SOME CONSTRAINTS TO INTERNAL DIVISION OF THE MELIATA UNIT S.L. (INNER WESTERN CARPATHIANS, SLOVAKIA) BASED ON PETROGRAPHIC STUDY AND FIELD RELATIONS

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Abstract: Based mainly on petrographical and field data from the Meliata s.l. Unit, we can distinguish on the basis of their protolith two subunits: upper complex of 'stratigraphically Meliatic' and lower complex of 'stratigraphically non-Meliatic' origin built by at least 7 different slices/developements (Ivan & Mello,2001). The aim of the paper is to extend already existing division schemes of the Meliata Unit s.l. by results of field investigations and petrographic data.

Key words: Meliatic, accretionary wedge, protolith, HP/LT, melange, basic rocks

The Meliata Unit s.l. in Slovakia is considered an accretionary wedge built mainly by remnants of the Triassic-Jurassic Meliata-Hallstatt oceanic basin. However, due to differences in metamorphism, age and probable protoliths the Meliata Unit in tectonic and in paleogeographic sense do not match. Basically there are two different approaches: Mello et al. (1997) subdivided the unit on the base of metamorphism: the HP/LT metamorphosed parts they called Bôrka Nappe and the non-metamorphosed ones Meliata Unit s.s. Faryad (1995) offered a scheme when he had subdivided the Bôrka Nappe into upper (derived from Meliatic basin) and lower complexes (derived from other protolith) based on metamorphism and Ar/Ar age data; his scheme however do not include the Meliata Unit s.s. Aim of this paper is to extend the most recent division schemes of Ivan and Mello (2001) and Ivan (in press) with some field and petrographical data.

Respecting age, metamorphism, protolith, geochemical and tectonic style criteria we can recognize at least 7 different developments in the Meliata Unit s.l. which most probable correspond also to tectonic slices/subunits.

From bottom they are:

Developements of stratigraphically non-Meliatic origin (lower complex)

1, phyllonitized amphibolites and gneisses of unclear tectonic position from Rudník village first mentioned by Faryad (1988), more recently Ivan and Mello (2001) pointed out this series suffered amphibolite-facies metamorphosis probably of pre-Meliatic age overprinted by blueschist and further greenschist (phyllonites) overprint. Geochemically these rocks belong to N-MORB.

2, metamorphosed Permian psefitic-psammitic series (Jasov and Filipka development); tectonically they form well-layered slices on the N border of the Slovak Karst. This sequence is the

spatially most widespread one, known in large occurrences in Nižná Slaná Depression as well as in the N margin of the Slovak Karst (in the area of Jasov - Medzev - Hačava).

4, Permian series can be represented also by metamorphosed rhyolites and acidic volcanoclastics (Golát and Bučina developments). In spite of their logical relationship to Permian metaclastic series (2) based on results of geological mapping this sequence seems to be overlying the basic metatuffs (3, see below). Developements (2) and (3) are well comparable with north-Gemeric Permian Knola Fm (metaclastics) and Petrova Hora Fm. (metarhyolites) (see Vozárová,A & Vozár,J.,1988).

However actually Mello et al.'s (1997) concept is the most accepted in which they form two separate slices there are facts which show rather their lateral transition. There are only two occurrences where these two developements occur in the same vicinity: Nižná Slaná - Čertov chrbát Hill and Golát Hill near Medzev; generally we can sustain that developement (2) occupies southern parts of the study area (Nižná Slaná Depression and the Jasov-Medzev area) while developement (3) is known in the more northern parts mainly in the area of the Radzim Hill (Bučina developement), less in the Golát Hill (Golát developement). The Golát Hill is however an isolated occurrence which has tectonic contact with the neighbouring Jasov Fm. metaclastics as well as with the overlying Hačava developement/slice (6). The Čertov chrbát Hill is also problematic: the 'ring' of Meliata Unit banded phyllitic metatuffs (3) is in fact covered by fields with no outcrops; thus we cannot except that the metatuffs were originally overlying the more resistant metarhyolites - recently forming the top of the hill - and was eroded and redeposited on its slopes as a 'ring'.

3, basic metapyroclastics known from the N margin of the Slovak Karst (Jasov area) and in the Nižná Slaná depression (Nižná Slaná developement sensu Ivan & Mello,2001). These banded, often schistose less massive rocks form a heterogenous series of glaucophanites, greenschists and sometimes also micaschists. Metamorphic history of this series is not fully known, occurrences of biotite-garnet bearing micaschists can be assigned to a former MP/MT metamorphism, garnet, rare occurrences of omphacite and rutile in some massive glaucophanites to HP/MT; the bulk mass of the rocks is generally metamorphosed in epidote-blueschist facies conditions. Almost all rocks suffered strong retrgograde metamorphosis into greenschist facies. Geochemical analysis of these rocks show CAB-affinity even we need to interpret this data carefully due to heterogeneity of the series. The slice seems to be thickest in the southern parts of the study area and northwardly thinning: in the vicinity of the Filipka saddleback (Nižná Slaná depression) the slice forms only smaller local relics and on the southern slopes of the Ždiar Hill towards to north probably disappears.

