

Figures

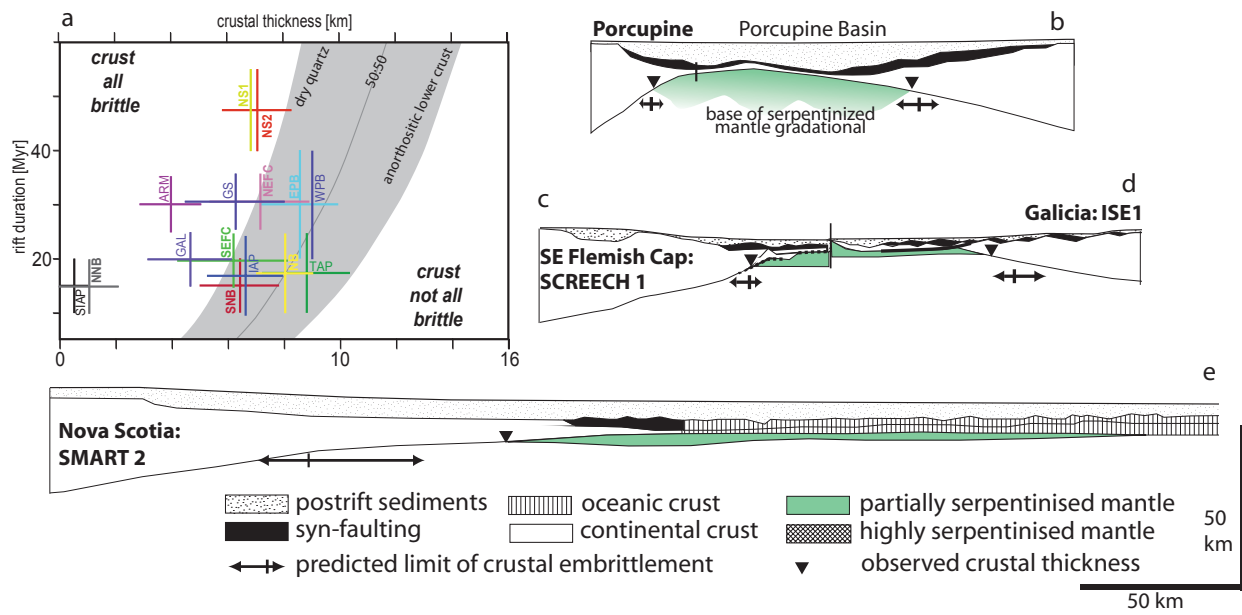


Figure 1: Comparison between the crustal thickness at which complete crustal embrittlement is predicted to occur³ and the maximum crustal thickness observed above or juxtaposed against serpentinised mantle at various a) Modelling results showing the crustal thickness at which the entire crust becomes brittle (grey region covering three different modelled rheologies). North Atlantic magma-poor margins⁸. NS: Nova Scotia, PB: Porcupine Basin, FC: Flemish Cap, IAP: Iberian Abyssal Plain, GS: Goban Spur, ARM: Armorican Margin, GAL: Galicia, NB: Newfoundland Basin, TAP: Tagus Abyssal Plain. The prefixes W, E, N, S are West, East, North and South respectively. Cross sections of b) Porcupine Basin⁹, c) Southeast Flemish Cap¹⁰, profile SCREECH-1, d) Galicia¹¹, profile ISE-1, and e) Nova Scotia¹², profile SMART-2.

