THE FUTUNA RIDGE, NORTH FIJI BASIN : NEW EVIDENCES FOR SMALL SCALE HETEROGENEITIES WITHIN THE MANTLE

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Active spreading ridges of the northern part of the North Fiji Basin, close to the junction with the Lau Basin are unusual slow-spreading ridges characterized by the alternance of segments composed of oversized domes and deep grabens. The Futuna ridge axis was recently recognized and mapped during the ALAUFI cruise (R/V l’Atalante, March 2000). Its northern part consists of a succession of dome-shaped segments composed of numerous coalescents volcanoes (Pelletier et al., 2001; Garel, 2001). Exceptionnally fresh basaltic samples were recovered at regularly spaced sites along the axis. For all dredge sites, we performed major, trace and isotopic (Nd, Sr, Pb) measurements on several samples within each dredge. The whole-rock compositions of the samples evolve from normal MORB to LREE-enriched Hawaiite. Their Nd and Sr isotopic signatures can be compared with those from Type I basalts defined by Volpe et al. (1988) in the Lau basin, while being slightly enriched. The data reported in a 143Nd/144Nd=f(208Pb/204Pb) diagram define a different trend than the samples used by Turner and Hawkesworth (1998) to demonstrate that volcanoclastic sediments participate to the subduction budget under the North of the Lau Basin. Our samples lie along a mixing trend between a MORB source and a domain defined by the Samoan Hot Spot lavas. However, there is no correlation between the latitude and the variations in the geochemical parameters. Furthermore, samples from the same dredge can display a broad chemical contrast, which directly infer that the Samoan Hot Spot influence under this part of the Basin is definitively not simple. Therefore, small- to medium-scale heterogeneties may exist within the mantle below this ridge. This implies that a very complex and disconnected plumbing system is activated during magma transfer from the mantle to the surface.