

# **CHARACTERIZATION OF REGIONAL FRACTURE SYSTEM THROUGH LINEAMENT ANALYSIS USING SATELLITE IMAGE AND DIGITAL ELEVATION MODELS OF LAND AND THE SEA FLOOR**

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The lineament analysis targeting both land and the sea floor is important for comprehensive understanding of regional fracture system and preliminary planning of mineral exploration, because some of the major lineaments are related to fracture zones that can replace mineral and geothermal resources. For this reason, we have developed an automatic extraction method of lineaments, the segment tracing algorithm, and a vector-analysis technique to calculate azimuths and dips of interpreted fractures through the combination of lineament data and DEM. The Kyushu district, southwest Japan, is chosen as a study area and 77,893 lineaments are derived from the three full-scene LANDSAT TM band 4 images of the district. It is clarified that the azimuths of the continuous fractures estimated near the rich metalliferous gold deposits correspond generally to those of the principal veins. This correlation suggests an angular relationship between directional emplacement of the gold deposits and the tectonics that produced the fractures oriented in the estimated directions. For the geothermal field in the middle Kyushu, the significant fractures which act as conduits for transport of hydrothermal fluids to the ground surface can be specified. In addition, a lineament analysis for the sea floor is conducted using the shaded DEM of 1-km mesh, produced by interpolating the sea depth data. A combination of lineament maps of the land and the sea floor is useful to identify tectonically significant lineaments being continuous over the two regions and examine positional relationship between the lineaments and the known hydrothermal deposits.