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Coupling between impacts and lunar volcanism for Humorum and Procellarum basins

S.T.M. Peters (1), D. Koschny (2), B.H. Foing (2) and the SMART-1 AMIE Team

(1) VU University Amsterdam; faculty of Earth and life sciences, Amsterdam, the Netherlands (stefan.peters@falw.vu.nl / Phone: +31 20-59 87000) (2) European Space Agency; Research and Scientific Support Department, ESTEC/SCI-S, the Netherlands (Bernard.Foing@esa.int, Phone: +31 71 565 6565)

A lot of knowledge has been obtained by ground-based observations and previous space missions on Mare Humorum and Oceanus Procellarum, which are a circular and irregular basin, respectively. Correlating tectonic signatures and volcanic outflows within this area gives information on the development of both basins; and thus on their origin of impact. By marking different fracture patterns, paleo-stress fields occurring in the area of both maria become visible. These stresses are believed to be caused by the contrast in density of the solidified lava and the anorthosite crust and therefore to be post-volcanic. The presence of underlying topography and structures of fault systems influence the formation of new zones of weakness within the basins. Therefore they induce faults which do not properly reflect the stress field under which they are formed. To exclude this distortion, only the most inner parts of the basins are measured. Images from the AMIE-camera on SMART-1 Moon mission were annotated for tectonic interpretation using ARC-GIS. A volcanic outflow analysis is made using Clementine UVVIS-data: Lava outflows from different origin were distinguished on base of their FeO and TiO_2 contents. Ages of the units were determined by crater-counting methods from other authors. The eruptional and structural analyses provide a model for the stratigraphic development and spatial occurrence of the volcanic processes that flooded the maria. This model is compared with both irregular and circular impact basins for different shape, age and geographical positions. The results show how these impact-related parameters influence volcanic mare evolution. With the geographical position, also the depth and thickness of the KREEP-layer has been taken

in account.