Geophysical Research Abstracts
Vol. 18, EGU2016-14609, 2016
EGU General Assembly 2016

Volcano-tectonic framework of a linear volcanic ridge (Faial-Pico ridge, Azores Archipelago) assessed by paleomagnetic studies

Pedro Silva (1,2), Bernard Henry (3), Ana Lopes (2,4), Fernando Marques (5), Pedro Madureira (6,7), Anthony Hildenbrand (8), José Madeira (2,5), João Nunes (9), and Zuzana Roxerová (10)

(1) IPL, ISEL, Physics, Lisboa, Portugal (pmfsilva@fc.ul.pt), (2) Instituto Dom Luiz (Universidade de Lisboa), Portugal, (3) Paleomagnetism, IPGP and CNRS, 4 Av. de Neptune, 94107 Saint-Maur cedex, France, (4) Instituto Português do Mar e da Atmosfera, Lisboa, Portugal, (5) Departamento de Geologia (Faculdade de Ciências da Universidade de Lisboa), (6) Centro de Geofísica de Évora and Dep. de Geociências da Univ. de Évora, R. Romão Ramalho, 59, 7000-671 Évora, Portugal, (7) Estrutura de Missão para a Extensão da Plataforma Continental, Paço de Arcos, Portugal, (8) Interactions et Dynamique des Environnements de Surface, UMR 8148 IDES, Université Paris-Sud, Sciences de la Terre, Bâtiment 504, 91405 Orsay cedex, France, (9) University of Azores, Department of Geosciences, Rua da Mãe de Deus, 9501-801 Ponta Delgada, Portugal, (10) Institute of Geophysics, Acad. of Sci. of the Czech Republic, Prague, Czech Republic

The morphology of volcanic oceanic islands results from the alternation between constructive and destructive episodes. In this study directional analyses obtained from paleomagnetic studies are used as a tool to achieve relative rotations related with destructive processes intra the Pico-Faial linear volcanic ridge (Azores archipelago; North Atlantic). A total of 45 lava flows and one dyke were sampled preferable along lava piles though to record volcano-tectonic movements. The respective paleomagnetic results are able to show important rotations within the two islands that resemble the onshore signature of this ridge. Paleomagnetic directions retrieved here mostly show elliptical distribution of ChRM's sub-perpendicular to volcanic ridge. Such distribution agrees with the development of listric faults plunging towards the axis of the volcanic ridge at Faial Island and towards offshore at the Topo complex of Pico Island. In Faial Island, the "collapse" related to the magma chamber decompression was accommodated by brittle deformation with listric faults plunging toward the core of the formed graben. On Pico Island, this collapse was probably of less importance and simply accommodated by a local tilting. Listric faults then should have been developed, in the opposite direction (compared to Faial Island case) relatively to the collapsed area, to compensate a relative local uplift. Accordingly paleomagnetic studies appear as key data to retrieve intra-islands deformations due to the volcano-tectonic balance responsible for the construction and destruction of such unstable buildings. This important tool to address georisks and natural hazards remains poorly explored and need to be strongly developed. The author wish to acknowledge MEGAHAZARDS (PTDC/CTE-GIX/108149/2008) and REGENA (PTDC/GEO-FIQ/3648/2012) projects for its major contribution without which this work wouldn't be possible. Publication supported by project FCT UID/GEO/50019/2013 - Instituto Dom Luiz.