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NAPPE POSITION OF THE HLADOMORNÁ DOLINA GROUP ON THE FOEDERATA GROUP IN THE DOBŠINÁ HALF—WINDOW

(Figs. 1—2)



Abstract: At the eastern margin of the Veporides the epimetamorphosed Early Paleozoic group of the Hladomorná dolina valley with its sedimentary envelope (Upper Carboniferous to Lower Triassic) is lying in nappe position on the Upper Permian to Middle Triassic Foederata group, which is the envelope of the crystalline of the Kráľova hofa complex. The imbricate structures and Alpine metamorphism obscure mutual relations of these units, in contrast to higher superficial nappes, however, a metamorphic and structural discordance is evident. It is a reflection of the stages of tectonic development, also connected with manifestations of transversal folding, which caused axial submersion of the Veporide block below the Gemeride.

Резюме: Рядом с восточным краем вепорид лежит эпиметаморфизованная старопалеозойская серия Гладоморной долины со своей осадочной оболочкой (верхний карбон — нижний триас) в покрововом положении на верхнепермской до среднетриасовой серии Фоедерата, которая является оболочкой кристалликума краповогольского комплекса. Имбрикационные структуры и альпийский метаморфоз затушевывают взаимные отношения этих единиц, но в отношении к высшим поверхностным покровам явное метаморфическое и структурное несогласие. Это является отражением этапности тектонического развития связанного также с проявлениями поперечной складчатости, которая вызвала аксиальное погружение вепоридного блока под гемеридный.

Introduction

After an Early Paleozoic, most probably Devonian age of the Hladomorná dolina group (A. Klíneč, 1962, 1966 a. o.) was supposed, difficulties arise when considering its position to the Kohút crystalline either there is a metamorphic mantle, into which Hercynian granitoids of the Kohút zone intruded, what would be in accordance with older views of this part of the Veporides, or the present-day position of the Hladomorná dolina group is tectonic of nappe character¹. In the next we present some arguments in favour of the second conception from the area of the Dobšinská tectonic half-window and area west of Rejdová. We lay stress on tectonic interpretation of knowledge, obtained mainly by detailed geological mapping and meso-structural investigation. The results and conclusions are, however, of course, preliminary only.

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¹ In the geological map of A. Klíneč 1976 the boundary between the Kráľova hofa complex and Hladomorná dolina group is systematically designated as „tectonic contact of units of unclear competence obscured by metamorphic processes“.

Foederata group

On the crystalline of the Kohút zone (Králova hoľa complex - granitoids and migmatites) is lying in autochthonous position the weakly metamorphosed Foederata group (Struženík unit in the sense of M. Maheľ et al., 1967). At its base the probably Permian sequence of greywackes and arcose sandstones occurs irregularly, which gradually pass into Seisian quartzites. The Campilian is represented by variegated shales and subordinately also fine-grained conglomerates.

The carbonate-pelitic sedimentation of the Middle Triassic begins with rudimentarily developed dark-grey dolomites. They attain greater thicknesses in the Šajby fold. Higher up is lying the sequence of dark marly and cherty, rarely also crinoidal limestones with intercalations to several-metres layers of dark pelitic shales. The dark shales are probably equivalent in age to analogous shales from the Struženík area, the Middle Triassic age (Anisian-Ladinian) of which was proved palynologically (A. Biely — E. Plandrová, 1975). This complex is overlain by white and pink marbles, which, as it often can be observed, form only more or less thick layers and lenticles amidst dark limestones. They probably represent the Ladinian. The Carnian sequence is close to the Anisian in lithology—again dark limestones and shales. The shales are often marly or contain fine clastic mica and rhythmical more sandy laminae are found in them, so resembling the Lunz beds. In the lenticles of limestones P. Straka (1978) determined a condont microfauna of Cordevolian-Julian age. The stratigraphic overlier of this sequence is unknown. We consider the grey dolomites on Šajby above Carnian shales as Anisian, as part of the overturned limb of local recumbent fold — cf. Fig. 2 profile 7—8.

