Geophysical Research Abstracts
Vol. 16, EGU2014-7014, 2014
EGU General Assembly 2014


# Palaeoproterozoic Volcanic Massive Sulphides (VMS) in the Lithuanian crystalline basement: evidences for a back-arc tectonic setting

Grazina Skridlaite (1) and Laurynas Siliauskas (2)

(1) Institute of Geology and Geography, Nature Research Centre, Vilnius, Lithuania (skridlaite@geo.lt), (2) Faculty of Natural Sciences, Vilnius University, Lithuania (juniorlaurynas@gmail.com)

In the southwestern part of the East European Craton (EEC), several events of Palaeoproterozoic volcanic arc magmatic activity were recognized in the concealed crystalline basement. In Lithuania, the TTG suites of 1.89 Ga and 1.86-1.84 Ga were later metamorphosed in amphibolite and granulite facies conditions. Remnants of a volcano-sedimentary sequence metamorphosed in green schist and amphibolite facies conditions were discovered in central and southern Lithuania.

In southern Lithuania, the upper part of the Lazdijai 13 (Lz13) drilling (at c. 493 m depth) consists of exhalitic quartz chlorite cherts mixed with andesitic rocks. The rocks are impregnated with magnetite in some places replacing calcite. Most of the magnetite grains are overgrown by a dendritic kovelite, which may have formed while magnetite was still in aqueous surrounding. Other accessory minerals are xenotime, zircon, apatite, Sr-Ba sulphates etc. The cherts are underlain by a metaandesite which volcanic structures were obscured by hydrothermal alteration, i.e. the idiomorphic magnetite crystals and porphyritic plagioclase grains were replaced by clay minerals and quartz or muscovite in many places. Thin metamorphosed mudstone layers turned into garnet, biotite (+/-staurolite) and chlorite schists. The rocks were affected by silicification, chloritization, argilitization and carbonatization. Taking into account the rock composition, micro and macro scale alteration zones and absence of breccia, the whole package resembles an outer part of the VMS stockwork. The lower boundary at 526 m is sharp, marked by a quartz vein, below which lies quartz, biotite (+/- chlorite) bearing schist with minor tremolite (former sandstone). It was intensely affected by silicification, and was enriched in Na, K and Ca. Accessory minerals are monazite, xenotime, apatite and detrital zircon. The schist exhibits fine mineral foliation, and is fine-grained. A 4 m thick granitic vein cuts the rock at 654 m depth, below which there are amphibolites with layers or lenses of skarns formed in marbles. Some amphibolites resemble porphyritic basalts. These might be dikes of basalts, which are common for back arc VMS surroundings. The volcano-clastic rock from the Lz13 yielded c. 1.83 Ga and c. 1.80 Ga ages. The whole rock Sm-Nd isotopic composition points towards juvenile origin of the rock (TDM=2.08 Ga, $\varepsilon$Nd (1.9) +1.8).

After the comparison of the obtained data set with VMS deposits formed in different environments, it is most likely that the volcano-sedimentary sequence of Lz13 was formed in a back arc tectonic setting. The volcano-sedimentary sequence can be correlated with the 1.83 Ga Oskarshamn-Jönköping Belt (Mansfeld et al., 2005) and the volcano-sedimentary Vetlanda formation (Makowsky and Mansfeld, 2013) in southeastern Sweden. The c. 1.83-1.80 Ga volcanic arc and back-arc system continues from southeastern Sweden through the Baltic Sea to Lithuania.

This is a contribution to the Open Access Centre activities

Mansfeld, J., Beunk, F.F. and Barling, J., 2005. GFF, 127: 149-157
Makowsky, F., Mansfeld, J., 2013. 31st Nordic Geological Winter Meeting, Lund, Sweden, 89-90.