

EARLY OBSERVATIONS OF THE LEONIDS IN EAST ASIA

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1. Introduction

The parent comet of the Leonids, 55P/Tempel-Tuttle, was recovered in 1997. An improved orbit for the interval 1366 to 1997 together with predictions before 1366 were calculated by Nakano (1997). These orbital elements are used to determine the longitude of the descending node of the cometary orbit so that this can be compared with the solar longitude of meteors found in historic records. A number of catalogues listing the appearances of meteors showers have already been published. Most notable of these are Imoto and Hasegawa (1958), Zhuang (1977), Mason (1995), Rada and Stephenson (1992), Kidger (1993) and Hasegawa (1996). Nearly fifty records of the Leonids from AD855 to the end of the 19th century are found in these catalogues.

2. Early Observations of bright Leonid meteors

Some Chinese records of bright meteors also give star names along the meteor trail so that the radiant point can be determined. Beside shower records, we found a number of Chinese record of bright Leonid meteors as shown in the Table. The first recorded appearance in China was in AD 81, though the difference in longitude is rather large. We can not obtain the radiant from the Japanese records. However, between October 13 and 21 in 1434 many bright meteors fell in the early morning, moving from the east or north to the south. These could be Leonids since comet 55/P passed its perihelion in 1433 on July 31 and meteors were also recorded in China at this time.

In November 1705, about fifty meteors were observed by a Japanese government astronomer and these could be Leonids.

TABLE 1. Bright Leonid Meteors Recorded in China and in Japan

Location	No.	Year AD	Date	Sol. Long. Eq 2000	Long-node	time diff
China	1	81	Sept 17	199.5	-6.6	+0.4
China	2	1010	Oct 14	220.2	-0.1	+9.4
China	3	1024	Oct 11	217.6	-2.7	-10.2
China	4	1034	Oct 13	219.1	-1.3	-0.2
China	5	1034	Oct 13	219.1	-1.3	-0.2
China	6	1037	Oct 12	218.3	-2.2	+2.8
China	7	1055	Oct 17	222.7	+1.6	-14.4
China	8	1077	Oct 14	220.0	-2.0	+8.6
China	9	1096	Oct 16	222.2	+0.3	-5.7
China	10	1403	Oct 23	226.5	-0.3	+3.4
China	11	1420	Oct 27	231.1	+4.2	-12.8
China	12	1427	Oct 23	226.3	-0.6	-5.8
China	13	1430	Oct 21	224.5	-2.4	-2.8
China	14	1433	Oct 24	227.8	+0.8	+0.2
China	15	1461	Oct 24	227.6	+0.6	-4.8
Japan	1	1171	Oct 18	222.9	-0.2	+3.9
Japan	2a	1434	Oct 12.8	215.8	-11.2	+1.2
Japan	2b	1434	Oct 13.8	216.8	-10.2	+1.2
Japan	2c	1434	Oct 18.8	221.8	-5.2	+1.2
Japan	2d	1434	Oct 20.8	223.8	-3.2	+1.2
Japan	3	1705	Nov 12.6	234.1	+3.1	+6.1

References

- Dall'olomo, U. (1978) Meteors, Meteor Showers and Meteorites in the Middle Ages: From European Medieval Sources, *Jour. Hist. Astron.*, ix, 123-134
- Hasegawa, I. (1993) Historical Records of Meteor Showers, in *Stohl, J. and Williams, I. Meteoroids and their Parent Bodies*, Astron. Inst. Slovak. Acad. Sci, Bratislava
- Hadsegawa, I. (1996) *Q. J. R. Astr. Soc.*, **37**, 75-78
- Imoto, S. and Hasegawa, I. (1958) Historical Records of Meteor Showers in China, Korea, and Japan, *Smithsonian Contrib. Astrophysics*, **2** (6), 131-144
- Kidger, M. R. (1993) Some Comments on the Identification of Medieval Meteor Showers Recorded by the Arabs, *Q. J. R. Astr. Soc.*, **34**, 331-334
- Mason, J. (1995) The Leonid Meteors and Comet 55P/Tempel-Tuttle, *J. Brit. Astron. Assoc.*, **105**, 219-235
- Nakano, S. (1997) Private Communication
- Rada, W. S. and Stephenson, F. R. (1992) A Catalogue of Meteor Showers in Medieval Arab Chronicles, *Q. J. R. Astron. Soc.*, **33**, 5-16
- Zhuang, T. (1977) *Chinese Astr.*, **1**, 197-220