



Transition from external imbricate zone to foreland thrust sheet in the Caledonides, N. Scandinavia

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Thrust front geometries vary considerably between orogens, although erosion has usually removed external parts of the foreland thrust belt in older collision zones. This is the case in most of the Scandinavian Caledonides, where a well-defined basal decollement separates the nappe pile from the Autochthon. However, in both S and N Norway (E. Finnmark) thrust deformation dies out gradually towards the foreland. In Finnmark, the foreland thrust belt (Gaissa Thrust Belt) shows dominantly E-directed shortening. The internal part comprises the 50 km long (parallel to shortening) Munkavarrí Imbricate Zone, with 50% shortening on 0.25-1.0 km spaced major imbricate thrusts. Minor thrusts/back-thrusts, are abundant near the basal decollement. Over ca. 12 km, major imbricate thrusts gradually cut up-section to lower stratigraphic levels, passing into tip-folds within the overlying Vuonjalrassa Thrust Sheet (20% shortening). The 10 km wide Låkkaskaidi Duplex (50% shortening), also underlies the Vuonjalrassa TS some 14 km to the foreland of the leading edge of the Munkavarrí IZ. Stratigraphic overlap with the underlying Autochthon indicates that the Munkavarrí IZ, Låkkaskaidi D and Vuonjalrassa TS were also transported en bloc towards the foreland by up to 25 km, along the Ruok'sadas Thrust. Below this, 20% shortening continues eastwards to the Hanadalen Thrust, in the footwall of which thrust ramps are no longer developed, although bedding-parallel slip continues further to the east. Sequentially, shortening in the Munkavarrí IZ was likely of a continuously out-of-sequence nature, with all imbricate thrusts moving essentially together at the same time and older thrusts thus reaching higher stratigraphic levels as the basal decollement progressed towards the foreland. The decrease in shortening suggests a lower taper angle and/or faster thrust propagation. The cause of this is unknown, but much of the basal decollement under the Vuonjalrassa TS lies between pelitic rocks that could have operated as 'easy-slip' horizons.