are hosted in marbles they have the anhydrous assemblage: quartz + plagioclase + Kfs + diopside-hedenbergite cpx + titanite + scapolite + zircon. This paragenesis is interpreted to arise from the interaction of silicic magma with the carbonate host rock. In carbonate rich environments the fluid phase composition should be rich in $CO_2$. Fluid phase compositions $X_{CO2}fl>0.5$ have been reported in analogous cases where silicic melts are in contact or intrude carbonate rocks. Under these circumstances, imposing nearly anhydrous conditions of crystallization, silicic liquids of extremely high temperature are required in order to crystallize rocks with pegmatitic texture It has been experimentally established that for P=5 to 10 kb and $X_{CO2}fl=0.7$ the granitic Ts is 800 ºC, whereas it is above 950 ºC for $X_{CO2}fl=0.9$. This implies that melting of the gneisses took place at a temperature well above the wet granitic solidus. It is suggested therefore that (HP?) granulite facies conditions existed during the partial melting of the gneisses and the formation of the studied granitic and monzonitic leucosomes in this part of the Rhodope.

## Partial melting and genesis of HP graphite-bearing granulites in the Intermediate Unit of the Central Rhodope Metamorphic Province, Greece

Kipouros N. and Dimitriadis S.

*School of Geology, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece, nkipouro@geo.auth.gr, sarantis@geo.auth.gr*

Three main tectono-lithostratigraphic Units are pilled up in the Greek part of the Rhodope Metamorphic Province. The Lower Unit (Pangaion complex), with continental passive margin affinities, is composed of orthogneisses of Permo-Carboniferous magmatic age overlain by amphibolite facies marbles and minor schists. The Intermediate Unit is an assemblage of strongly deformed -in parts ultramylonitic- and variably migmatized lithologies of oceanic and trench affinity (amphibolites, eclogites and metatrondjemites bearing MORB and arc signatures, metacherts, phengitic quartzites, biotite gneisses, pelites, psammites and calcsilicates), into which large pods of ultrabasites and ~300 Ma orthogneisses are tectonically intercalated. Biotite (± amphibole) gneisses, dominating the upper part of the Intermediate Unit, are interpreted as trench filling metagreywakes of mainly volcanic origin, dragged down and accreted to the overriding plate of a subduction zone active during the Late Jurassic. Above them, the Upper Unit is composed of orthogneisses of Late Jurassic magmatic age, probably the edifice of a volcanic arc built above this subduction zone.

Although HP (kyanite field) amphibolite facies parageneses characterise the ITU, some evidence of UHP metamorphism has been reported from ex-eclogitic pods and some pelites in it. These may represent samples of deeply subducted material returned by some mechanism from mantle depths and tectonically emplaced at shallower levels. Evidence however also exists that the dominantly HP amphibolite facies parageneses in the ITU overprint earlier HP (kyanite, cpx) granulite facies ones, which were imposed coevally with partial melting in this unit. For the now exposed subducted oceanic and trench lithologies of the ITU, this implies a prolonged residence and thermal relaxation near the base of an overthickened crust, apparently after continental collision. This could only be achieved by an abnormally slow collapse and levelling of the orogen above, probably as a result of preserving a high crustal relief due to Cretaceous shortening (?thrusting) in the Rhodope.

Focused in an area near Sminthi village, partial melting phenomena in the ITU related with the HP granulite event are examined in some detail. The dominant rock type in this area is a migmatized dark coloured Bt-gneiss. Leucosomes of variable sizes and distribution forms have been separated from the mesosomatic gneisses and are interbedded with or cut as veins the surrounding gneisses and marbles. (?)Syn- to post-melting intense deformation affects both the mesosomatic gneisses and the leucosomes forming boudins and tight isoclinal folds. From the migmatitized gneisses two representative rock types bearing evidence of an early HP granulite facies event have been studied in more detail. The first is a medium grained, mesosome dominated metatexitic migmatite with Bt + Pl + Qtz + Kfs + Cpx(Amp) + Gt + accessories (All, Ttn, Ap, Gr, Py(Ght), rounded zircons). The second is a coarse grained

metatexitic paragneiss with Phl + Gt(Bt) + Ky(minorSill) + Pl + Qtz + Kfs + Rt + Gr. Melting should have been anhydrous; likely dehydration melting reactions are:

a) Bt + Pl + Qtz = Cpx + Gt ±Kfs + melt.

b) Phe + Pl + Qtz = Phl + Als + Gt + melt

c) Bt + Als + Qtz + Pl = Gt ± Kfs + melt.