Markuška nappe

The occurrences of dark phyllitic rocks with diabase volcanism amidst the Foederata group in the valley of the Dobšinská brook we consider, similarly as the most rocks of the fold or „digitation“ of Markuška or of Markušský vrch mount (V. Zoubek — L. Snopko, 1954; V. Zoubek, 1957) as part of nappe tectonic unit of higher order. In order to stress the regional, not local character of this structure, we shall use for it formally the name Markuška nappe so far. Its rocks belong to the Early Paleozoic group of Hladomorná dolina and its sedimentary envelope with stratigraphic range Upper Carboniferous to Lower Triassic. The group of Hladomorná dolina proper is laterally represented by two sequences — in the southern region it is the Hladomorská dolina group s. s., the filling of which north of Slavošovec is formed mainly by dark-grey and greenish grey chlorite-sericitic and quartz phyllites to mica-schists, north of the Zelinová dolina valley the sequence of dark phyllites with basic volcanism predominates. This sequence occurs west of Rejdová, on Tálfiová, in the cutting of the Dobšinský potok-brook and then beyond the area under study far away to the north at the foot-hills of Kráľová hoľa north of Švermovo and in the area of Úplaz and Predná hoľa. There the rocks, close in material, were investigated by Š. Bajanič et al., (1979) and from tuffitic and phyllitic rocks near diabases an

Upper Devonian palynoflora was described and their correlation with similar ones at Heľpa and from the Dobšiná half-window was suggested. There is probably a higher stratigraphic member of the Hladomorná dolina group. Phyllites with basics from the Dobšiná half-window were prevailingly ranged into the Carboniferous or Triassic in the past. The Markuška nappe is of fold character near Slavošovce, farther to the NW near Rejdová, however, its lower overturned limb is gradually wedging out. In the lower limb a probably Upper Carboniferous sequence of dark micaceous shales and greywackes, locally also of quartz conglomerates, is preserved. A sequence

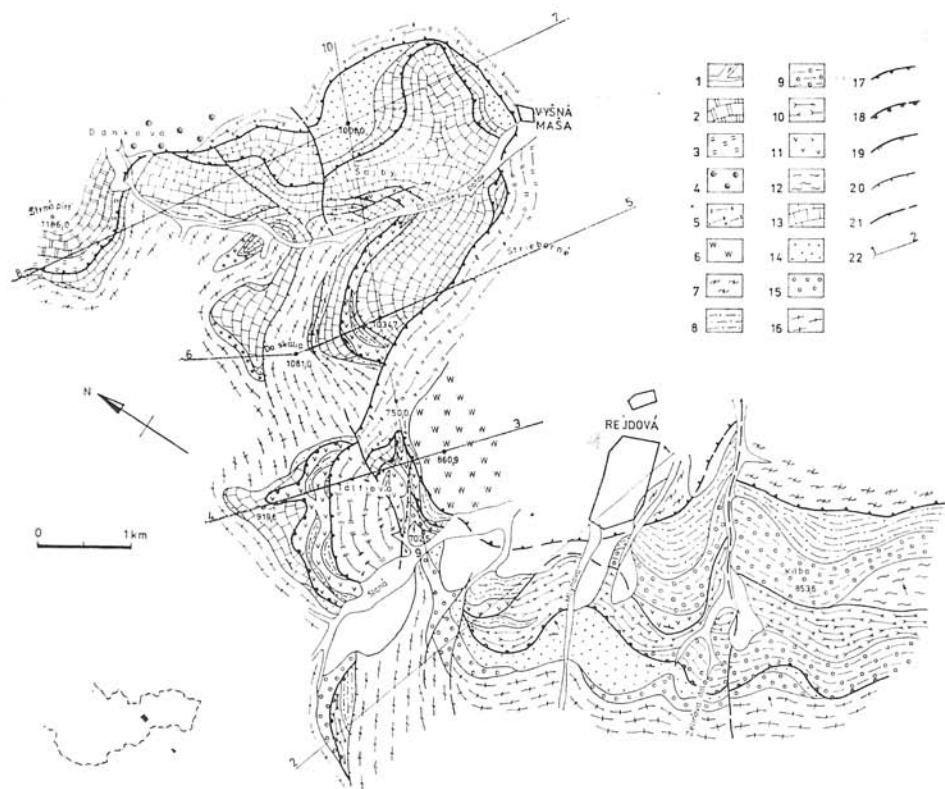


Fig. 1. Geological sketch map of the area of the Dobšiná half-window and northern part of the Markuška fold.

