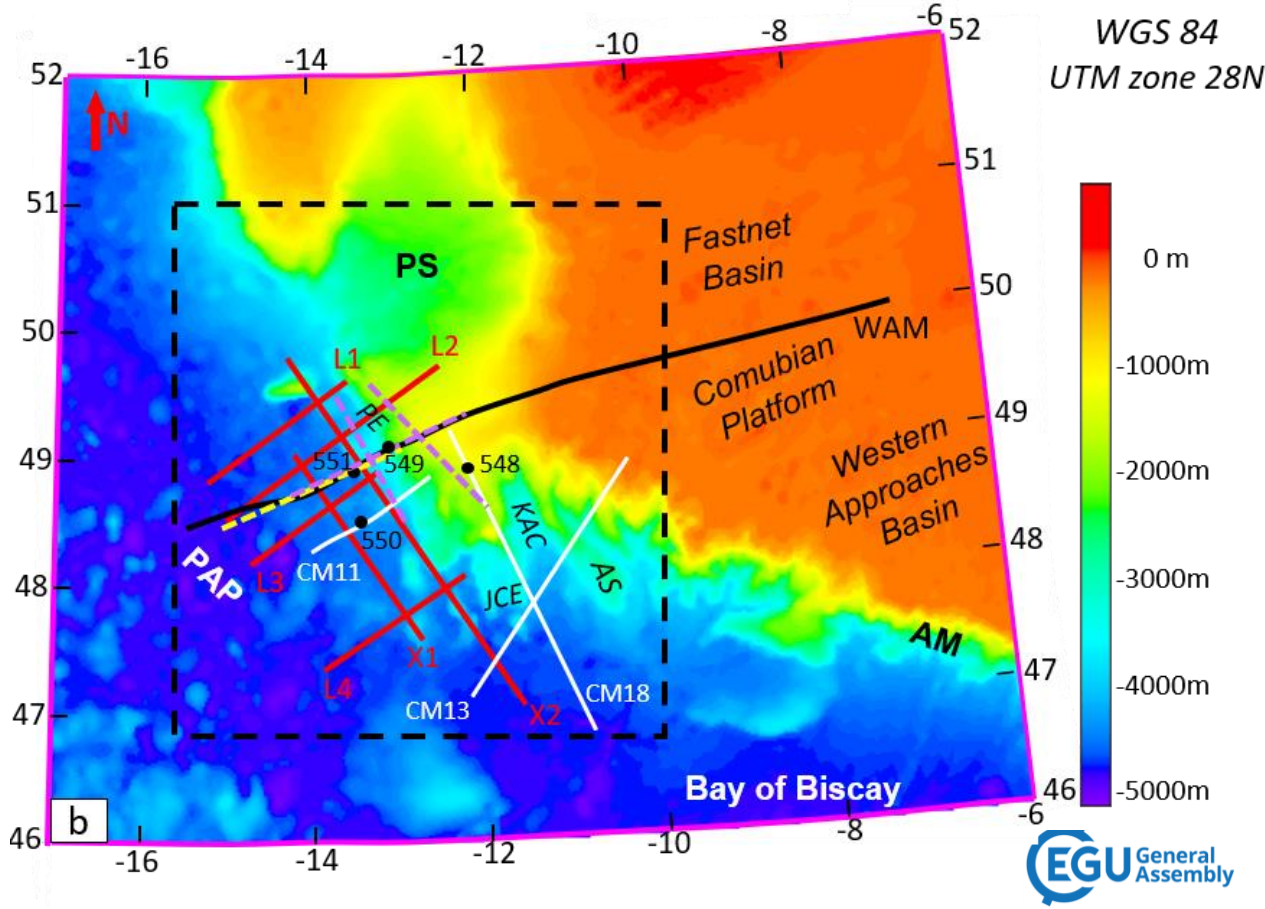
Pei Yang & J. Kim Welford

May 8, 2020

❖ Background & Scientific Issues

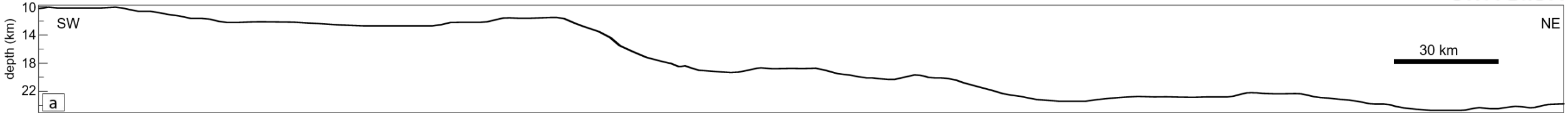


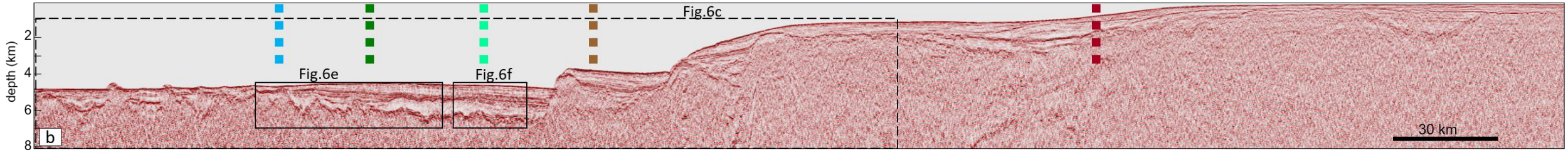
- **Late Tri.- Early Jur.: EOB; Flemish Cap unaffected**
- **Late Jur. to Early Cret.: WOB; separation of SE FC & GB;**
