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BOOK OF ABSTRACTS

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THE SITHONIA PLUTONIC COMPLEX (CHALKIDIKI, N. GREECE): AN EXAMPLE OF INTERPLAY BETWEEN GEOCHEMISTRY AND MAGMA DYNAMICS DURING MAGMA INTERACTION

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Orogenic granitoids are often characterized by mineralogical and geochemical features suggesting evolution processes in open magmatic systems. This is testified by the presence of mafic enclaves into the granitoids, mineral disequilibrium textures, and/or extreme geochemical and isotopic variability. Here, the Sithonia Plutonic Complex (Chalkidiki, N. Greece) is studied using mineral chemistry, whole-rock major, trace and REE geochemistry, and Sr and Nd isotopic composition. The Sithonia rocks are divided into a basic group characterized by the presence of mafic enclaves, disequilibrium textures, and geochemical and isotopic evidence of magma interaction, and an acid group with geochemical and isotopic features consistent with a magma mixing process, but mafic enclaves and disequilibrium textures are lacking. A two-step mixing plus fractional crystallization process is considered responsible for the evolution of the basic group. The first step explains the chemical variations in the mafic enclaves group: a basic magma interacts with an acid magma to give the most evolved enclaves. The basic magma is represented by the least evolved enclaves while the acid magma by the most evolved granitoid rocks. The second step explains the geochemical variations of the remaining rocks of the basic group: the most evolved enclaves interact with the acid magma to give the range of the rocks with intermediate geochemical compositions. A convection-diffusion process is envisaged to explain the geochemical and isotopic variability and the lacking of macroscopic (mafic enclaves) and textural evidence of magma interaction in the acid group. The mafic magma is the result of melting of mantle, repeatedly metasomatized and enriched in LILE due to subduction events, whereas the acid magma is considered as the product of partial melting of lower crustal rocks of intermediate to basaltic composition. The study of the Sithonia Plutonic Complex offers the opportunity to investigate in detail the complex interplay between geochemistry and magma dynamics during magma interaction processes between mantle and crustal derived magmas.