- 1 — Quaternary; 2 — 3 North Gemeric Mesozoic (or Silicic); 2 — Middle Triassic, limestones and dolomites; 3 — Werfenian, variegated shales and marlstones; 4 — 7 Gemeric; 4 — Permian, variegated sandstones and shales; 5 — Carboniferous, Hámor beds; 6 — Rakovec group; 7 — Gelnica group; 8 — 12 Markuška nappe; 8 — Lower Triassic, quartzites; 9 — Permian, shales; 10 — Upper Carboniferous, dark shales and sandstones; 11 — Upper Devonian?, dark phyllites and diabases; 12 — Devonian?, phyllites to mica schists (11 — 12 Hladomorná dolina group); 13 — 15 Foederata group; 13 — Middle Triassic, limestones and shales; 14 — Lower Triassic, variegated shales and quartzites; 15 — Permian, arcoses and shales; 16 — Kohút crystalline; 17 — overthrust of the Gemeric or Silicic; 18 — overthrust of Markuška nappe; 19 — overthrust of Šajby fold; 20 — upthrusts; 21 — faults; 22 — profile lines.

from the southern areas of the Veporides, close in lithology and metamorphism, is described by E. Planderová — A. Vozárová (1978) as the Stephanian C—D. North of Slavošovce its gradual transition into probable Lower Permian light-coloured arcoses, lying in their underlier, is evident. In the upper limb the Carboniferous is missing and immediately on the Hladomorná dolina group are resting Permian, originally clayey and sandy rocks, which acquire an „arcose” character with crystalloblastesis of quartz and albite (S. Vrána, 1964b) and Lower Triassic quartzites. The nappe character of this complex is evidenced by the following facts. West of Rejdová, underlying the allochthonous Permian (which is wedging out to NW) and Upper Carboniferous, Lower Triassic quartzites occur, which we consider as part of the Foederata group (Fig. 1, Fig. 2, profile 1—2). The structural disharmony between both units is considerable. The quartzites are of simple monoclinial position, whereas the incompetent Upper Carboniferous shales are highly folded mainly at the base of the overthrust (cutting of new road in the Mlynová dolina valley). On Táľiova and in the Dobšínský potok brook the Devonian sequence is even lying on light-coloured Ladinian limestones (Figs. 1, 2, profile 3—4). The situation is here, however, considerably complicated by postoverthrust folded-sliced deformations, which caused mutual refolding of the Kohút crystalline, Foederata group and Markuška nappe. In this conception we consider the slice of Devonian phyllites with lenticles of probably Lower Triassic, tectonically wedged in quartzites on the ridge Do skália as synclinal, not anticlinal structure as interpreted by A. Klíne c (1979, p. 168) — cf. Fig. 2, profile 5—6. The core of this syncline is detached through on the other side of the Dobšínský potok brook (Fig. 2, profile 7—8). A nappe position of the probably Upper Devonian volcanic complex (diabases and quartz keratophyres — c. f. Š. Bajaník et al., 1979) is evident also near Švermovo, where the latter lies on the Triassic envelope of the Kráľova hoľa crystalline (D. Plašíenka, 1979b). Thus the Markuška nappe is obviously the uppermost Veporic structural unit, orderly coincident with the Hron complex and Kráľova hoľa nappe, which were distinguished by A. Klíne c (1966).

Alpine metamorphism and stage-character of tectonic development

Alpine metamorphism of the Kohút crystalline, Foederata group and Markuška nappe is on the whole of equal character in this region and falls to lower subfacies of green schist facies cf. S. Vrána, 1964a, b, 1966. The syn-tectonic recrystallization, connected with formation of metamorphic schistosity, was later, probably in connection with intrusions of Alpine granitoids, replaced by metasomatic growth of quartz and albite porphyroblasts at the southern margin of the Veporides. According to S. Vrána (1964b) this is also valid for the Gemeride fundament, however, not already for the North Gemeride and Muráň Mesozoic, at the base of which is a distinct metamorphic throw in contrast to the underlying Veporide units. We suppose that metamorphism had its place after overthrust of the Markuška nappe and probably also of the Gemeride fundament (the Alpine metamorphism also reached conditions of lower subfacies of green schists facies — I. Varga, 1973) before or also during further reduction of space along zones with sliced

