



Regional stresses before, during and following Large Igneous Province magmatism

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The actual stress field acting before, during and after Large Igneous Province (LIP) magmatism has never been thoroughly investigated from a large combination of fault field data. Evaluating stress orientation from seismic reflection surveys showing off-shore deformed sediments or/and lavas is subject to major uncertainties. Dyke swarms considered as sets of mode-I fractures only provide information on the orientation of the minimum and maximum horizontal stresses active during their emplacement ; no information is given on the stress regimes and stress fields predating and postdating dyke emplacement. However, considering the inherent fractal organization of fractures in the crust, it is possible to infer the whole stress evolution of a LIP at a regional scale from a statistical study of local stress tensors inverted from populations of small-scale faults. This work is partly achieved at the scale of the North-Atlantic Province including data from W- and E-Greenland, Scotland, Ireland, Faeroe Islands and Iceland. We thus characterise a major transient stress field instability at the scale of the LIP during the main magmatic activity of the Early Cenozoic. We discuss the origin of the stress fields and their time/space evolution in light of the different theories for LIP generation (mantle plumes, lithosphere delamination, etc.).