- **Late Cret. : separation of NE FC & GS**

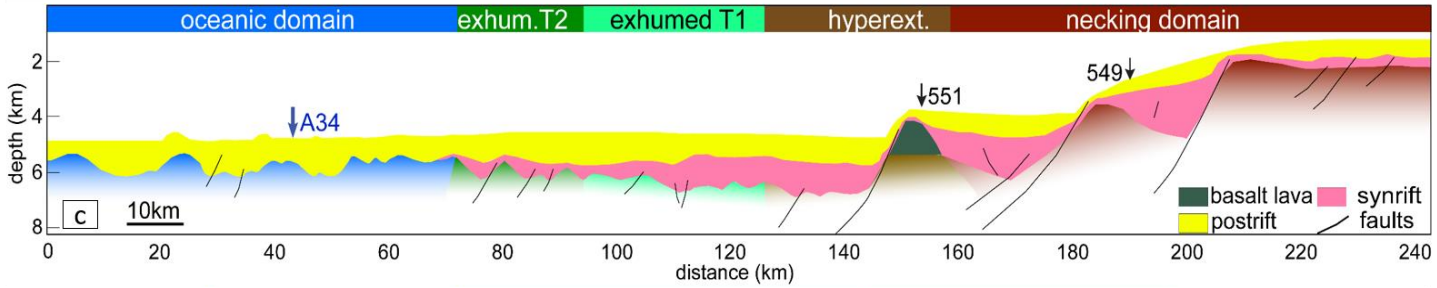


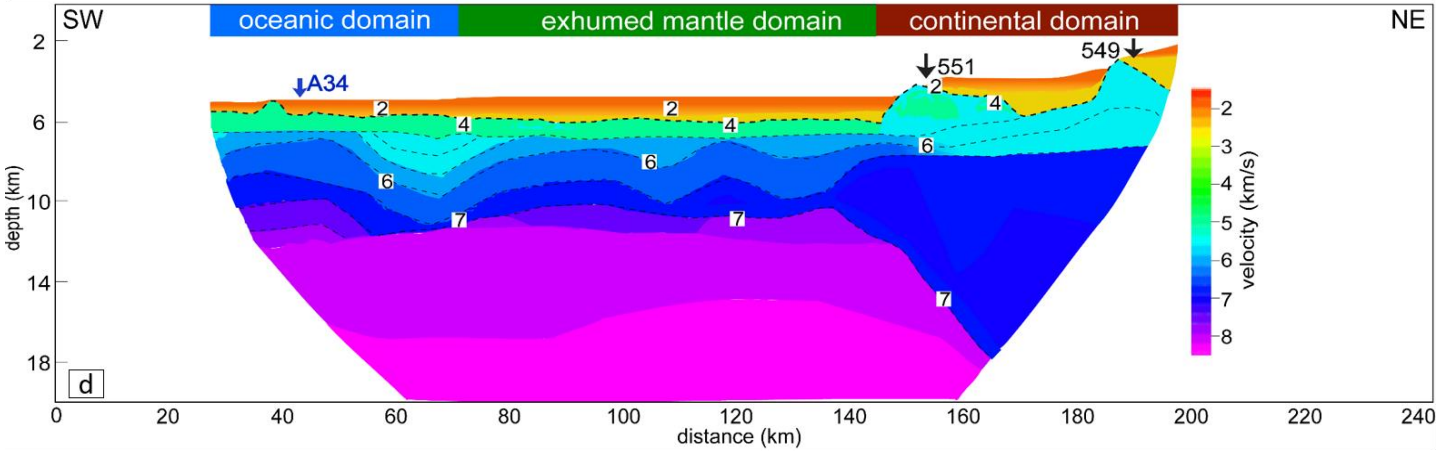
- **Poorly-defined crustal architecture at the Goban Spur**
- **Poor knowledge of COT at the Goban Spur**
- **GS and FC are conjugate ?**
- **Lacking seismic evidence for plate models**

