

A geomagnetic total intensity anomaly originated from lightning-induced isothermal remanent magnetization

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Magnetic total intensity anomaly maps of Yatsugatake magnetic observatory, central Japan, in 1975, 1982 and 2005 are examined. The magnetic environment seems to be stable during the period except the appearance of an anomalous thin patch-pair in the middle part of the observatory sometime between 1975 and 1982. Peak-to-peak amplitude of the patch-pair is about 80 nT at 2 m above the ground level. The magnetization induced by horizontal electric current in the ground due to the lightning which hit the observatory area in July, 1981, is a probable cause for the patch-pair. It is confirmed by a modeling that the characteristics of the patch-pair are well reproduced by model magnetizations which represents lightning-induced isothermal remanent magnetization acquired due to horizontal lightning electric current in the ground. Required maximum magnetization to explain the peak-to-peak amplitude of the patch-pair is estimated to be in the range between 10 to 40 A/m.