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DYNAMIC STRUCTURE OF THE DAYSIDE MAGNETOPAUSE DURING THE SI EVENT ON FEBRUARY 9, 1986

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Abstract

Dynamic structure of the dayside magnetopause is studied with the Si event observed on February 9, 1986. It is clarified that three successive magnetopause crossing occurred with the interval of about 150 second in association with the Si event on February 9, 1986.

Si event on February 9, 1986

A very large Si event started at about 1748.2 UT and ended at about 1801 UT on February 9, 1986. The range of the Si event is about 90nT at the low-latitude ground-based station, Kakioka in Japan as shown in Figure 1. The figure was produced using every one second data by KASMMER (Kakioka Automatic Standard Magnetometer). The details of the KASMMER have been described by Kuwashima and Sano (1984). As shown in Figure 1, the Si event was accompanied with the oscillative variation with the period of about 150 seconds. It seems that the Psi 5 magnetic pulsation was excited in association with the Si event. However, that oscillative variation could not be identified as Psi 5, because no pulsative signature could be found either at the higher latitude station (Syowa Station in Antarctica) or in the magnetosphere (GOES 5 and 6). If the oscillative variation shown in Figure 1 were Psi 5 magnetic pulsation, it should be observed more clearly both at the high-latitude on the ground and in the magnetosphere around $L = 6 - 7$. The oscillative variation shown in Figure 1 could be interpreted as the successive arrival of interplanetary shock at the earth. This interpretation will be supported by the observation at the geosynchronous satellite as shown in Figure 2, which was produced using the magnetic data obtained at the geosynchronous satellite, GOES 6 (180° W) at every three seconds. As shown in the figure, the Si event started at about 1747.5 UT and ended at about 1801 UT. The time difference between the start time of Si at Kakioka and at GOES 6 was 0.7 minutes.

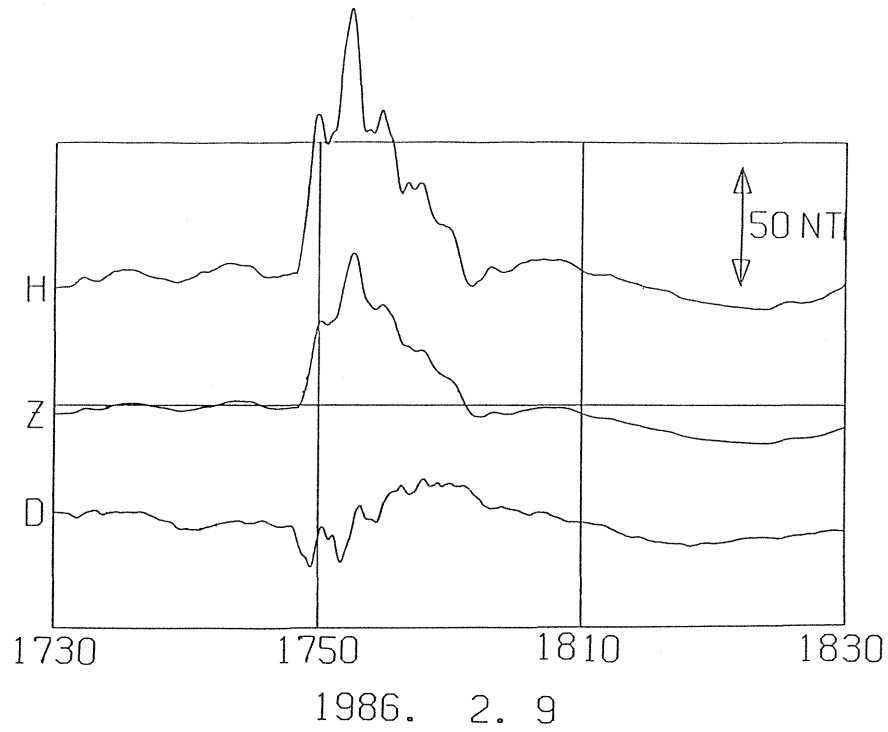

Fig. 1. Magnetic variations observed at the low-latitude ground-based station, Kakioka, on February 9, 1986

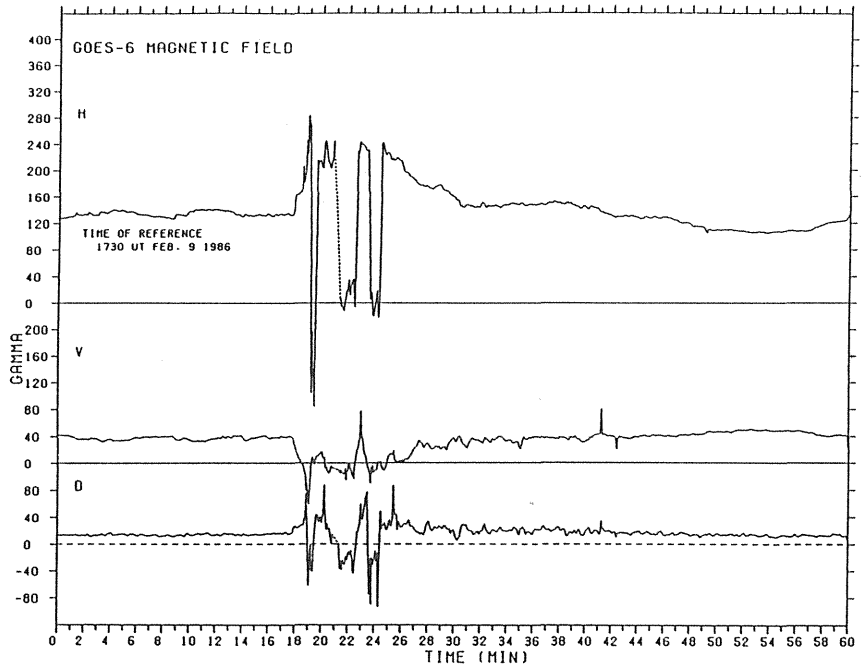

Fig. 2. Magnetic variations observed at the geosynchronous altitude, GOES 6 (108°W) on February 9, 1986.

This is attributed to the fact that GOES 6 was located on the noon side (~12 h). This result is consistent with the statistical study by Kuwashima and Fukunishi (1985). It should be noted in Figure 2 that three successive magnetopause crossings were observed at the geosynchronous altitude. In a detailed examination, these three magnetopause crossings correspond to the oscillative magnetic variations observed on the ground shown in Figure 1. Those relationships are summarized in Table 1. The times of arrival of the successive interplanetary shocks would correspond well to the times of the successive magnetopause crossings at the geosynchronous altitude. The time difference of about 1 minute between the ground and at the geosynchronous altitude is quite consistent with the result of Kuwashima and Fukunishi (1985). In association with the Si event on February 9, 1986, the magnetopause crossings occurred successively with very short time intervals of about 150 seconds.

Table 1. Time difference between ground and geosynchronous altitude (GOES 6)

	ground	GOES 6	difference
Start time of Si	1748.2	1747.5	0.7
Arrival time of 1st shock	1750.2	1749.2	1.0
Arrival time of 2nd shock	1752.6	1751.6	1.0
Arrival time of 3rd shock	1754.7	1753.9	0.8

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