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Characterising The Role of Basin Margin Structure On Finite Strain Patterns Across A 'Cleavage' Front From The Variscan Of Southern Ireland

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Strain analysis is commonly based on the axial ratio measurements of populations of approximately ellipsoid objects (e.g. sedimentary clasts), based on the assumption that these 'strain markers' act passively during deformation. However truly passive strain markers are rare due to competency contrasts which can lead to underestimates of strain where the strain markers are more rigid than the deforming host. (Meere et al., 2007). Therefore we have used a combination of traditional strain analysis of sedimentary clasts, field and microstructural observations and anisotropy of magnetic susceptibility (AMS) measurements to quantify and validate the finite strain patterns across the Irish Variscan cleavage front.

This region lies at the northern boundary of the European Rhenohercynian. Deformation of a thick (7 km +) Upper Devonian continental clastic sequence and overlying Carboniferous marine carbonate/clast sequence at the end of the Carboniferous consisted of an initial phase of layer parallel shortening, followed by folding, ongoing cleavage development and late stage accommodation thrusting. AMS data can help to quantify weak or subtle fabrics by effectively measuring the preferred orientation of iron bearing minerals (in this case clay minerals).

Preliminary AMS results indicate a gradient in deformation intensity within lithologies across the cleavage front from the south to the north. A microstructural comparison from across the cleavage front is used to characterise the strain regime either side of the boundary. Integrating these techniques will refine our current knowledge of spatial distributions of strain in the periphery of orogenic forelands.