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GEOLOGY OF THE HIGH AHRNTAL, SW TAUERN WINDOW (ITALY)

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A new geologic map of the High Ahrn Valley (Ahrntal, South-Western Tauern Window) at the scale of 1:25.000 is presented. The field work was performed at the scale of 1:10.000, in the frame of the CARG-PAB (Provincia Autonoma di Bolzano) project (Geologic Map of Italy, scale 1:50.000, Sheet Nb. 003 "Vetta d'Italia"). The eastern part of this sheet was carefully mapped by Bianchi & Dal Piaz (1930). The Ahrntal is located in the SW part of the Tauern Window, where the Penninic nappe stack and the overlying Austroalpine units are exposed, due to updoming and tectonic denudation. The Penninic units consist of (see review in Kurz et al. 1998): 1) the (structurally lower) pre-Variscan *Venediger Nappe /Wolfendorn Nappe*, intruded by Late Paleozoic granitic plutons (*Zentralgneis)*, covered by Mesozoic sequences (*Hochstegen* and *Kaserer* formations); 2) the Variscan *Storz Nappe,* and the *Greiner Series/Murtörl Group* (quartzites and metapelites of Late-Paleozoic? or Cretaceous? age); 3) the *Eclogite Zone* made up of mafic eclogites intercalated with metasediments showing high pressure peak metamorphic conditions (Dachs, 1986) and a later retrogression into garnet-amphibolite/greenschist facies conditions; 4) the *Rote Wand-Modereck Nappe* built-up of thin gneissic units (*Lamellae*) and a Mesozoic metasedimentary-metavolcanic unit; 5) the *Glockner Nappe*, consists of metabasites and serpentinites covered by metacherts, quartzites, micaceous marbles and calcareous schists intercalated with MORB-type metabasalts of Jurassic to Cretaceous (?) age; 6) the *Matrei Zone* is made-up of metamorphic flysch sediments, breccias and olistholites (or tectonic slices) mainly of Austroalpine derivation. In the study area, only Penninc units crop out, with the exception of the Matrei Zone. In our study we refer to the nomenclature adopted by Dal Piaz (1934), who recognized in the Ahrntal the following nappes: 1) the *Gran-Veneziano Nappe* (Grosse Venediger-Zentralgneis Auct.), consisting of Late Carboniferous-Permian granitoids transformed into gneiss during the Alpine orogenic cycle, and by pre-granitic paragneiss and amphibolites. Textural types of gneisses range from undefomed granitoids in low-strain domains, to sheared, mica-rich gneiss in high-strain domains. Biotite-rich schists are also present. The Alpine metamorphic imprint is mainly characterized by greenschist facies conditions in the southern sectors, whereas increasing T conditions are shown to the north. The Gran-Veneziano Nappe crops out along the northern side of the Ahrntal. 2) The *Dreiherrnspitz-Greiner Nappe* crops out in the south-eastern side of the valley. To the north, it overthrusts the Gran Veneziano Nappe, along a straight ENE-WSW trending contact, going along the valley bottom and crossing through the Birnlucke pass to the Austrian side. The Dreiherrnspitz-Greiner Nappe is mostly made-up of paraschists, enclosing layers and boudins of mafic (garnet)-amphibolite, orthogneiss and marbles of pre-Triassic age?. The paraschists are of various types. A preliminary distinction (work in progress) was tentatively made on the basis of lithological assemblages and on the occurrence of garnet and graphitic matter, with the aim of recognizing the pre-granitic metamorphic basement (i.e., "Unterste Schieferhülle" Auct.) from the younger "Untere Schieferhülle" (post-Variscan), as it has been done in other parts of the Tauern Window, where

the Alpine imprint is less pervasive than in the Ahrntal. 3) The *Glockner Nappe* was divided in the study area into the Ophiolite Unit ("Obere Schieferhülle" Auct.) and the Continental Margin Unit. The Ophiolite Unit crops out along the southern side of the valley, to the south of the Windtal. It consists of calcareous schists intercalated with greenschists and amphibolites, and of scarce serpentinite slices. Near the village of St. Peter, the tectonic contact between the Glockner and the Gran-Veneziano nappes is outlined by a 400-500m-thick tectonic imbrication of calcschists from the Ophiolite Units, and Triassic marbles and dolostones from the Continental Margin Unit. Structural analysis suggests that in this sector of the Ahrntal the main thrust surface has been re-activated by a sinistral trascurrent fault system. In the south-eastern side of the Ahrntal, between the Windtal and the Röttal, the north-vergent Glockner Nappe overthrusts the Dreiherrnspitz-Greiner Nappe. Here the tectonic contact is complicated by an imbrication of slices of ophiolites, paraschists from the Grainer Nappe and Triassic quartzites, dolostones and marbles from the Continental Margin Unit. At least three main ductile structures of Alpine age were recognized on the field: D1 structures consist of rootless isoclinal folds observed within cm-thick quartz-rich layers, relict in the penetrative regional schistosity (S2). D2 structures are isoclinal folds with a penetrative S2 axial plane foliation (regional schistosity). D3 structures are asymmetrical folds (mostly S-saped looking eastwards), with no axial foliation and dipping 30°-60° westwards. D3 stage locally developed crenulation cleavage in calcschists. Anyhow, coherent structures at the meso-scale are not widespread, due to the vicinity of the main thrust surface between the Gran Veneziano Nappe and the Dreiherrnspitz-Greiner Nappe and the Glockner Nappe, where ductile deformation is penetrative and overprinted by later faulting. A noticeable improvement with respect to previous works on this area was done in Quaternary geology. Quaternary deposits were revised and various units were distinguished according to allostratigraphic criteria. The Postglacial Unit (Ahrntal Alloformation) includes all quaternary sediments deposited from the Last Glacial Maximum (LGM) to the Present. It includes the Dreiherrnspitz Allomember consisting of Quaternary deposits related to the Little Ice Age. The Garda Allofm. includes all glacial and fluvial deposits related to the L.G.M., and the Kasern and the St. Jakob Allomembers, both consisting of stadial deposits not correlable each other. The introduction of the Garda Allofm. allows the correlation among all deposits referable to the L.G.M. from the whole Adige-Garda basin.

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