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The Pragian–Frasnian 'transitional' facies of the Carnic Alps (Austria-Italy)

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The Variscan deposits of the Carnic Alps, extending across the Italy–Austria border, is a non-metamorphic to low metamorphic sector of the Southern Alps. This Late Ordovician–Early Permian succession is mainly calcareous but includes shallow- to deep-water siliciclastics. The Pragian–Frasnian succession is characterized by development of a rimmed shelf passing distally to slope and then open-sea deposits (BANDEL 1972, VAI 1976 and 1980, SCHÖNLAUB 1979 and 1985, KREUTZER 1990). We have focused on elucidating the sedimentary processes and evolution of KREUTZER'S (1990) 'transitional' facies connecting shallow with open-sea facies. In order to understand the geological context of these successions, geological mapping of selected areas has been undertaken, coupled with detailed measuring and sampling of sedimentary successions (Fig. 1) for constructing a timeline-framework for correlating units from area to area. All facies-transitions have been exhaustively sampled for conodonts. Preliminary results from several sections representative of these units are presented.

Viewed in a general way, the stratigraphic succession consists of intercalations of horizons interpreted as possibly generated by settling from suspension in rather calm waters, together with shallow neritic horizons, and lithoclastic bodies suggesting reworking from the shelf. Sedimentation commences with centimetre- to decimetre-scale wackestones of Pragian–Emsian age (Kellerwand Limestone). Lithoclastic rudstone and grainstone levels up to c. 1 m. in thickness appear during the latest Emsian or Eifelian intercalated with the aforementioned facies (Vinz Limestone). A sharp erosional boundary marks the passage to massive decimetre-scale levels of grainstone and breccia in a grainstone matrix; this appears to have occurred between the Eifelian and early in the Givetian (Cellon Limestone). The clasts are interpreted as probably consisting, at least in part, of shelf-derived material, consistent with progradation of the shelf into the basin. Phosphorite nodules have been documented from one of these massive levels (BANDEL 1972); they are consistent with reworking of a lag deposit accumulated during an interval of sediment starvation. The massive layers are followed by Givetian–Frasnian metre-thick levels of rudstones locally intercalated with laminated grainstones and thin centimetre-thick wackestones (Freikofel Limestone). The wackestone strata, appearing at the beginning of the Frasnian, accord with a transgressional episode. A more prominent, apparently transgressional event, is represented early in the Famennian by transition to sedimentation dominated by centimetre-thick wackestones intercalated with thin laminated grainstones and rudstones (Pal Limestone).

This overall evolution suggests alternating phases of progradation and retrogradation of shelf-derived reworked material in the basin. Our goal is to correlate these units with more proximal as well as more distal successions for better definition of the depositional evolution and for inferring controls on the sedimentary deposition.

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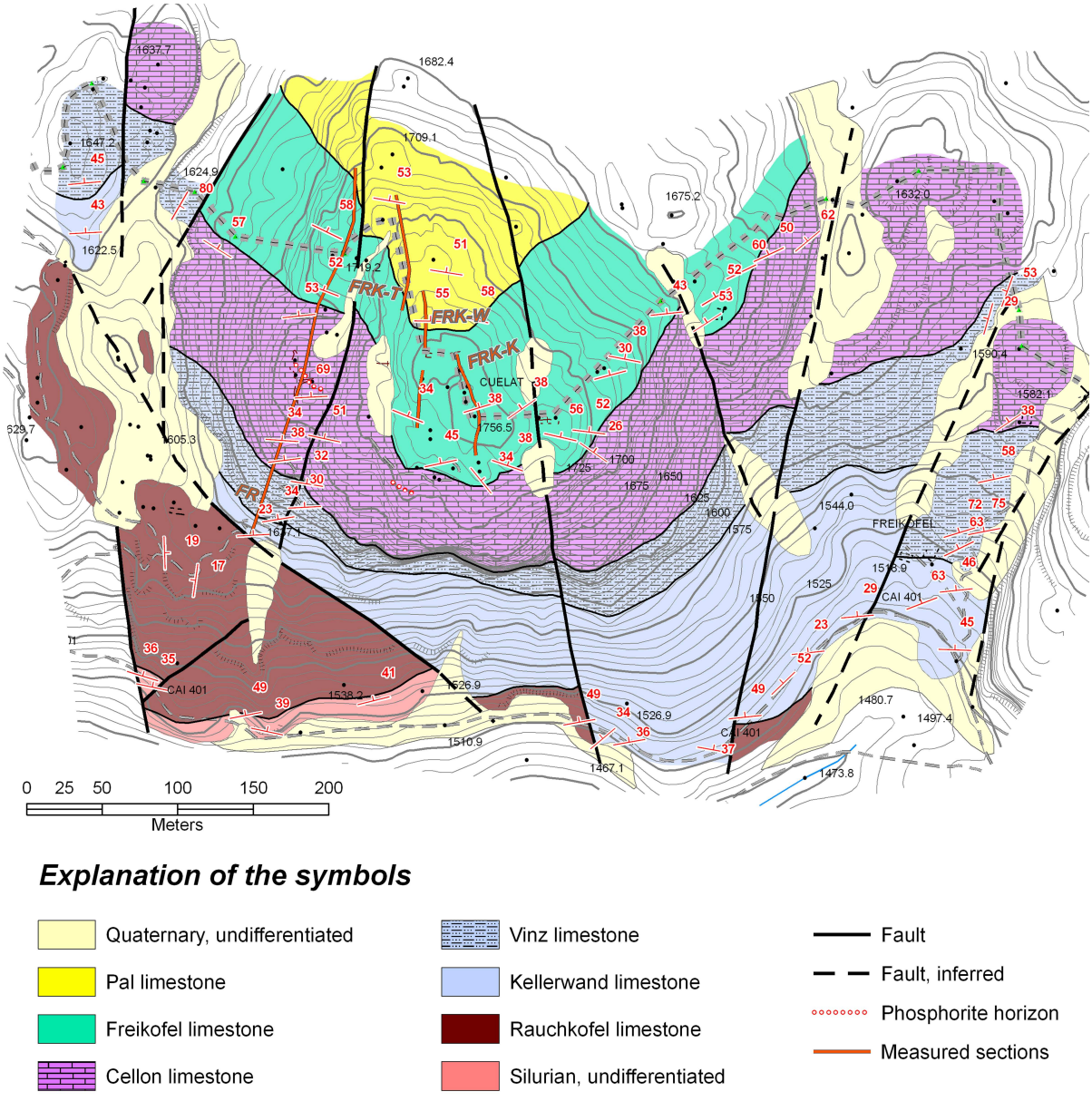

Fig. 1: Geological map of the Freikofel area.