tectonic style (Lubeník line, Zdychava fault zone) and culminated after releasing of pressures with penetration of Alpine granites (L. Rozložník, 1978). The imbricate tectonic style of isoclinal folds and slices in the Dobšiná half-window cannot be designated as explicitly deep and synmetamorphic, because the steep upthrusts from the lower structural stages, mainly formed by the Kohút crystalline, are passing higher up into subhorizontal thrusts [recumbent fold of Šajby — Fig. 2, profile 7—8) and in tectonic breccias connected with these upthrusts fragments of already metamorphosed limestones occur.

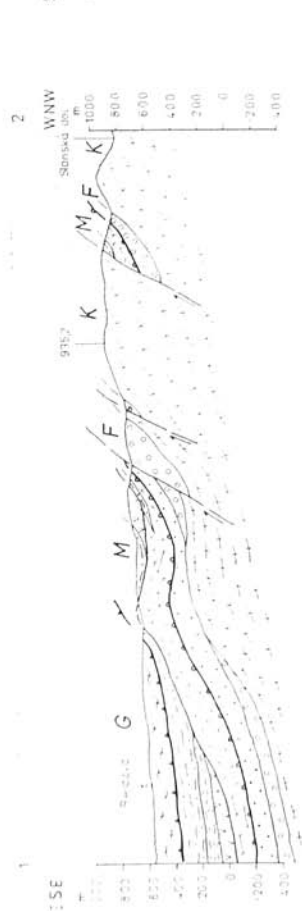
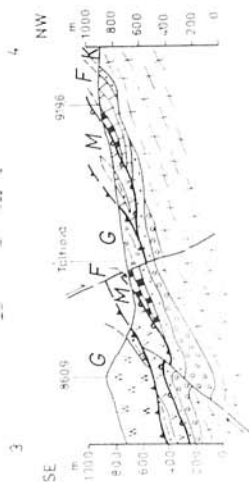
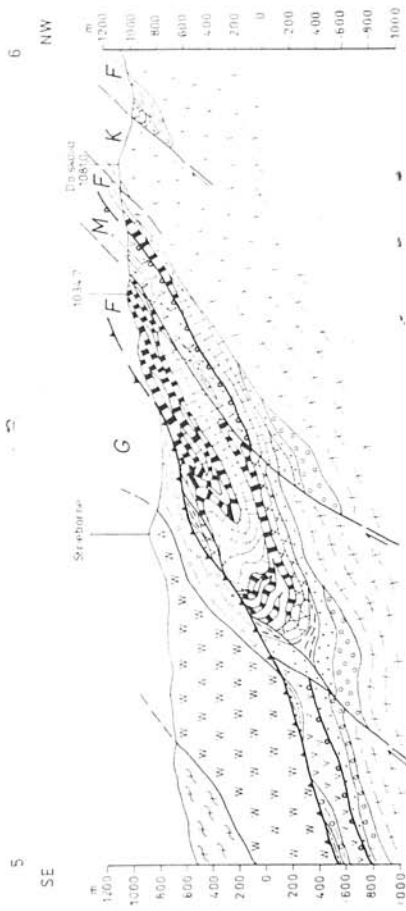
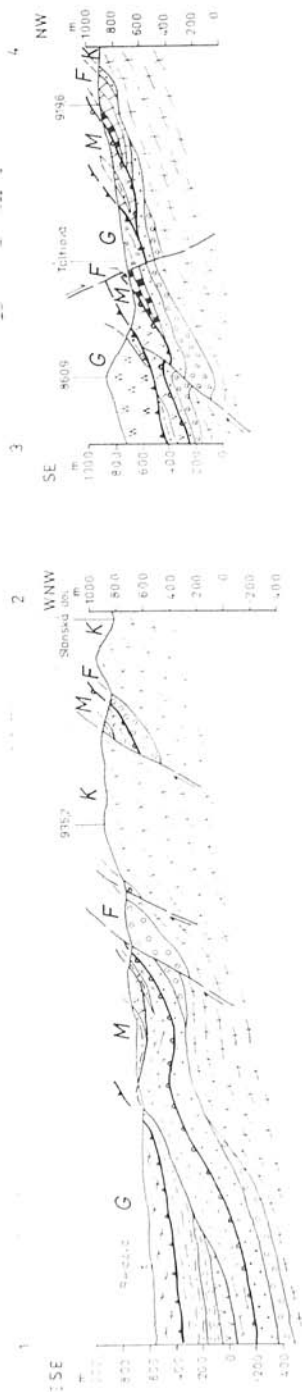
After metamorphism probably a longer period of tectonic rest set in, connected with uplifting and intense denudation („postmetamorphic breaking up of the Veporides” — S. Vrána, 1966). The nonmetamorphosed superficial nappes („Gemeride” Mesozoic and/or Silicic) are of relief character of overthrust and perhaps gravitation played the greatest role in their formation.

