(from E to W), under LU the main foliation S1, mineral lineation L1 and folds F1 were produced. The southern parts of both units, were affected by HP/LT metamorphism. Subsequent exhumation processes were initially associated with increasing temperature (amphibolite facies in the KCU, higher P range of greenschist facies in LU) and then, with continuous regression, up to LP/LT greenschist facies. The top part of KCU accomodated the highest rates of ductile, rotational deformation. D1 in the PU adjacent to the N part of the LU acted exclusively under greenschist conditions. In a dextral transpression regime in brittle-ductile conditions the following D2 structures formed: W-E trending F2 mesofolds, axial cleavage S2 and crenulation lineation L2 k. Locally, after the change of paleostress direction other structures were developed: N-S oriented L2z flexural slip lineation (only in KCU) and late F2' folds and L2z' mineral lineation (only in LU). During D3 phase, in brittle regime, F3 "kink band" folds formed. Phases D2 and D3 reoriented earlier structures, so that D1 kinematic indicators now appear to indicate E vergent nappe stacking, on generally E dipping foliation planes, with down-dip tectonic transport. The final RJMC structure may be described as an antiformal stack and foreland dipping duplex.

Kryza R, Mazur S, Pin C., *N. Jb. Miner. Abh.*, 170/1, 59-74, (1995).
Oliver GJH, Corfu F, Krough TE, *Jour. Geol. Soc. London*, 150, 355-369, (1993).
Winchester JA, Floyd PA, Chocyk M, Horbowy K, Kozdroj W, *Jour. Geol. Soc. London*, 152, 105-115, (1995).

LS07 : TUpo29 : PO
Geochronological Constraints on the Tectonometamorphic Development of the West Sudetes (Bohemian Massif)

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The West Sudetes (NE margin of the Bohemian Massif) consist of a complex mosaic of several tectonometamorphic units regarded as autonomous terranes. The terrane juxtaposition is interpreted as a result of Variscan multiple collisions of members of the Armorican Terrane Assemblage (ATA) and their amalgamation with Baltica and/or Avalonia followed by late Variscan large-scale thrust and shear movements. The polyphase Variscan development of the West Sudetes was precised by ^{40}Ar-^{39}Ar ages.

The oldest ages around 365-360 Ma were obtained from the mafic blueschist in the East Krkonose Complex (EKC) (Maluski & Patocka 1997) and the high-grade rocks of the Gory Sowie Massif (GSM). This coincidence suggests that the end of a subduction related HP-LT metamorphism in the EKC was contemporaneous with the end of a HT-LP metamorphism in the GSM.

Mid/Late Devonian HP-events in the Krkonose-Jizera Terrane and Orlica-Snieznik Dome are followed by coeval HT-events between 345-330 Ma (Visean), which are interpreted as consequence of uplift, and decompression during overthrusting of both complexes on their forelands. Subsequent small- to large-scale shear movements dated at around 325-320 Ma affected all the above mentioned units, including the Intra-Sudetic Fault, and generated the contemporaneous emplacement of the Krkonose pluton. The upper limit of the tectonometamorphic and magmatic activity is dated at 314-312 Ma.

The distribution of Ar-Ar ages in the West Sudetes reflects the complexity of the Variscan polyphase deformation and metamorphism ranging from very low-grade to eclogite facies with peaks around 360 Ma (HP-; HT-events), c. 340 Ma (HT-event) and c. 325 Ma (shearing and thrusting). The final juxtaposition of the diversified tectonometamorphic units, which constitute the West Sudetes, took place in the Early Namurian.

A comparison of geochronological data obtained from subduction-related HP-rocks of the ATA reveals the set of broadly contemporaneous latest Devonian HP-events pursued by Viscan exhumation processes at least in the West Sudetes, Armorican Massif (Champtoceaux) (e.g. Ballevre et al. 1999) and NW Iberian Massif (Malpica Tuy) (e.g. Rodriguez Aller et al. 1997). This conformity could be interpreted as closure of intervening seaways between members of the ATA at around 360 Ma (Carboniferous/ Devonian boundary).

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Ballevre M, Bosse V & Capdevilla R, *J. Conf. Abs.*, 4, 88, (1999).
Maluski H & Patocka F, *Geol.Mag.*, 134, 703-716, (1997).
Rodriguez Aller J, Cosca M & Gil Ibarguchi JI, *Terra Nova*, 9, 497, (1997).

LS07 : TUpo30 : PO
The Significance of the Mariánské Lázne Complex during the Paleozoic Amalgamation of Central Europe: A Radiogenic Isotope Study on Eclogites and Related Rocks

