

R003-P01

ポスター 4 : 11/26 AM1/AM2 (9:00-12:00)

2022年1月のHunga Tonga-Hunga Ha'apai 火山活動によるトンガ・アテーレ観測点における磁場変動

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Magnetic field variations in Tongatapu due to Hunga Tonga-Hunga Ha'apai volcanic activities in January 2022

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This presentation will characterize and discuss the magnetic field variations observed at 'Atele in Tongatapu due to the January 2022 Hunga Tonga-Hunga Ha'apai (HTHH) volcanic activity.

Magnetic field variations due to the volcanic activity on January 15, 2022, observed at Apia, Samoa (about 835 km NNE from HTHH) has been reported by Iyemori et al. (2022) and Yamazaki et al. (2022). They identified a variation with a period of about 4 minutes with amplitude of about 3 nT at the station. This variation is due to electric currents induced in the ionosphere by atmospheric acoustic resonance caused by the eruption. At the 'Atele station, which is about 74 km south of HTHH, magnetic field variations with a similar period but with an amplitude ten times larger than that at Apia were observed. Differences in the magnetic field variations are seen not only in the amplitude but also in the direction of variations. The trajectory of the magnetic field variations in the horizontal plane is in the NE-SW direction at 'Atele, while it is almost in the East-West at Apia. The observed characteristics is consistent with the electric current model proposed by Iyemori et al. (2022).

In addition to the variations due to the atmospheric acoustic resonance, a magnetic field variation that started soon after the time of volcanic eruption and lasted for about two hours is observed at the two stations. The variation is the most significant in the Z (vertically downward) component at 'Atele, and it is a one-sided variation with an amplitude of about 80 nT. The dominance in the Z component implies that the variation is not caused by the induction in the heterogeneous Earth, and this is formally confirmed by modeled Z variation using the geomagnetic transfer function at 'Atele. On the other hand, the variation started about the same time at Apia seems to be compatible with geomagnetic transfer function at the station. These suggest that the two-hour variation at 'Atele is likely due to the local electric current near the station, but its signature may not be detected at Apia.

The field variation at 'Atele seems to be synchronized with the plume activity of the eruption. Several electric current models that might be realized by the interaction of plume (neutral air) and ionosphere were examined whether they can reproduce the variation at 'Atele or not. These models will be presented to discuss the phenomena that had occurred near the area.