Tectonic subdivisions in thrust belts – cleaning up the western Northern Calcareous Alps (NCA)

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Tectonic subdivisions of larger geologic units reflect the geologic knowledge at the time of creation. In many thrust belts the original subdivisions had been created during the first comprehensive mapping campaigns at the end of the 19th to early 20th century and reflect the geologic knowledge at that time. Even if many thrusts were identified correctly, no formal framework existed to give guidelines of how to distinguish tectonic units. Nevertheless, these subdivisions are still in use.

We analyze the thrust sheets of the Northern Calcareous Alps of western Austria and southern Germany and test the implicit assumptions underlying most tectonic subdivisions against field observations:

Assumption 1: Thrust transport is large and thrusts do not end laterally. However, several major thrusts do lose stratigraphic offset and end laterally.

Assumption 2: Allochthons are surrounded by thrusts on all sides. Unfortunately, any fault has been used to delimit allochthons.

Assumption 3: Thrusting should bring old on young rocks. In some cases, allochthons have been delimited by out-of-sequence thrusts, that stack young on old rocks. In other cases, the allochthon is a mountain-size glide block that was buried by younger sediments, and the trace of the thrust is an unconformity in the field.

As a consequence we propose a revised tectonic subdivision of the western part of the NCA, that avoids some of the problems discussed here, and is entirely based on the emplacement of old-on-young rocks across thrusts.