0012-9402/05/010097-2
DOI 10.1007/s00015-005-1151-z
Birkhäuser Verlag, Basel, 2005

Eclogae geol. Helv. 98 (2005) 97–98

Tectonic map and overall architecture of the Alpine orogen Comment on an article by Stefan M. Schmid, Bernhard Fügenschuh, Eduard Kissling & Ralf Schuster 2004, Eclogae geologicae Helvetiae, 97, 93–117

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Schmid et al. (2004) compiled a new tectonic map of the entire Alps, also reflecting current ideas and concepts. Knowing that the map also intends to introduce the non-specialists into the major units of the Alps, and being aware of the fact that not every detail can be taken into account, I intend to address some details because this may help to avoid misconceptions and misinterpretations in the future. In particular, I would like to focus on the continuation of the Northpenninic ophiolites and Bündnerschiefer (see Fig. 1 and plate 1 in Schmid et al. 2004) towards east, and discuss their exposure in the area of the Tauern Window.

The paleogeographic reconstruction of the Penninic Nappes in the Eastern Alps represents a crucial problem regarding the tectonics of the Eastern Alps and was controversially discussed for many years. Referring to a tectonic map by Froitzheim et al. (1996), Schmid et al. (2004) extrapolated the Northpenninic ophiolites and Bündnerschiefer (their "Lower Penninic nappes") to the area of the Tauern Window within the Eastern Alps, based on the interpretation that the Upper Schieferhülle Unit represented the Valaisan paleogeographic domain. In the Tauern Window, the Glockner nappe (or Upper Schieferhülle Unit of Schmid et al. 2004) comprises an oceanic basement and a partly incomplete ophiolitic sequence. This is not only strongly similar to the Valais Bündnerschiefer, but also to the Piemontais ophiolitic units of the Western Alps (e.g., Zermatt-Saas ophiolites). The Matrei Zone above it represents an accretionary wedge that is characterised by metamorphic flysch sequences (Frisch et al. 1987). In sections where the Matrei Zone is either missing, or alternatively, where it cannot be separated from the Glockner nappe below, the latter is directly overlain by the Lower Austroalpine nappe complex. This would favour a Southpenninic origin of the Glockner nappe that would therefore be part of the "Upper Penninic nappes" in the sense of Schmid et al. (2004).

The Venediger Nappe of the Tauern Window (attributed to the "non-eclogitic Sub-Penninic basement nappes" in Schmid et al., 2004) was correlated with units representing the European margin in the Central Alps, following Froitzheim et al. (1996), Kurz et al. (2001), as well as an earlier proposal by Trümpy (1988). Consequently, the Glockner Nappe, the next higher unit of oceanic origin, was correlated with the Northpenninic by Froitzheim et al. (1996). Hence only the Matrei Zone would correspond to the Southpenninic according to Schmid et al. (2004). Since no continental nappes seem to occur between Glockner Nappe and the Matrei Zone, the Brianconnais was supposed to be completely missing in the Tauern cross section. Thus, possibly the Briançonnais primarily ended between the Engadine and the Tauern Window, whereby the North- and Southpenninic basins merged eastward into a joint basin (Froitzheim et al. 1996). Alternatively the front of the Briançonnais could be located south of the Tauern Window having been largely or completely subducted (Froitzheim et al. 1996). However, the attribution of the Glockner Nappe and the Matrei Zone to two different oceanic realms is at odds with the findings of Frisch et al. (1987) who showed that the transition from the Glockner Nappe to the Matrei Zone is very often rather of stratigraphical than a tectonic nature.

The paleogeography proposed by Trümpy (1988) shows that the Briançonnais ends east of the Engadine Window and is laterally displaced to the east, re-occurring in the Pienidic Unit of the Western Carpathians. Accordingly, the North- and Southpenninic basins may have merged into one single Penninic basin east of the Engadine Window (e.g., Stampfli 1993, Froitzheim et al. 1996; Kurz et al. 2001), that includes Glockner Nappe, the Matrei Zone, and the Rhenodanubian Flysch. Consequently, the paleogeographic separation into North- and Southpenninic may then be artificial in the Eastern Alps. However, the age of formation of oceanic lithosphere is essential for a chronological reconstruction. Jurassic ages of basin formation may be interpreted in terms of a Southpenninic, Cretaceous ages in terms of a Northpenninic origin. Due to the oc-

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currence of Jurassic ophiolites at the base of the Rhenodanubian Flysch within the Ybbsitz Zone (Decker 1990) a Southpenninic origin of this basin is favoured, and a Southpenninic position of the Rhenodanubian Flysch may be discussed.

REFERENCES

DECKER, K. 1990: Plate tectonics and pelagic facies: Late Jurassic to Early Cretaceous deep-sea sediments of the Ybbsitz ophiolite unit (Eastern Alps, Austria). Sediment. Geol. 67, 85–99.

FRISCH, W., GOMMERINGER, K., KELM, U., AND POPP, F. 1987: The Upper Bündner Schiefer of the Tauern Window – A Key to Understanding Eoalpine Orogenic Processes in the Eastern Alps. Geodynamics of the Eastern Alps, 55–69.

FROITZHEIM, N., SCHMID, S. M., & FREY, M. 1996: Mesozoic paleogeography and the timing of eclogite facies metamorphism in the Alps: A working hypothesis. Eclogae geol. Helv. 89, 81–110.

KURZ, W., FRITZ, H., PILLER, W. E., NEUBAUER, F., & GENSER, J. 2001: Overview if the Paleogene of the Eastern Alps, In: PILLER, W. E. & RASSER, M., (eds.), Paleogene of the Eastern Alps. Österreichische Akademie der Wissenschaften, Schriftenreihe der Erdwissenschaftlichen Kommisionen 14, Vienna, 11–56.

SCHMID, S. M., FÜGENSCHUH, B., KISSLING, E. & SCHUSTER, R. 2004: Tectonic map and overall architecture of the Alpine orogen. Eclogae geol. Helv., 97, 93–117.

TRÜMPY, R. 1988: A possible Jurassic-Cretaceous transform system in the Alps and the Carpathians. Geol. Soc. America Spec. Paper 218, 93–110.

Manuscript received January 20, 2005
Revision accepted April 10, 2005