# Review: The footsteps of Research on Electrical Conductivity Anomalies in Volcanically and Seismically Active Japan Arcs

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**SUMMARY**

The Japanese archipelago, situated in a subduction zone, consists of island arcs formed at a collision area of four tectonic plates among the approximately 10 plates covering the Earth. The complex movements of these four plates that control the crustal structure around the Japanese archipelago cause various crustal movements due to mountain building, volcanic/magma activity, fault movement, and seismic activity. This makes the island arcs much more unstable compared to continental landmasses. This can be found from the fact that, although Japan's territorial land area is only 0.29% of the world's total, 18.5% of the world's earthquakes of magnitude 6 or higher have occurred in Japan, and 7.1% of the world's active volcanoes are located in Japan. Hence, extensive observations and research aimed at elucidating the heterogeneous underground structures in seismogenic and volcanic zones have been conducted in both land and marine areas around Japan, to clarify the mechanisms behind earthquake and volcano formation/phenomena and use the knowledge for disaster prevention in preparation for potential future threats. In the field of electromagnetic research, the Society for Conductivity Anomaly Research was organized in the 1950s as a world-pioneering organization with the aim of achieving a comprehensive understanding of the heterogeneous structure (conductivity anomalies) of the mantle/crust and conducted collaborative observations across the island arc to elucidate the fundamental conductivity/resistivity structure of the Japan arcs. Currently, electromagnetic surveys and research into the subsurface heterogeneous structures and phenomena of seismogenic and volcanic zones of various scales are being actively conducted throughout Japan. In this presentation, I will review the progress and outcomes of electromagnetic research in the Japan arc, focusing on the role of fluids in seismic and volcanic activity.

**Keywords:** Conductivity Anomalies, Japan Arcs, Volcanically and Seismically Active Islands, Fluids, Magma