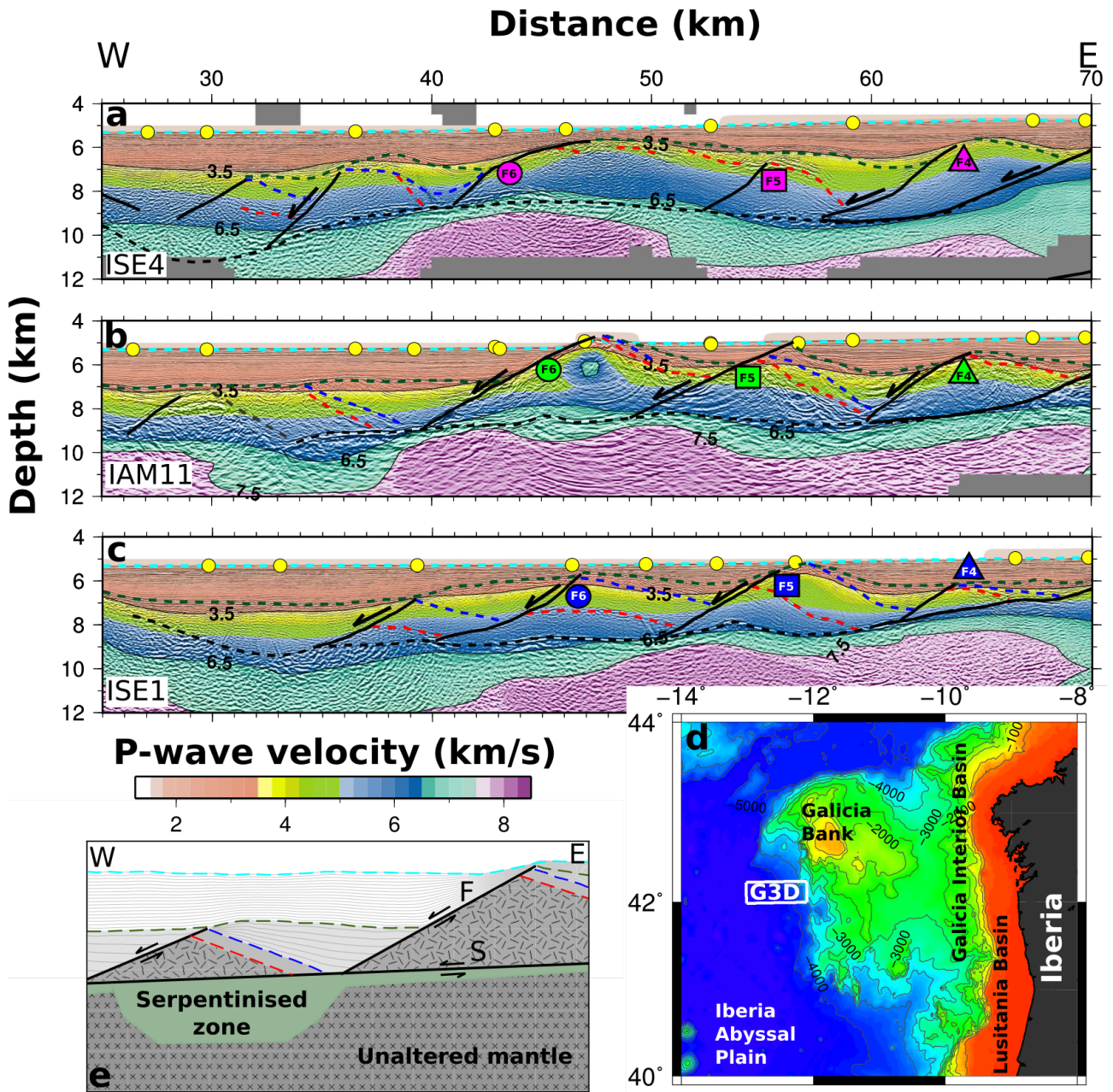


Figure 2: Compressional (P-) wave velocities superimposed on coincident seismic reflection profiles illustrate the concentration of serpentinisation beneath the hanging-wall of normal faults (expansion of 6.5 – 7.5 km/s iso-velocity interval). Yellow circles are seabed instrument locations. Iso-velocity contours are marked by thin black lines. Dashed lines mark the seabed (pale blue), interpreted base of post-rift sediments (green), top of the pre-rift sediments (blue), top of the crystalline basement (red), S reflector (black). Thick black lines indicate faults. **a)** ISE4 profile¹⁴; **b)** IAM 11 profile¹⁶; **c)** ISE1 profile¹⁷; **d)** location of the Galicia 3D survey with colour-coded bathymetry. **e)** Schematic illustrating serpentinization associated with a single normal fault "F".

