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# From Advancing to Retreating Subduction – A Model Explaining Uncommon Subduction Evolution

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Active continental margins in general are accompanied by compression processes and subduction related magmatism, if the dip of a slab allows installation of a corner flow above the subducting slab. Absence of a subduction related magmatism in many ancient and modern subduction zones is mainly interpreted as a non-existing corner flow.

This study tries link active continental margins with existing and with non-existing magmatism related subduction. In the Apuseni Mts. (Romania) a Mesozoic subduction was active, but subduction related magmatism started approx. 35 Ma after the subduction onset. During the period without magmatism a shallow marine forearc basin with sedimentary supply from both the crystalline hinterland and the forearc ridge evolved. The following period with subduction related magmatism was accompanied by a rapid basin subsidence and increased uplift rates in the crystalline hinterland. Sediments were also transported from the forearc ridge and the crystalline hinterland during this second period. The sedimentary succession was described as Gosau type deposits, which are mainly known from the Eastern Alps. The Gosau basin of both, the Eastern Alps and the Apuseni Mts. show similar features like sedimentary facies analogies (the Lower Gosau Subgroup with shallow marine sediments and the Upper Gosau Subgroup with deep marine turbidites), transport directions and total sediment thickness. However, a subduction related magmatism is not known from the Eastern Alps.

By means of several investigative methods (e.g., fission-track thermochronology, basin modeling, provenance analysis and paleontological dating), a new geodynamic ‚model is proposed. In contrast to the Eastern Alps, in the Apuseni Mts. the first period of subduction, with low-angle dip of the subducting slab, was followed by a retreating

subduction due to dehydrating processes in the subducting slab. The installation of a retreating subduction with a slab rollback is responsible for the installation of a corner flow. A second consequence is the abrupt basin subsidence at the boundary from the Lower Gosau to the Upper Gosau caused by the slab pull of the backwards moving subducted ocean crust. This model explains an initially missing subduction related magmatism and a subsequent incipient one, as well as the generation of a forearc basin with a rapid subsidence after an initial shallow marine period.