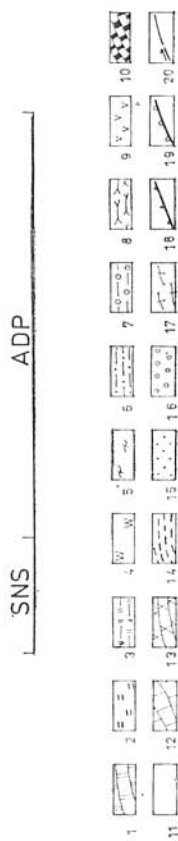
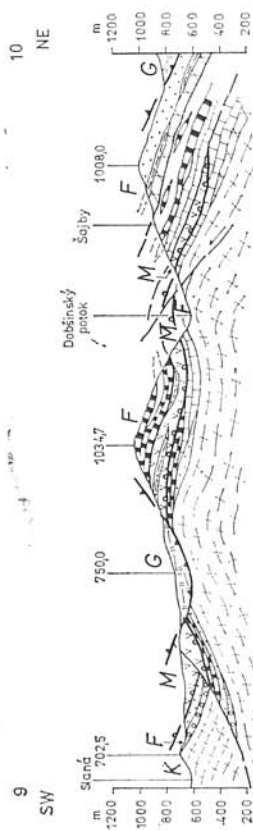
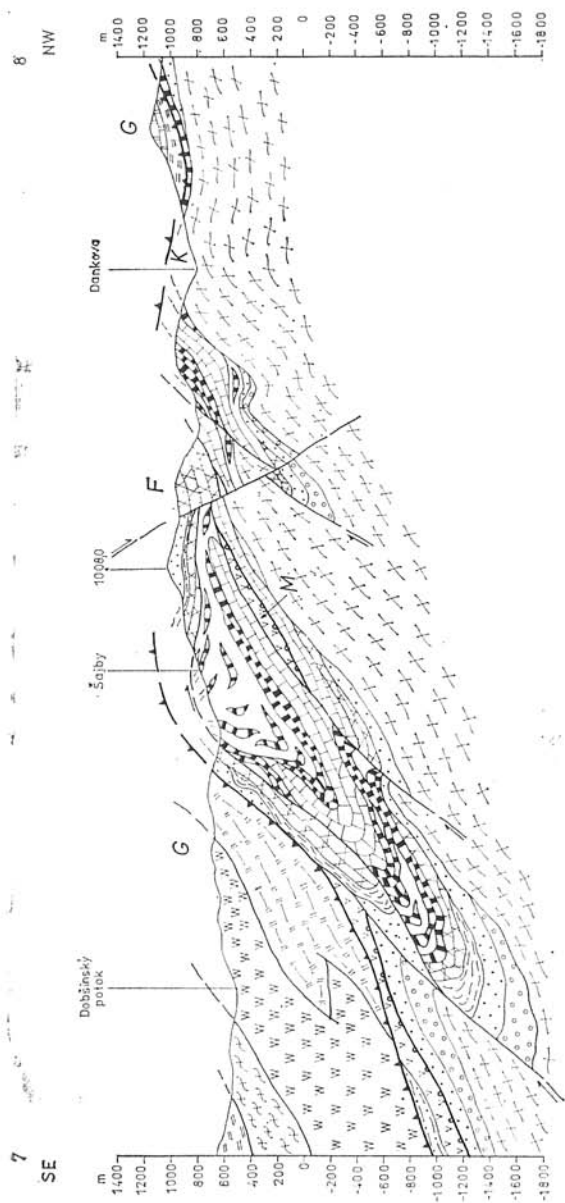
Transversal structures

