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EVAPORITES AS DUCTILE DETACHMENTS: FOLD UND THRUST GEOMETRY IN MESOZOIC SEDIMENTS OF THE HALLSTATT AREA (NORTHERN CALCAREOUS ALPS, AUSTRIA)

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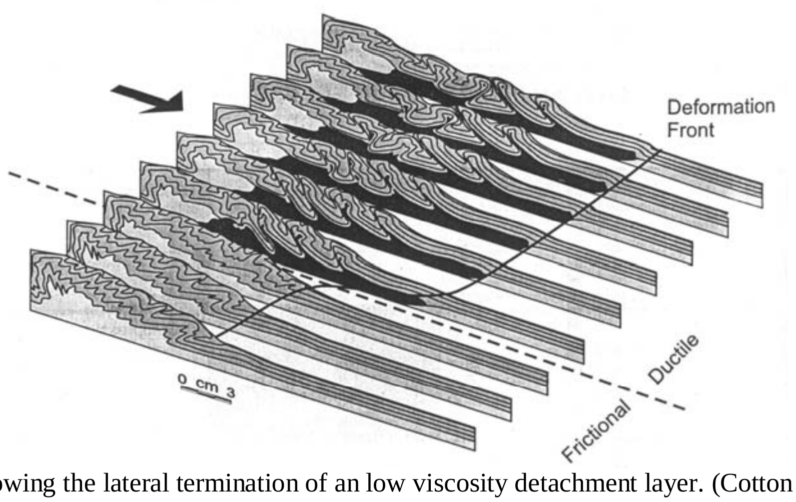
Fold-and-thrust belts are usually located in the frontal part of a collisional range in which tectonic shortening has been accommodated by growth of folds and thrusts above a detachment horizon that decouples the upper, brittle reacting part of the crust from its basement. The late Permian to early Triassic evaporites of the Northern Calcareous Alps (Eastern Alps) provide such a detachment horizon at the base of major nappes along which alpine thrust tectonic took place (Tollmann 1987). As shown by analogue modelling (e.g. Costa and Vendeville 2002; Cotton and Koyi, 2000) kinematic histories and geometries of fold-thrust-systems that detach along low viscosity evaporitic décollement layers show major differences to those having higher basal friction. Forward vergent imbricates, forming relatively steep wedges, develop above frictional detachments (Suppe 1983; Mitra 1986), whereas both foreland and rearward vergent imbricates develop above ductile salt layers. Furthermore, deformation propagates farther and more rapidly above ductile detachments than above frictional detachments. The differential rate of propagation of the deformation front between adjacent areas with ductile and frictional décollements generates an inflection and strike-slip faulting subparallel to the shortening direction where diapirism can take place.



Analogue model showing the lateral termination of an low viscosity detachment layer. (Cotton and Koyi, 2000)

The *Haselgebirge* of Hallstatt (Upper Austria) strikes sub-vertically as an elongated 500m thick and 2km long body ESE-WNW which is intercalated by a number of limestone, sandstone and marl lenses, also elongated in the same direction. The largest of these lenses ("Zentrale Einlagerung"), consisting of Hallstatt limestone, is up to 200m thick and forms the core of the structure. The evaporites show high strain ductile deformation containing structures typically seen in grenschist facies quarz feldspar mylonitic rocks like δ- and σ-clasts, stair stepping of flow lines or quarter folds. Due to continuous recristallisation processes a stretching lineation is almost never preserved. However abundant isoclinal folds reveal foldaxes parallel to the greatest finite extension. These roughly horizontal, ESE-WNW trending foldaxes together with a vertical foliation at the northern boundary of the Hallstatt salt mine indicate strike-slip movement. Kinematic indicators and overthrust structures observed in the overlaying and surrounding sediments of Dachstein- and Hallstatt limestone show shortening in an E-W direction subparallel to the striking of the saltbody. Resulting from these field observations is the interpretation of the Hallstatt salzberg as a “lateral boundary structure” that separates collateral areas of different styles of deformation.

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