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The high-grade metamorphic Mariánské Lázne Complex (MLC) between the continental lower grade Saxothuringian Zone in the northwest and the medium-grade Teplá-Barrandian Unit in the southeast comprises the largest outcrop of metamorphosed basic rocks in the Bohemian Massif. The southeast dipping MLC was previously interpreted as a dismembered Cambro-Ordovician ophiolite complex incorporated into different structural levels of an accretionary wedge that subsequently experienced high-grade metamorphism during the Variscan orogeny (Kastl and Tonika 1984, Bowes and Aftalion 1991). Different thrust-bound rock units with varying metamorphic grades include serpentinised peridotites, amphibolitic schists, amphibolite gneisses with eclogite lenses, metagabbros and coronitic metagabbros, and intercalations of paragneisses and felsic orthogneisses. Although the lithologies, structures, and metamorphic histories are often compared with other basic units from the western margin of the Bohemian Massif, i.e., the Zone of Erbendorf-Vohenstrauss (ZEV) or the Münchberg Massif, geochronological data for the MLC are sparse. A U-Pb zircon upper intercept of 496 ±1 Ma from a gabbro pegmatite indicates Early Ordovician crystallisation, however, other rock units of the MLC formed at different, and as yet unknown, times and settings (Bowes and Aftalion 1991). Sm-Nd isochron ages of ca. 420 and 409 Ma were ascribed to late Silurian/Early Devonian prograde metamorphism or to a cryptic amphibolite facies metamorphism, whereas 377 Ma and 367 Ma Sm-Nd isochrons were interpreted to reflect the timing of eclogite formation (Beard et al. 1995). However, similar ages in the ZEVand Münchberg Massif reflect the later high temperature event (e.g., Okrusch et al. 1997). In addition to dating the protoliths of the different rocks in the MLC, it is especially important to constrain the timing and relationship of the high pressure event and the following granulite facies and HT amphibolite facies overprints - do these belong to the same orogenic cycle? - in order to understand the geodynamic evolution and the tectonic processes that operated during formation of the rock units of the MLC. Primitive MORB-type eclogites with εNd(t) of +6.8 to + 7.7, as well as surrounding amphibolites (εNd(t) +2.5 to +7.9), metagabbros (εNd(t) +4.6 to +5.4), and continental rocks (εNd(t) +2.9 to -5.1) are dated by conventional U-Pb TIMS (and LA-PIMMS). The zircons from various eclogites are homogeneous without zonation in SEM backscatter images, typical for metamorphic growth, and may be used to constrain the high pressure event. In addition, the Lu-Hf systematics of garnet grown during the high-pressure event may be used to test the hypothesis that zircon growth occurred during eclogite formation.

Beard BL, Medaris LG, Johnson CM, Jelinek E, Tonika J & Riciputi LR, *Geol. Rdsch.*, 84, 552-567, (1995).
Bowes DR & Aftalion M, *Neu. Jb. Mineral., Mh.*, 7, 315-326, (1991).
Kastl E & Tonika J, *Krystalinikum*, 17, 59-76, (1984).
Okrusch M, Matthes S, Klemd R, O'Brien PJ & Schmidt K, *Eu. J. Min*, 3, 707-730, (1991).

LS07 : TUpo31 : PO
New Data Concerning Detailed Chronology of Variscan Deformation Events in a Key Sector of Ossa Morena Zone (Southern Iberian Variscan Fold Belt)

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The Viana do Alentejo-Alvito region is a key sector for the understanding of the Variscan tectonics in SW Ossa Morena Zone. In this sector it is possible to observe a North-South trending, West verging, antiformal macrostructure, comprising several tectonostratigraphic units from bottom to top: felsic gneisses, marbles, metapelites of the 'Série Negra' unit with enclosed eclogite bodies, and metapelites of the 'Xistos de Moura' unit. This macrostructure is bounded, to the West, by an intrusive mafic igneous complex, of ca. 340 Ma (the Beja Massif), comprising gabroic and dioritic lithologies. Previous work has considered these igneous intrusive rocks to be post tectonic. The succession of deformation events, at macroscopic scale, comprises: 1. an early D1 characterized by a pervasive planar fabric (S1), composite and possibly complex, with WNW-ESE direction dipping southwards, with an associated N-S stretching lineation; and 2. a D2 that overprints D1 structures by folding S1. Observed D1 structures exhibit a top to North sense of shear, whereas D2 structures indicate a top to the West sense of movement. In this paper we report new data concerning field observations and micro-tectonic studies in the Serie Negra and Marbles units:

a) In the metapelites, thin section observations of micaceous quartz-feldspar schists show existence of a refractory (graphite?) inclusion pattern, exhibiting a folded geometry of a previous deformation event (prior to the D1 defined before this study), inside twined feldspar and mica grains. Except for the graphite inclusion pattern, static recrystallisation of feldspar and mica completely erases the original rock texture and mineral assemblage (higher metamorphic grade?). We do not know yet which heat source caused the almost complete recrystallisation of the earlier rock - the intrusion of the Gabbroic Beja Massif? The answer to this question is greatly dependent on isotopic dating of the new recrystallised minerals and gabbros.

b) The marbles are intruded by the Beja Massif, which recrystallises the earlier S1 fabric of the marble. Dykes and sills originated in the Beja massif and cutting the marble are also penetratively deformed together with folded S1. This deformation can result from space problems due to the Gabbros emplacement and/or from persisting Variscan deformation.

Away from the Gabbroic Beja Massif, non-recrystallised marbles preserve a mylonitic planar fabric and a mineral stretching lineation trending NNE-SSW, with a top to the NNE sense of shear. This mylonitic fabric is not observed in adjacent outcrops where the recrystallised fabric is the latest event. Thus, such mylonitic fabric is older than ca. 340 Ma, the $^{40}Ar/^{39}Ar$ cooling age of the Gabbroic intrusion.