^{39}Ar-^{40}Ar dating on plagioclases of metabasic and metagranitic rocks in the Yoncayolu metamorphics, NE Turkey

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Low grade Yoncayolu (Erzincan, NE Turkey) metamorphics are overlined tectonically by ophiolitic units. The metamorphics are composed of widespread schists and metabasics, rare metagranitic rocks and calc-schists. All of these are represented by greenschist facies P-T conditions, with mineral assemblages of sericite, chlorite, illite, quartz, calcite, albite, epidote and rare muscovite in schists, and quartz, chlorite, albite, hornblende, epidote, clinozoisite and tremolite in metabasics.

Detailed mineralogical and petrographical studies are carried out on five metabasic and metagranitic samples to find out protolithic mineralogy and texture. Of these, metagranitic sample is a coarse-grained and contain anhedral quartz, plagioclase, aggregates of epidote, clinozoisite, and minor chlorite. The texture of the rock shows some evidence of minor cementation and annealing. Metabasic sample is fine-grained, sparsely phyric, consisting predominantly of altered (mainly sericitized, sometimes completely destroyed) plagioclase and hornblende. Hornblende occurs as part of the matrix, and the anhedral grains are intergrown with the plagioclase.

Metagranitic and metabasic samples were suitable for relict plagioclase separation and ^{39}Ar-^{40}Ar dating. Plagioclase of metagranitic sample (M16) yielded an age spectrum with two steps plateau characterized by 71% of ^{39}Ar and age value of 60.7±4.9 Ma, and plagioclase of metabasic sample (M32) yielded age spectrum with two steps plateau characterized by 56% of ^{39}Ar and age value of 94.1±3.3 Ma. Plagioclase plateau ages obtained from metabasic and metagranitic samples correspond Lower Cretaceous and Lower Palaeocene time, respectively. Hence the ^{39}Ar-^{40}Ar dating can be assumed as the crystallization ages of plagioclases, the metamorphism time and exhumation history of the low grade Yoncayolu metamorphics should have been later than Cretaceous-Palaeocene (?) time.

Fast iron sulfide oxidation in a region of land uplift and artificial drainage

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Postglacial isostatic uplift (currently up to 1 meter per 100 years) has brought large areas of land above the sea level in low-lying coastal areas of northern Europe. These exposed land masses are to a significant part covered by thick marine sediments, characterised by unusually high concentrations of fine-grained metastable iron sulfides (up to 1%) in an aluminosilicate clay-silt matrix [1, 2].

When drained for agricultural purposes, these sediments rapidly develop into acidic (acid sulfate) soils and release an abundance of metals (Mn, Al, Ni, Zn, Co, Be, Ln) into drains, despite the cold climate with frozen ground and a thick snow cover for about half of the year [3, 4]. We suggest that microbially mediated oxidation of the metastable iron sulfides initiate the soil ripening process, leading to a fast decrease in pH which favours further pyrite oxidation and silicate weathering.

The farmers are worried and the environment – including surface waters and down-stream sediments – is acidified and contaminated. There is thus an urgent need to increase the understanding of this on-going landscape-wide acidification process, in which the preservation and oxidation and toxic-metal content of the metastable iron sulfides is a key parameter.

[1] Boman et al (2008) *Chemical Geology* **255**, 68-77. [2] Boman et al (2010) *Geochimica et Cosmochimica Acta* **74**, 1268-1281. [3] Åström et al (2000) *Environmental Science and Technology* **34**, 1182-1188. [4] Sundström et al (2002) *Environmental Science and Technology* **36**, 4269-4272.