

# **Lateral Variations within the Moine Thrust Zone, NW Scotland and Somiedo-Correcillas Unit, Cantabria, Northern Spain: Comparisons with Appalachian Transverse Structures**

Michael Kelly

*Department of Earth Sciences & Geography, Keele University Keele, Staffordshire, United Kingdom*

[m.j.kelly@epsam.keele.ac.uk](mailto:m.j.kelly@epsam.keele.ac.uk)

Fold-and-thrust belts are intensely studied features of mountain belts around the world, with numerous authors reporting on geometry, kinematics, mechanics and hydrocarbon potential. Whilst many of these works have dealt with palinspastic reconstructions and transport-direction-parallel balanced cross-sections, far fewer have focussed on three-dimensional architecture of fold-and-thrust belts, or examined how lateral variations in thrust architecture in different segments of thrust belts are linked via so-called 'transverse zones'.

Causative structures for lateral changes are often concealed and not fully studied. However, systematic alignments of these lateral structures have been suggested to include sub-décollement basement faults, pre-thrusting cover strata deformation above basement faults, development of duplex structures and antiformal stacks, and/or along-strike variations in mechanical stratigraphy. Three-dimensional models of complex thrust belts are rare, and generally have not been restored to analyse thrust system kinematics.

In this work, detailed three-dimensional topologies, geometries and kinematics of selected thrust systems are studied in order to fully analyse the evolution and cause/effects of lateral changes in thrust belts, in each case integrating the field and three-dimensional model interpretations. Full, sequential restorations of three-dimensional thrust models using new digital mapping methodologies characterise the pre-thrusting template and assess that template's capacity to control subsequent lateral thrust geometries.

Project methodologies incorporate new studies of two well-understood and comprehensively mapped thrust belts; the Achnashellach Culmination / Loch Maree region, Moine Thrust Zone, NW Scotland and the Somiedo-Correcillas Unit, Cantabrian Arc, northern Spain. These are compared with structures situated within the Anniston, Bessemer and Harpersville transverse zones, Appalachian Thrust Belt.