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Geochemical analysis of oceanic basalt compositions lending support to a two large cells convective mantle structure –and constraints on the development of Core Mantle Boundary Segregation (CMBS) and Continental Crust Differentiation (CCD) processes.

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An analysis of the oceanic basalt compositions is realized through the conjugated use of the incompatible trace element ratio (Nb/La vs Th/La) diagram and Pb isotopic ratio (208Pb/204Pb vs 206Pb vs 204Pb) representation.

The particular interest of the incompatible trace element ratio representation is that it allows estimates or close constrains on the sources compositions themselves, and distinction of the residual characteristics of the basalt sources, either induced by the continental crust differentiation (CCD) process or intra mantle magmatic differentiation (IMMD) processes.

The first major result of the analysis is to show that, the mantle is structured in two large convective cells, one in the Pacific Ocean hemisphere and the second in the opposed Indian one. The distinct geochemical characteristics of the basalts from these two cells (forming in particular distinct MORB-OIB (type1) trends) are at the origin of the DUPAL anomaly.

The second major result concerned the interpreted nature of the LLSVP entities, sources of OIB's which compositions distinguish in each cell from those plotting on the MORB- OIB's type 1 trends, and called subsequently OIB's type 2. The source nature of these OIBs is consistent with those of slabs differentiated at oceanic ridges, at ages older than the OIB's type 1 sources, recycled at subduction zones, affected by the CCD process, and finally partly segregated at the core mantle boundary (CMBS process).

The analysis of the residual characteristics displayed by the basalts derived from the LLSVP entities brings constrains on the evolution with time of *the segregation process at CMB* and of *the CCD process*. The development of the *segregation process at CMB* is shown to have been very strong at primitive ages, and followed by a significant reduction of the material deposited (which may be the effect of a super plume development). A relationship with the original evolutions of the Sm/Nd compositions of the basalt sources at these old mantle ages may be drawn. The CCD process displayed an important development since primitive ages (reaching, at 3.0-3.5 Ga, 80% of the total CC developed), with a higher intensity of this process in the Pacific cell.