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FRACTURE PATTERN AND STRUCTURAL CONTROL OF MADEIRA ISLAND VOLCANISM (PORTUGAL)

R. Ramalho[1, 2], A. Brum da Silveira[1], J. Madeira[1], P. Fonseca[1], S. Prada[2] and C. F. Rodrigues[2]

1) LATTEX; Departamento de Geologia da Faculdade de Ciências da Universidade de Lisboa, Portugal; António.brum@fc.ul.pt; gpetfons@fc.ul.pt; jmadeira@fc.ul.pt
2) CEM; Centro de Estudos da Macaronésia, Universidade da Madeira, Portugal; rramalho@netcabo.pt

Madeira is a Mio-Pliocene to Holocene hot spot related volcanic island located in the African plate. Recent geologic fieldwork (geological mapping, geomorphologic and remote sensing analysis) has lead to the reconnaissance of a fracture pattern and structural control of volcanism.
A main WNW-ESE fracture system and two secondary E-W and NE-SE families were identified; these correspond to faults, dike systems, alignment of recent cinder cones, linear geomorphic features and lineaments deduced from satellite imagery analysis.
The faults are represented by single fault planes and fault zones, which may show anastomosed or branched map geometry. In section, faults commonly present upward ramifications and steep inclinations either to the north or to the south quadrants. Fault kinematics is still badly constrained, with the scarce slicken side observations indicating dominant normal component. The WNW-ESE Seixal-Machico fault zone, which crosses the whole length of the island, is the major tectonic structure and presents frequent NW-SE branches or *en echelon* fractures.
Madeira Island was built by successive fissural volcanism episodes. The trends of its conduits (represented by dike swarms) and of recent cinder cone alignments are comparable to those of the fault systems, thus indicating important tectonic structure control.
Geomorphic features, such as linear fluvial valleys, sea cliffs, and topographic scarps, also suggest important control by structures with the referred trends.
Preliminary tectonic data suggests a tensional stress field, with horizontal NNE-SSW minimum compressive stress axis (σ_3), stable in time. In fact, the orientation of volcanic and tectonic structures is constant throughout the geologic record.
Important mass movements located in the north coast, and spatially related with faults, may have been induced by neotectonic activity.

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