

Fan-shaped aurora as seen from Japan during a great magnetic storm on 11 February 1958

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A fan-shaped aurora was photographed at Memambetsu, Hokkaido Japan during a great magnetic storm on Feb 11, 1958. This is the first and oldest photograph record of auroras as observed in Japan, and many hand-written drawings were also recorded at the same time during the February 1958 event, giving a rare opportunity of the coexistence of photograph images and hand-written drawings. In fact, the combination of photographs and drawings of the 1958 event reminds us of the great red aurora with fan-shaped white pillars as illustrated during other great magnetic storms in 1872 and in 1770. From the analysis of newly digitized microfilm data, it is also found that the fan-shaped aurora appeared during the peak activity of magnetic storm, and moved westward at 0.4 km/s at 400 km altitude at 38-40 deg magnetic latitudes, which is consistent with the enhanced convection pattern in middle latitude during storm time. Such a fan-shaped aurora can be a fundamental characteristic of middle-latitude evening-to-midnight auroras during great magnetic storms, which show the most destabilized transient appearance of the inner magnetosphere.

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