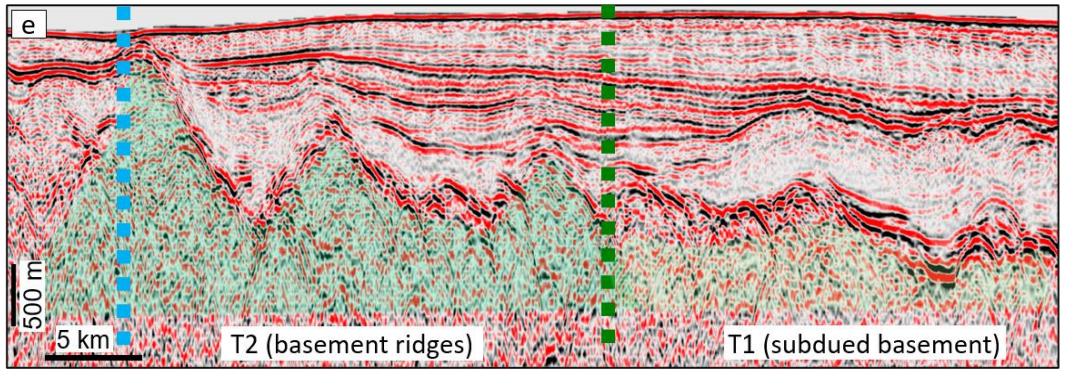
❖ Methodology

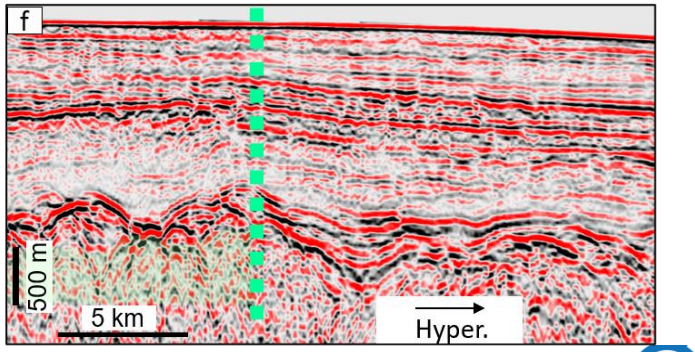




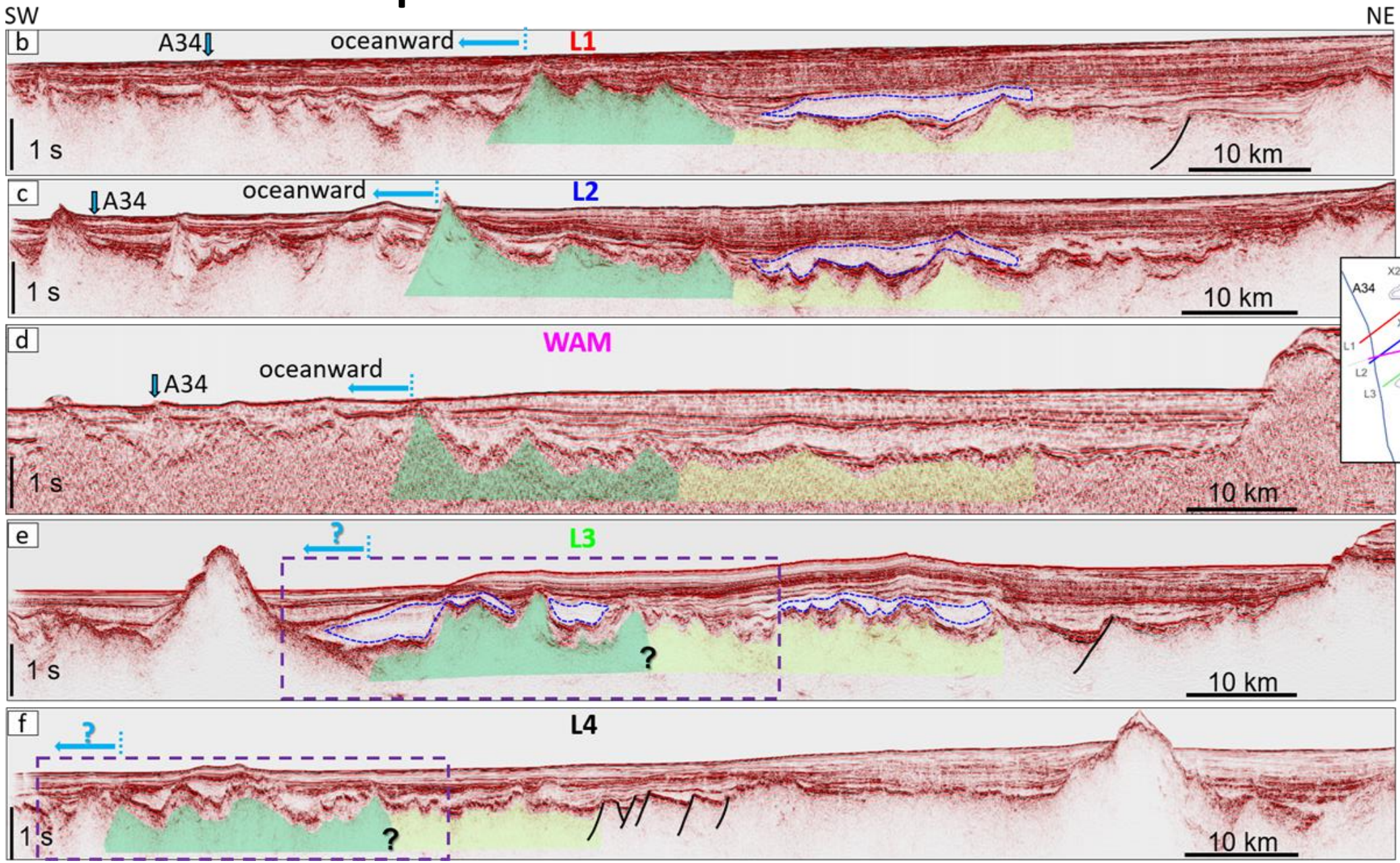


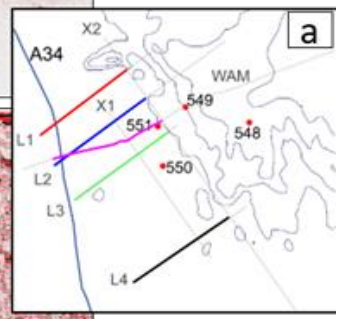






❖ Seismic Interpretation



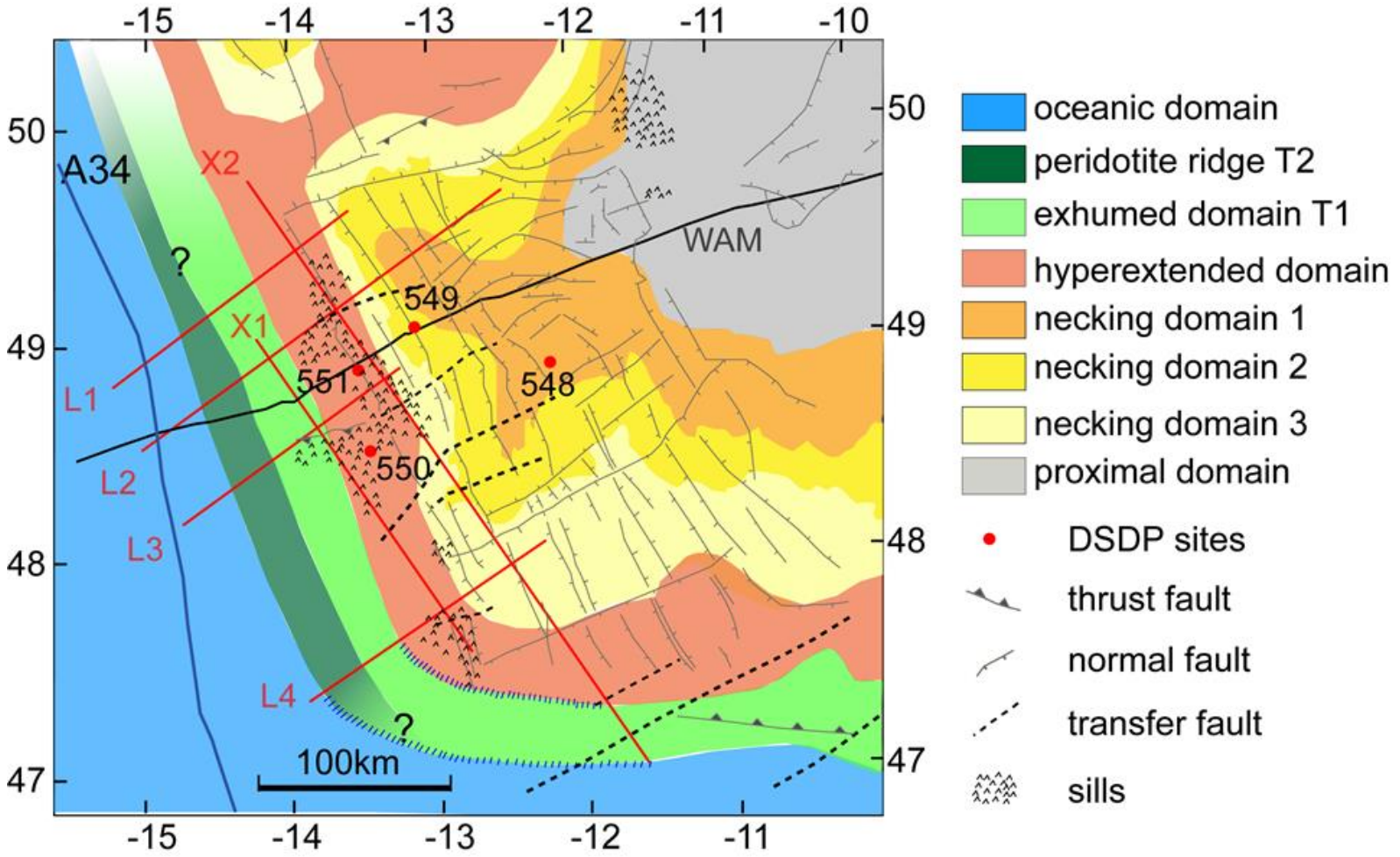


Basement features change to the south

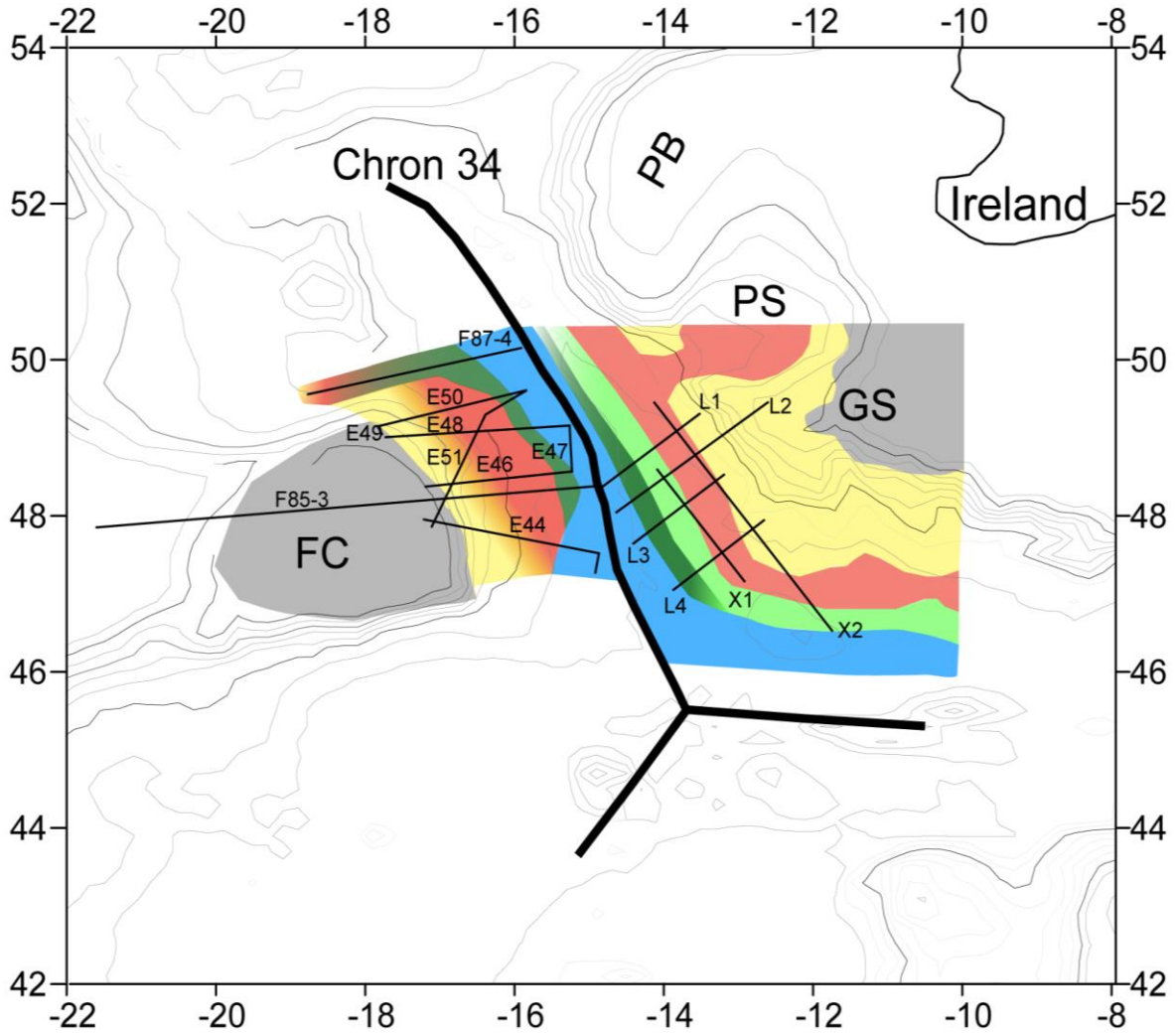
Peridotite ridge disappears towards the southern margin

❖ Crustal architecture map across the Goban Spur