As the next important question of this region appears the function of the transversal Štítník fault. Along the whole northeastern termination of the Veporide block, which is actually a continuation in the direction of the Štítník fault, manifestations of transversal folding with structural directions NW—SE can be observed, which alternate with much more intensive movements in „normal” vergency to NW. On the whole two stages of transversal folding may be distinguished. The first quite intensive (open folds of the order of 100 m, locally upthrusts — c. f. profile 9—10 in Fig. 2) was taking place after overthrusting of the Markuška nappe, metamorphism and slicing along the Zdychava fault zone. Distinct minor-structural element (fracture cleavage in competent, crenulation cleavage in less competent rocks and also flexure, minute folds, the axial directions l_2 of which are almost perpendicular to older lineations l_1) of this folding are well visible mainly in the Rejdová—Slavošovce area. The second stage followed after overthrusting of superficial nappes, forming wide and shallow folds of km order (synclinal structure of the Nižná Slaná depression, anticlinal structure of the Dobšiná halfwindow — Fig. 2, profile 9—10). These transversal movements gave rise

Fig. 2. Geologic profiles at the NW end of the Veporic;

1—2 North Gemeric Mesozoic (or Silicic); 1 — Middle Triassic; 2 — Werfenian; 3—5 Gemeric; 3 — Carboniferous, Hámor beds; 4 — Rakovec group; 5 — Gelnica group; 6 — 9 Markuška nappe; 6 — Lower Triassic, quartzites; 7 — Permian, shales; 8 — Upper Carboniferous, dark shales and sandstones; 9 — Upper Devonian ?, dark phyllites and diabases (Hladomorná dolina group); 10 — 16 Foederata group; 10 — Anisian to Carnian, dark marly and cherty limestones; 11 — Anisian to Carnian, dark shales; 12 — Ladinian ?, light-coloured limestones; 13 — Anisian, dolomites; 14 — Campilian, variegated shales; 15 — Seisian, quartzites; 16 — Permian, arcoses and shales; 17 — Kohút crystalline; 18 — overthrust of the Gemeric or Silicic 19 — overthrust of the Markuška nappe; 20 — upthrusts and faults G — Gemeric (or Silicic); M — nappe of Markuška; F — Foederata group; K — Kohút crystalline; SNS — synclinal structure of the Nižná Slaná depression; ADP — anticlinal structure of the Dobšiná half-window.





on the whole to a steep axial depression (complicated megaflexure, see also D. Plašíenka 1979a) of the Veporic below the overlying complexes.

Conclusion

Distinguishing of particular tectonic units and the indicated succession of the tectonometamorphic processes are tempting us to some important generalizations. Mainly the contact of the Veporic with the Gemic, is of nappe character in the Rejdová—Ochtiná area, the Alpine metamorphism is irrespective of this overthrust plane and is thus probably younger. This question, however, will have still to be studied in detail. On the contrary, at the base of higher nappes — Muráň and North Gemicide Mesozoic, which are perhaps part of the Silicic (J. Mello, 1979) a metamorphic throw has been established since long ago and their overthrust is of younger date.

From this aspect it is also difficult to seek for the root zone of the Choč or higher nappes between the Veporic and Gemic. The zones with a sliced tectonic style, as the Lubeník and Zdychava zones, we consider as younger than formation of nappes of the fundament (Kráľova hoľa, Markuška and Gemicide nappes), but older than overthrusting of the Silicic. The Lubeník line with steep dips of the Veporic below the Gemic formed on an already existing nappe structure and continues from Ochtiná probably to the interior of the Gemic, whilst the boundary of the Veporic and Gemic is to the north of it, as far as Rejdová, of original flat character. A further zone with sliced tectonic style and steep contact between the Veporic and Gemic W of Dobšína continues to the interior of the Veporic with the syncline of Kyprov vrch (A. Klíne c, 1962) and Zdychava fault zone.

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