Evolution of REE minerals from diagenetic to amphibolite facies conditions in the Central Alps, with implications to geochronology

E. JANOTS, M. ENGI & A. BERGER

[1]Institute of Geological Sciences, University of Bern, Switzerland, ejanots@geo.unibe.ch

We report on the REE distribution in metapelites from the northern Lepontine domains (Central Alps), taken along a well established metamorphic field gradient recording conditions from diagenetic to amphibolite facies. Our strategy has been to characterize texturally and chemically the REE-minerals, document their assemblages, and deduce mineral reactions which occurred with increasing metamorphism. In diagenetic to low-grade metamorphic rocks, LREE are contained in roundish inherited and/or minute newly formed monazite (Chemical U-Th-Pb dating), whereas HREE reside in xenotime. With the appearance of chloritoid, monazite vanishes, and LREE are taken up in idiomorphic homogeneous allanite. With the appearance of biotite, allanite acquires a first rim of epidote, and a second one grows contemporaneously with garnet. At the “chloritoid-out” zone boundary, allanite is replaced by monazite associated with plagioclase, biotite and/or staurolite. In our samples, the evolution of the REE-phases thus appears to be correlated with the succession of major silicate assemblages. This demonstrates potential for novel geochronology, since all of the samples display REE-minerals, for which ages may be determined and related to the P-T conditions of their formation. In particular, the occurrence of allanite, epidote, and monazite in the same samples offers the unique

p[illegible]f dating their prograde evolution using different chronometers.