Introduction
Common eclogites (CE), very high-pressure eclogites (VHPE) (Săbău, 2000; Negulescu et al., 2009), metabasaltic gneisses (GN) (Negulescu et al., 2007), and Cr-rich eclogites (CE) (lenses (Cosin & Lülf, 2001; Negulescu, 2009) occur in the Bughea Complex (BC), a thin layer sandwiched between two units of polymineralic greenschist and marble, in low grade. The BC semipelites matrix comprise micaceous gneisses, amphibole-garnet schists and dioclastic bearing marbles that experienced up to 0.85-0.95 GPa and 555-565 °C while the calculated metamorphic conditions of the HP-blends range between 555-760°C, 1.5-3 Gpa (Negulescu et al., 2007; Negulescu, 2009), illustrating the incompatibility between these rocks and their host.

Aims and methods
Major elements (X-ray fluorescence: XRF) and trace element analysis (inductively coupled plasma - ICP-MS) were performed on three occurrences of CE (PC, RT, PS) from the Bughea Complex. Analyses were performed at the Institut für Mineralogie und Kristallchemie, Stuttgart (for details of analytical techniques and conditions see Massonne & Czambor, 2007). Mineral compositions were analyzed using a Cameca SX100 WDS electron microprobe with 5 spectrometers at the same institute. Operating conditions were: 15 kV accelerating voltage, 15 nA beam current, focused beam for anhydrous minerals, and 100 nA beam spot of 6 μm for hydrous or volatile-bearing minerals. Composite maps were obtained using the same EMP. Measurement conditions were 15 kV and 10 nA, the evaluation of the maps was performed using the Cameca software packages and ideal end-member concentrations.

The acquired data are used to best describe the origin of these unusual Cr-rich eclogites on the basis of bulk-rock chemistry, mineral compositions and geological context.

Mineral assemblages and mineral chemistry
In hand samples (fig. 1), the CE are fine grained with distinguished emerald-green rimmed nodules embedded in a fresh matrix made up of clinopyroxene-garnet amphibole-pelite-rudite, secondary amphiboles occurring among micromelts. The nodules consist entirely of Cr-rich minerals sheathed by hydrous phases also rich in Cr, as well as relatively abundant talc crystals. In the Cr-nodules (fig. 2, 3, 5) unusually Cr-rich amphiboles look like maganaites (fig. 5) and Mg-rich staurolites (fig. 6) associate with dioclastic chrome-beds, abundant Cr-rich micas and amphiboles (fig. 5, 6), also rich in K. Chromian diffusion halos extend away from the Cr-nodules (fig. 6) in the neighbouring amphibole, clinopyroxene, chlorite and talc.

Bulk-rock chemistry
The CE are characterized by relatively high MgO (11.59±1.14 wt %) and Mg# (82.0-109.5%) and high Na (ca. 40.0-50.0 wt %). The Cr-rich minerals sheathed by hydrous phases also rich in Cr, as well as relatively abundant talc crystals. In the Cr-nodules (fig. 2, 3, 5) unusually Cr-rich amphiboles look like maganaites (fig. 5) and Mg-rich staurolites (fig. 6) associate with dioclastic chrome-beds, abundant Cr-rich micas and amphiboles (fig. 5, 6), also rich in K. Chromian diffusion halos extend away from the Cr-nodules (fig. 6) in the neighbouring amphibole, clinopyroxene, chlorite and talc.

The distinctive textures of the CrE from the Bughea Complex support the same conclusion of Barag et al. (1991) of Cr- and Cr-rich staurolite and Cr-rich talc, forming through metasomatism partial destruction of Cr-rich spinels. Considering the textural, mineralogical and geochemical features of the CE, the well-determined aspect of the Cr-rich nodules, and their association with Cr-bearing hydrous phases in a rock showing otherwise no evidence of hydrosilicate metasomatism, these Cr-nodules probably represent MARID-type nodules carried by arc picrites.

Conclusions

References


