Geophysical Research Abstracts
Vol. 19, EGU2017-8898, 2017
EGU General Assembly 2017

Wide-angle seismic constraints on hyper-extended crust at the Deep Galicia Margin

Tim Minshull (1), Richard Davy (1), Gaye Bayrakci (1), Joanna Morgan (2), Tim Reston (3), Dale Sawyer (4), Jon Bull (1), Dirk Klaeschen (5), and Cord Papenberg (5)

(1) University of Southampton, Ocean and Earth Science, National Oceanography Centre Southampton, Southampton, UK (tmin@noc.soton.ac.uk), (2) Imperial College London, Department of Earth Science and Engineering, South Kensington Campus, Southampton SO14 3ZH, UK, (3) University of Birmingham, School of Geography, Earth and Environmental Sciences, Birmingham B15 2TT, UK, (4) Rice University, Department of Earth Science, Houston, Texas 77005, USA, (5) GEOMAR, Helmholtz Centre for Ocean Research Kiel, Marine Geodynamics, 24148 Kiel, Germany

During the Galicia3D experiment in 2013, we acquired coincident normal-incidence and wide-angle seismic data covering a 64 by 20 km region of hyper-extended continental crust and exhumed mantle on the Deep Galicia Margin west of Spain. The hyper-extended crust is characterised by steeply dipping normal faults soling out onto the low-angle S detachment. Using three-dimensional first-arrival seismic tomography across this region and two-dimensional reflection-refraction tomography along a densely sampled region through this region, we have previously shown that uppermost mantle velocities are reduced where the normal faults intersect with the S detachment, interpreted as the result of hydration. Here we present further analysis of these data using two-dimensional time-domain full-waveform inversion (FWI) and three-dimensional reflection-refraction tomography. These techniques allow us to reduce ambiguities in interpretation of syn-rift sediment, pre-rift sediment and crystalline crust above S, and provide enhanced resolution of variations in hydration beneath S.