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Insights into the dynamics of planetary interiors obtained through the study of global distribution of volcanoes.

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The distribution of volcanic features is ultimately controlled by processes taking place beneath the surface of a planet. For this reason, characterization of volcano distribution at a global scale can be used to obtain insights concerning dynamic aspects of planetary interiors. Until present, studies of this type commonly have focused on volcanic features of a specific type (e.g., large volcanoes in Venus or hot-spot volcanism on Earth), or have concentrated on relatively small regions (Vent distribution within individual volcanic fields), but no comparison of extensive databases has been made for both planets. In this work, the description of the distribution of volcanic features observed over the entire surface of the Earth and Venus is compared to each other using an extensive database of submarine and subaereal volcanoes on Earth, and an inclusive list of volcanic features identified so far on Venus. The analysis is based on density contours obtained with the Fisher kernel. While on Earth it is possible to generate a hierarchy of clusters that can be compared with geological constrains concerning the tectonic setting of volcanism, such constraints are not straightforward for Venus. Nevertheless, based on the results from Earth, a semi-automated algorithm capable to identify volcanic groupings that are associated to tectonic features following a hierarchy of significance levels is applied on Venus. As the results show, there are similarities on the groupings of volcanoes that can be defined at various hierarchical levels on both planets, suggesting that their geodynamic behavior may have more common features than commonly assumed.