

Determination of the fluid–absent solidus and supersolidus phase relationships of MORB-derived amphibolites in the range 4–14 kbar

SUSANA LÓPEZ* AND ANTONIO CASTRO

Department of Geology, University of Huelva, Campus de La Rábida, 21819 Huelva, Spain

ABSTRACT

Experiments on a MORB (Mid Ocean Ridge Basalt)–derived amphibolite have been conducted in order to determine fluid–absent solidus and supersolidus phase relationships. The solidus has been determined in the range 4–14 kbar by using the incremental heating technique, tested against classical procedures. Peritectic clinopyroxene was produced below 10 kbar and epidote was the stable peritectic phase at pressures greater than 10 kbar for temperatures near the solidus. Garnet was the peritectic phase for temperatures above 800 °C and pressures of 10 to 14 kbar. The shape of the solidus was similar to previous estimations but the temperature interval between the high- and low-pressure regions was strongly reduced. With these new estimations, the possibilities for melting of the oceanic crust at P below 10 kbar are increased and, consequently, the number of tectonic scenarios needed for magma generation from amphibolite sources is enlarged. In the absence of free water, the solidus in the pressure region above 10 kbar is at higher T than previous estimations.