INTERPRETING THE MAGNETIC SIGNATURE OF SERPENTINIZED PERIDOTITES FROM MID-OCEANIC RIDGES AND OPHIOLITES

Carlut, J

Univ. Paris Diderot, Sorbonne Paris Cite, IPGP, UMR CNRS, Paris, France

Corresponding author: jcarlut@yahoo.fr

Abstract: The reaction between mantle peridotites and water generates serpentine with the addition of magnetite, brucite and hydrogen. However the amount of magnetite formed during the reaction remains rather poorly understood. A nonlinear dependency of magnetite production and the progress of the reaction is described in oceanic samples but is not always reported in experimental studies. Thermodynamical models show a link between magnetite production and parameters as the temperature at which the reaction occurs. It is also suggested that water/rock ratio and silica activity play an important role in controlling the crystallization of magnetite. We will first review some of the available data. Then we will describe a method using magnetic properties which was developed to monitor newly formed magnetite during experimental serpentinization. These experiments show contrasted results depending in particular on the temperature of the system. Finally we will make an attempt to use the magnetic properties of natural serpentinized samples from contrasted settings to gain insights on the conditions prevailing during serpentinization. Results on a set of samples from the Atlantic ridge at 23°N (odp leg 153) and four ophiolites from different geodynamic context: Pindos which outcrops in Northern Greece, Chenaillet an undeformed massif in the Alps, Xigaze in Tibet and the well-known Oman ophiolite will be presented. Altogether these results allow a better understanding of the geodynamic context during the exhumation of oceanic mantle rocks.