

# Kinematic retro-modelling of a cross-section through a thrust-and-fold belt: the Western Irish Namurian Basin

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## Abstract

The Western Irish Namurian Basin (WINB) developed into a fold-and-thrust belt at the front of the northward-propagating Variscan orogenic wedge. Part of this basin is well exposed along the coast of County Clare, Ireland. From a detailed study that used an integrated GPS mapping approach, we produced a c. 50 km long, balanced cross-section, parallel to the tectonic transport vector. We sequentially decompact and retro-deformed the Namurian strata in 7 stages to evaluate the palinspastic situation of the basin and the amount of shortening. By using passive markers in the model and a highly-detailed timescale, we were able to determine that shortening of the WINB, from the onset of Central Clare Group sedimentation was 7.44% (or 4.07 km) of which shortening due to folding accounts for c. 2.64% (c. 1.37 km), and therefore c. 4.80% (c. 2.69 km) was solely because of thrusting. The rate of horizontal shortening ranges from 1–34 mm a<sup>-1</sup>; this is within typical orogenic values.