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Characterising finite strain patterns using AMS across a foreland 'cleavage' front from the Variscides of southern Ireland.

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Anisotropy of magnetic susceptibility (AMS) measurements were carried out on 25 oriented samples of Upper Devonian 'Old Red Sandstone' from the Munster Basin, south west Ireland. This region lies at the northern boundary of the Rhenohercynian Zone of the European Variscides. Deformation of a thick (7 km +) Upper Devonian continental clastic sequence and overlying Carboniferous marine carbonate/clastic sequence at the end of the Carboniferous is thought to have consisted of an initial phase of layer parallel shortening, followed by folding, ongoing cleavage development and late stage accommodation thrusting.

Three distinct types of AMS fabric have been identified that define zones relating to the degree of tectonic deformation. The relationship of the Kmin axes to bedding and/or cleavage indicates the relative degree of tectonic overprint. In order of increasing tectonic strain the fabric types are: 1) primary sedimentary fabrics (essentially zero tectonic strain), 2) early layer parallel shortening (LPS)-cleavage controlled fabrics and 3) complete tectonic overprint fabrics. These fabric zones extend beyond the inverted Munster Basin margin and record a northerly decrease in deformation intensity.

Of particular interest is the Coomnacronia Fault, which marks an abrupt change from steeply dipping axial planar cleavage to the south to variably dipping passively rotated cleavage to the north. This is reflected in the AMS data and interpreted as an important boundary structure to the basin. This fault acted as a structural boundary between the full penetrative cleavage event to the south and a relatively weak cleavage preserving early LPS to the north.