The leucosomes are anhydrous pegmatites or aplites, bearing mostly Di-Hd cpx (when hosted in marbles) or garnet (when hosted in biotite gneisses). Graphite and sulphides are ubiquitous in both mesosomes and leucosomes, suggesting highly reduced conditions during melting.

## Correlation of Neotethyan rifting related peperitic basaltic occurrences in the Dinarides, displaced fragments of the Dinarides and in the Hellenides

Kiss G.[1], Molnár F.[1], Palinkaš L.A.[2] and Kovács S.[3]

[1]*Department of Mineralogy, Faculty of Science, Eötvös Loránd University, 1117 Budapest, Pázmány P. sétány 1/c, Hungary, gabriella-kiss@chello.hu*

[2]*University of Zagreb, Faculty of Science, Institute of Mineralogy and Petrology, 10000, Zagreb, Horvatovac bb., Croatia*

[3]*Research Group of Geology, Geophysics and Space Sciences, MTA-ELTE, 1117 Budapest, Pázmány P. sétány 1/c, Hungary*

Volcanological, mineralogical, petrological and geochemical studies on pillow lavas, peperites and hyaloclastite breccias as parts of basaltic extrusions of Triassic age into uconsolidated deep water sediments were carried out in the Jurassic mélange of the Darnó Unit (NE Hungary), which is a displaced fragment of the Dinarides. The results were compared with similar occurrences in the Kalnik Mts. (Croatia) and Vareš-Smreka (Bosnia and Herzegovina) in the Dinarides and in the Stragopetra Mts. (Greece) in the Hellenides. Earlier sedimentological and lithostratigraphical studies suggested advanced rifting-related origin to these formations; however petrological and petrochemical comparisons are made in the framework of the present study.

At the studied localities at most six different volcanological facies can be distinguished (coherent pillow, closely packed pillow, in-situ hyaloclastite breccia, pillow fragmented hyaloclastite breccia, isolated pillow breccia and peperitic basalt); in the Kalnik Mts., a complete submarine lava mould-flow complex with all of these facies is known. Comparing the other localities to this complete system, the volcanological facies can be identified even in occurrences characterized with small blocks. In the studied Darnó Hill quarries, the closely packed pillow, the hyaloclastite breccia and the peperitic facies were observed, suggesting an originally distal position in the submarine lava flow. At Vareš-Smreka and Stragopetra only the peperitic facies is known. This facies bears high importance, as it forms when the lava arrives into the water soaked sediment; mingling the basalt with the limey mud is a clear evidence of early rift-type formation (i.e. formation above the CCD level), and this can be used in the field to distinguish these associations from the Jurassic ophiolites (formed below the CCD level) occurring in the same mélange.

Petrographic features show similarities among the basalts of the studied localities; the textures are sphaerolitic and variolitic, while the main rock forming components are albitized plagioclase with skeletal crystal habit, calcite/chlorite/serpentine pseudomorphs after olivine, opaque minerals (pyrite, chalcopyrite, hematite) and microcrystalline material as groundmass while clinopyroxene and glass are rare.

Results of the fluid inclusion studies and examination of the hydrothermal minerals at all the studied localities show that extended fluid circulation system did not develop, but rapid cooling was characteristic in the seawater-dominated hydrothermal system. Several stages of the alteration can be distinguished; after the chloritization of the groundmass, the hydrothermal infillings (quartz, chlorite, epidote, prehnite, pumpellyite, calcite and zeolite) of the amygdales, veins, pyjamas-type basalts' mineral bands and earlier feeding channels of lava lobes have formed, then finally the low-temperature layer-silicates precipitated. Fluid inclusion and chlorite thermometry data suggest shallow depths of 1.4-4 km for the fluid/rock