Oral | Symbol S (Solid Earth Sciences) | S-VC Volcanology

[S-VC53_28PM2]volcanic activities and tectonics

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The principal aims of this session are to advance our understandings in the relation among volcanic activity, ground deformation and tectonics on the viewpoints of volcano-tectonics. We welcome all contributions based on fieldwork, geophysical or geodetic measurements, analog experiment and analytical and numerical simulations, for unraveling volcanism in temporally and spatially various scales. The session involves the related topics, are the followings: (a) the deep structure of volcanoes; (b) emplacement mechanism and their activities of magma chamber; (c) various intrusions, growth and emplacement mechanisms of dykes; (d) relationship between the volcanic activities and near-field earthquakes; and (e) magma storage and eruption process in caldera-forming eruption. We of course welcome the studies of subaerial and submarine volcanisms, and those of other planets.

4:30 PM - 4:45 PM

[SVC53-P07_PG]Paleostress analysis of dilational fractures using genetic algorithm

3-min talk in an oral session

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Keywords:real-coded genetic algorithm, magma pressure, mixed Bingham distribution, dike, vein

The attitudes of dilational fractures, including dikes and veins, are clues to the paleostresses under which the structures were formed. A software tool for clustering their 3D orienatations has been developed in this study. The software fits mixed Bingham distributions to them, and detects girdle, elliptical and circular clusters. In addition, it determines the three principal stress axes, stress ratios and maximum fluid pressure for each of the clusters. Fitting a mixed Bingham distribution is not a well posed problem, because the mathematical inversion is highly non-linear and its object function is multimodal. It is demonstrated that genetic algorithm is more effective than the expectation-maximization algorithm which was used by previous researchers (Yamaji and Sato, 2011).