Variations of the geomagnetic transfer functions associated with Kagoshima earthquakes

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Change of stress field in the seismic region can cause changes of the electric conductivity structure of the Earth. Since the geomagnetic field is affected by the seismicity in the region, the transfer functions are possibly related to the seismicity. The temporal variation of such transfer functions at the time of seismic activity can be used to identify the precursor of the earthquake. In 1996-1997, large earthquakes occured in Kagoshima, Japan, with magnitudes more than 6 or 7 and the depth 20 - 40 km. In order to investigate temporal changes of the electromagnetic structure caused by the Kagoshima earthquakes, we calculated the transfer functions at KAG

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In 1996-1997, large earthquakes occured in Kagoshima, Japan, with magnitudes more than 6 or 7 and the depth 20 - 40 km. In order to investigate temporal changes of the electromagnetic structure caused by the Kagoshima earthquakes, we calculated the transfer functions at KAG (N 31.48, E 130.72). The sampling time of the KAG magnetic data was 1 second and the distance from the epicenter was less than 100 km. We also analyzed the frequency range of ULF (f < 1 Hz) pulsations for finding seismic precursors: Because the skin depth of ULF electromagnetic variations are comparable to typical Earthquake origin depths, the ULF variations can convey seismic information from the source region.

In order to examine whether the temporal variations of transfer functions at KAG which we got in previous study are really local variation or not, we used another reference station KAK (N 36.23, E 140.19, sampling time = 1 sec), and calculated interstation transfer functions in the ULF frequency range. Using horizontal components of the reference station KAK which has more quiet data than KAG, we could remove local noises. From this analysis using the two sites, close to and remote from the earthquake epicenter, we found that the magnitude of some coefficients of the interstation transfer functions decreased at short periods (< 100s) before earthquakes