
[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

[S-IT21]Do plumes exist?

convener:Hidehisa Mashima(Center for Obsidian and Lithic Studies, Meiji University), Gillian R Foulger (Durham University), Dapeng Zhao(東北大学大学院理学研究科附属地震・噴火予知研究観測センター)

Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The debate regarding whether anomalous volcanic areas on Earth's surface are fed by deep-mantle plumes is widely considered to be the most significant debate currently ongoing in Earth science. Not only does the debate touch on a fundamental aspect of how Earth works dynamically, but the subject is extraordinarily cross-disciplinary to an extent that probably few scientists fully realize. Sub-disciplines that can contribute to efforts to resolve the debate include sedimentology, palaeontology, tectonophysics, geochronology, volcanology, petrology, geochemistry, geothermal research, seismology, geodesy, electromagnetics and many others.

In addition to the disciplines of Earth science, the plume debate provides a remarkable and thought-provoking subject for scientific philosophy and reflections on correct scientific methodology: (1) What exactly is a plume? People often change their definition of a plume a posteriori in order to fit their observations. (2) How can the plume- or the plate hypothesis be falsified? (3) Do Earth scientists tend to present only one possible interpretation of their data, or do papers reflect all possible interpretations? Unfortunately, the former is often the case. (4) Are published interpretations consistent with other data from the subject field area? Often they are not, and the inconsistencies are not sufficiently highlighted nor discussed. These issues are particularly useful for inducting students into correct scientific working. In summary, the debate provides enormously fertile ground for new, fundamental questions and cross-disciplinary research.

This session welcomes studies of melting anomalies on Earth from the point of view of any sub-discipline. We also welcomes studies of geological phenomena which are attributed to mantle plumes, such as back-arc extension, plate motion, sedimentary basin formation and lithospheric uplift, and any other work that bears on this fascinating and challenging geological debate.

[SIT21-P04]Evidence for the low-pressure and -temperature origin of the Minami-Shimabara basalts in northwest Kyushu, southwest Japan

*Tajima Toshihiko, Hidehisa Mashima¹ (1.Meiji University)

Hot spot-type basalts erupted from 4.6 to 0.6 Ma are distributed in the Minami-Shimabara area, at the southern foot of the Unzen volcano in northwest Kyushu, southwest Japan. Compositional similarities between the Minami-Shimabara basalts and the host lava of mantle xenoliths from northwest Kyushu indicate that most of the Minami-Shimabara basalts would have originally been primitive or less-fractionated magmas. Their normative olivine‐quartz‐[Jd + CaTs] compositions demonstrate that the Minami-Shimabara magmas would have been segregated from the heterogeneous source mantle at pressures ranging from 1.5 to 0.5 GPa. Their normative olivine‐quartz‐[Jd + CaTs] compositions also indicate that the source mantle would have had a relatively low potential temperature, such as 1300 °C. Upwelling of the mantle with such low temperature would have been caused by shallow mantle processes, such as plate tectonics. Potential tectonic activity causing mantle upwelling would be the subsidence of the Amakusa-nada Graben simultaneous with the Minami-Shimabara

volcanism.