IMPACT OF ESCAPE TECTONICS ON THE EVOLUTION OF THE AUSTRIAN-GERMAN ALPINE FORELAND BASIN

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The Alpine foreland basin formed during Eocene collision. Two marine to continental megasequences fill the basin. The second megasequence is poorly understood, and different models have been put forward. I present a new model, based on the analysis of the Subalpine Molasse thrust belt east of the Rhine river.

The main characteristics of the Subalpine Molasse thrust belt are:

1. A frontal anticline/thrust started to develop during deposition of the older, marine portion of the second megasequence. Structural growth is documented by growth strata.

2. The thrusts in the Subalpine Molasse evolved in a break-back sequence.

3.The amount of shortening during depositon of the second megasequence reduces from 40-50 km near the Rhine valley to zero in the east in the Salzburg area.

The onset of the second megasequence in the foreland north of the Subalpine Molasse thrust belt is characterized by an angular unconformity documenting a tilt of the foreland toward the orogen, and therefore ongoing flexure of the lower plate. East of the eastern end of the Subalpine Molasse thrust belt, the deposits of the second megasequence are in a horizontal position, lower plate flexure had stopped.

In the internal part of the Alpine orogenic wedge, shortening, exhumation and E-directed stretching of the Tauern Window as a consequence of escape tectonics was active. Shortening was transferred from the Alpine front into the zone of lateral escape, causing the break-back thrust sequence at the Alpine front. Active thrusting in the Subalpine Molasse would bring the orogen closer the foreland, and increase loading of the foreland, but at a smaller rate, as material was continuously transported out of the zone of shortening by lateral escape.

The contemporanous onset of the second megasequence of the foreland basin fill and of escape tectonics is therefore no coincidence. East of the Subalpine Molasse thrust belt, onset of lateral escape terminated shortening and thus lower plate flexure. Marine conditions in the lower part of the second megasequence, that exist also in the eastern part of the foreland basin, are therefore not dependent on flexure, but rather on reduced sediment input into the basin.