- **Along- and across- strike variation in crustal domain**
- **Differential extension**
- **Non-uniform exhumation stage**



❖ Plate reconstruction back to 83 Ma



oceanic domain
T2: exhumed mantle (shallow ridges)
T1: exhumed mantle (deeper basement)
hyperextended domain
stretched crust
necking domain
proximal domain
chron 34

- **Asymmetric features**
- **"Conjugate" relationship**
- **Rotation of FC**
- **Oblique rifting**

Yang, P., Welford, J.K., Peace, A.L. and Hobbs, R., 2020. Investigating the Goban Spur rifted continental margin, offshore Ireland, through integration of new seismic reflection and potential field data. Tectonophysics, 777, p.228364.

❖ Summaries & Future work

- Five distinct crustal domains related to different rifting stages are identified and their regional extents are evaluated.
- In the northwest, the exhumed domain consists of shallower peridotite ridges (transitional subdomain T2) and deeper exhumed serpentinized mantle (transitional subdomain T1). The different styles of mantle exhumation are inferred to reflect different exhumation rates
- The asymmetries between the Goban Spur and Flemish Cap call into question the conjugate relationship between the two margins.
- Future work involving the seismic interpretation on the Porcupine Bank and the restoration of the margins using deformable plate reconstructions will help to resolve this debate

Thanks!

Questions?