Ein Beitrag zur Stratigraphie der Trias-Serien im unterostalpin Graubündens

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EIN BEITRAG ZUR STRATIGRAPHIE DER TRIAS-SERIEN IM UNTEROSTALPIN GRAUBÜNDENS (GRISONIDEN)

ABHANDLUNG

zur Erlangung des Titels eines

DOKTORS DER NATURWISSENSCHAFTEN

der

EIDGENÖSSISCHEN TECHNISCHEN HOCHSCHULE ZÜRICH

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ABSTRACT

At the western end of the Eastern Alps in Graubünden we can distinguish a pile of continental basement nappes lying on the South Penninic units, a melange of oceanic crust (ophiolites) and pelagic sediments of Jurassic to Cretaceous age. According to their tectonic position, the lowermost Austroalpine nappes (Err- and Bemina-nappes s.l.) are called the Lower Austroalpine (LAA). They are partly covered with thin mesozoic sediments (Middle Triassic to Upper Cretaceous), which show in a wide range their own characteristics and may be named the Grisonides. To the E and to the N the LAA-nappes are overlain by the Central Austroalpine units (CAA), which comprise large basement (Languard, Campo, Silvretta) and sediment nappes (Ela-Ortler, Engadiner Dolomiten).

In recent years the Triassic to Middle Jurassic sediments of the CAA have been analysed by several authors. The stratigraphic nomenclature has been revised and a number of new lithostratigraphic names introduced. On the results of this work an investigation of the LAA’s Triassic sediments has been carried out. The main results are the following:

Clastic sediments form the lowermost part of the Mesozoic and ly disconformably on cristalline basement rocks or on Permian volcanoids. Generally they grade upwards from coarse, often matrixrich conglomerates and sandstones (Chazfora-Schichten) into finer grained sand- and siltstones with intercalations of carbonates and evaporites (Fuorn-Schichten). This typical transgressive succession represents the development from continental (conglomerates) to alluvialplain or floodplain (sand- and siltstones) and into playa and/or lagoonal sediments (evaporites, carbonates). The whole sequence is called "Detritische Basis-Serie" and correlates with the Verrucano and Buntsandstein of former authors. Due to an almost complete lack of fossils and the sparse sedimentological features a clear distinction between continental and marine sediments is not possible. On the contrary, an upper part of the clastics in the CAA seems to be marine and can be dated as Late Anisian.

On top of the "Detritische Basis-Serie" follows a sequence of bright to dark gray dolomites, rauhwackes and locally dark limestones which are informally called the "Karbonatische Mitteltrias". These wellbedded carbonates show the various features of sub- to supratidal platform sediments that have been formed under low energy conditions. Only a very poor fauna can be found, which gives no other date indications than Ladinian. Therefore it is supposed that these Middle Triassic carbonates of the LAA almost entirely are of Ladinian age and comprise no Anisian sediments. In the CAA, Anisian carbonates of considerable thickness can be dated (Ducan-Formation) and the whole Middle Triassic sediments thickness exceeds this of the LAA by about two to five times.

The Upper Triassic sediments of the LAA generally also consist of flat marine carbonates, mostly dolomites, and are devided into the Raibler Serie (± Carnian), the Hauptdolomit (± Norian) and the Kössener Serie (± Rhaetian).

The Raibler Serie is characterized by comparatively abrupt environmental changes which partly can be interpreted as tectonically induced (breccias, tuffs and volcanic sills, emersion surfaces). Partly red coloured terrigenous clastics together with subaerially altered carbonates form the upper part and are called Bunte Raibler Schichten. They generally grade into the Hauptdolomit, which, above all in the lower and middle part, contains red and green shale intercalations ("Karpatischer Keuper"). This LAA-Hauptdolomit represents a typical low energy carbonate platform series where shallowing upward sequences dominate. In the uppermost part sometimes tuffaceous layers are found.

The Kössener Serie forms a succession of shales, marls, limestones and in the upper part dolomites, which is very fossiliferous in comparison with the other Triassic series of the LAA. It proves partly openmarine conditions with corals and contains forams of Rhaetian age.

These LAA Triassic sediments can be well correalted with those of the CAA and are believed to represent paleogeographically a external zone of the Austroalpine realm, where the transgression of the Mesozoic generally postdates the one of more internal areas as e.g. the CAA.