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Metamorphic glauconite in palaeozoic sediments of Schwarzburger Antiklinorium (Saxothuringian Thüringer Schiefergebirge)

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Abstract

Palaeozoic sedimentary rocks of the Saxothuringian Thüringer Schiefergebirge contain common spherical to ellipsoidal chlorite-sericite-aggregates with a size of 0,05 to 0,20 mm. Such spherical aggregates of chlorite and white mica were named “chlorite-mica-stacks” (CMS). They occur in some units of the Phycodes Group, the Gräfenthal Group (Griffelschiefer- and Lederschiefer formations) and various fine-grained to sandy slates of the Devonian and Lower Carboniferous. Chlorite-mica stacks (CMS) consist of coarse chlorite flakes, interbedded with sericite. Their genesis is still controversial. They were interpreted as clastic chlorites, as metamorphic porphyroblasts, as altered tuff particles, and as metamorphosed clastic biotite. Morphology, grain-size and occurrence in conspicuous sedimentary facies conditions point to a different mode of formation. We conclude a primary formation of glaucony grains (fecal pellets), which were later altered to CMS during low grade metamorphic conditions. Metamorphosis occurred under reducing conditions at temperatures between 350-380°C and pressures of around 3-4 kbar (corresponding to a depth of 10-15 km). As these CMS occur even in higher units of the Lower Carboniferous, a thicker cover of stacked nappe units on top of the preserved palaeozoic units, because sedimentary thickness is not sufficient to explain the degree of metamorphic overprint.