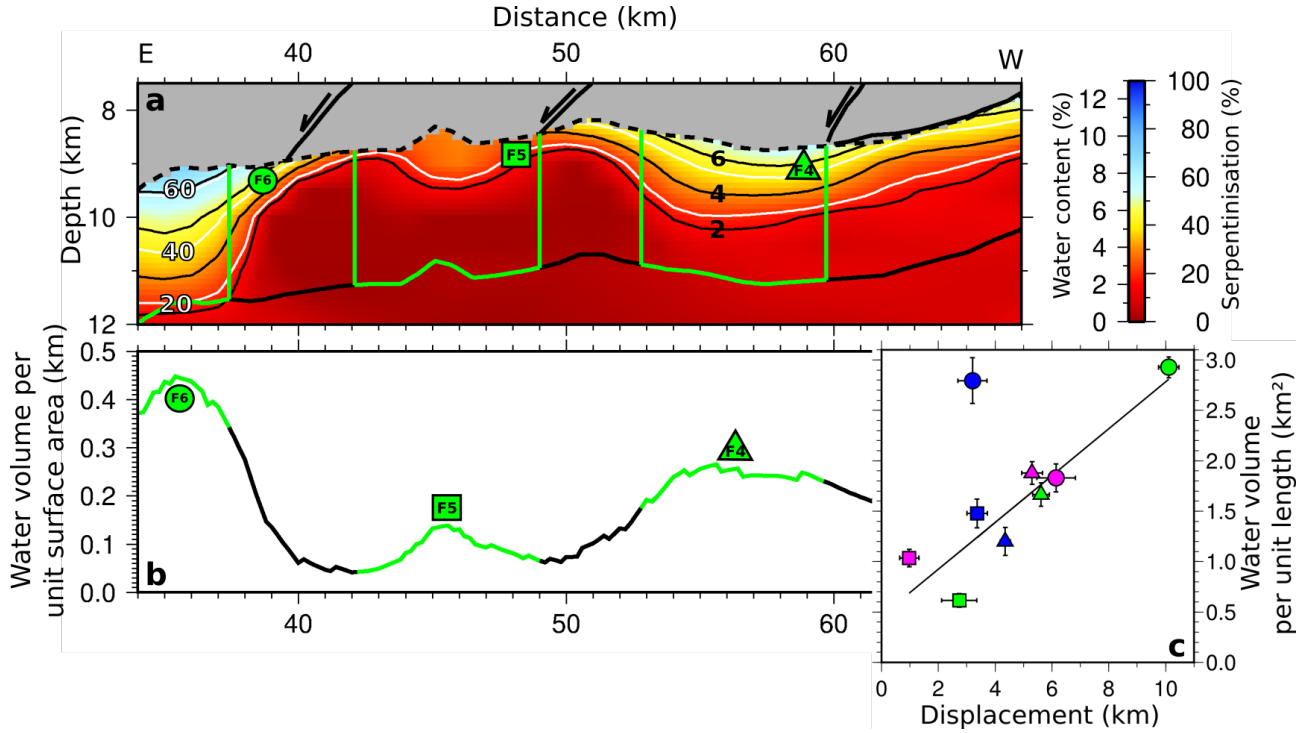


Figure 3: Water volume and amount of serpentinisation associated with faults on the seismic reflection profile shown in Fig. 2b, assuming a two-dimensional structure. **a)** Degree of serpentinisation (white contours) and water content (black contours). Black and green boxes show the vertical and horizontal integration domains, respectively. Bold black lines are the faults and dashed black line is the S reflector. **b)** Vertically integrated water content (black) and horizontal extent associated with faults (green). **c)** Correlation between water volume within hydrated mantle, representing integrated net fluid flux through the fault, and fault displacement at the top of crystalline basement. Data derived from seismic profiles (Fig. 2a – c) are shown by the magenta, green and blue colors respectively. Faults F4 – F6 are shown by the triangle, square and circle symbols respectively.