Developements of stratigraphically Meliatic origin (upper complex)

5, metamorphosed melange with massive glaucophanites with magnetite (Ždiar developement) occur only in the massif of Ždiar (Nižná Slaná Depression). The melange is built by phyllitic matrix including blocks of crystalline limestones and glaucophanites. Basaltic protolith of glaucophanites

was coarse grained (doleritic and ophitic fabric), which can imply their origin in lower parts of the oceanic crust. Metamorphic history of these glaucophanites reached its peak with epidote-blueschist facies followed by a medium-scale retrogression into greenschists. Geochemical characteristics of these rocks are close to IAT.

6, metamorphosed melange with structurally variegated glaucophanites (Hačava developement) is one of the most widespread types occurring in the S-SW slopes of the Radzim Hill (Nižná Slaná Depression) and in the N margin of the Slovak Karst near villages Hačava and Bôrka. This melange series consists of phyllitic matrix with blocks of variegated crystalline limestone and metabasic blocks, scarcely also metacherts. Structurally the basaltic protolith ranges from glassy types and volcanic breccias to fine- to medium-grained ophitic basalts; in some samples even magmatic pyroxenes preserved. These rocks were metamorphosed in epidote-blueschist facies and subsequently retrogressed into greenschists. Geochemical characteristics show N-MORB affinity or BABB, respectively (Ivan, in press). Occassionally basic tuffs can form synsedimentary intercalations in limestone blocks (Šugov locality) where these glaucophanized tuffs has signs of WPB origin - thus they can represent first relics of a very beginning of the rifting even in the environment of the not-fully-disrupted carbonatic platform. Based mainly of lithological analogues age of this sequence is Triassic-Jurassic.

7, non- or only very slightly metamorphosed melange with structurally variegated spilitized basalts. This type is known from several occurrences: 7.1, south of the Rožňava line - where the above mentioned metamorphic sequences lack - they occur in forms of small tectonic windows below the Torna or Silica Nappe systems, probably also as slices in melange (Meliata s.s. sensu Kozur and Mock,1985). 7.2, in the vicinity of village Jaklovce they are in nappe position on the underlying Gemeric basement. Stratigraphy of these series is relatively well documented and up to middle Triassic similar to the neighbouring carbonatic platforms, sedimentation is rapidly changed (appearance of radiolarites) in the Ladinian due to the beginning of the Meliatic rifting which also produced the first basaltic magmas. During the Jurassic subduction - terminated in the upper Jurassic - all these older members were incorporated into the shales of the Meliatic accretionary wedge as blocks or olistoliths (Mello et al.,1997). The Jaklovce and Meliata s.s. subunits/developments show also some differences in volcanism. The Jaklovce development basites show large variability in magmatic structures from volcanic glasses and breccias through arborescent and intersertal to coarser ophitic fabric with dominancy of ophitic ones; on contrary, among my samples from Meliata s.s. series (Meliata, Čoltovo) coarser-grained types are known only as fragments in volcanic breccias while glassy types dominate. These basic rocks was not significantly metamorphosed, only more or less strong spilitisation take place. Unfortunately, Meliata s.s. basic rocks are not suitable for geochemical analysis; the Jaklovce basalts show clear N-MORB affinity.

General characteristics of these parts of Meliata Unit s.l. of 'stratigraphically Meliatic origin' are:

- melange character reflecting accretionary wedge tectonics

- shaley/phyllite matrix - according to different metamorphic stages; in non-metamorphosed occurrences dated as Jurassic

- blocks included in the shaley melange: basic rocks, limestones, radiolarites in the non-metamorphosed parts and crystalline limestones, basites and rarely metacherts in the HP/LT metamorphosed ones. Interesting is the coincidence of radiolarites with more primitive MOR basalts which may indicate their original position in deeper - and thus probably younger and more axial - parts of the ancient Meliata basin.

- basic rocks represent higher levels of an oceanic crust; the deepest originated rocks can be coarse-grained, doleritic basalts - maybe relics already of the sheeted dyke complex, the most dominant types are ophitic - medium-grained basalts and relitively abundant are also glassy types - volcanic breccias in metamorphosed as well as in non-metamorphosed parts.

- prograde metamorphism varies in a relatively large interval from slight spilitisation through greenschists to epidote-blueschists; retrograde metamorphism had also different importance in different slices. This fact well corresponds to our knowledge about dynamics of burial and exhumation in recent accretionary wedges.

- these subunits always overlay the 'non-Meliatic' lower complex developements even not every subunit is necessarily present.

Based on this summarisation of Meliata Unit s.l. basic rocks we can draw the following scheme: (Fig.1)

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