

Diurnal and seasonal Variability of Meteor Rates at high, middle and low Latitudes

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Meteors are an important source for the metal atoms of the upper atmosphere metal layers and for meteoric dust in the upper mesosphere and lower thermosphere. Five SKiYMET meteor radars at locations between 69°N and 35°S have been used to study the annual and diurnal variations of meteor rates and their latitudinal variability. We report on the observed diurnal variations (averaged over one month) of meteor rates and their significant variations throughout the year. The ratio of maximum over minimum rates throughout one diurnal cycle is increasing with decreasing latitude and reaches values of about 2.3 at 69°N, of 4.6 at 54°N, of 6.4 at 22°S, and of 5.6 at 35°S. The annual variation of meteor rates is described as follows: A strong peak of meteor rate is found for the month June at high and middle Northern latitudes, whereas the meteor rates peak at low Southern latitudes in June and December.

In June, almost all of the meteors are detected at 69°N at altitudes below 100 km with their rate maximizing close to 90 km altitude. A large number of the echoes occur at elevation angles at and below 35°. These altitude and elevation distributions seem to suggest that the meteors observed in June come from sporadic meteoroids arriving from the North ecliptic hemisphere. The contribution of the summer daylight showers (Arietids, Zeta Perseids, and Beta Taurids) to the total meteor rate in May and June is probably not larger than 10%.