

Hour-to-hour variation of the Martian dust cloud on 18 October 2005

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The dust disturbances on Mars are quite decisive to the Martian atmosphere activity, and belong to the important items to be studied concerning the Martian meteorology. The dust cloud covers some area but sometimes develops to a storm to conceal the whole surface of the Red planet. They are thus local or global, higher or lower, but the initial stage looks similar. This initial dust, if the dust ascending is influenced by the absorption of the solar radiation, is expected to continue to be blown up and develop further in the daytime.

The development of the dust clouds including the global dust storms have been observed several times hitherto, while the initial stage of this event has never been fully traced and has been checked no more than in the Martian afternoon, that is, after passing the central meridian. In the afternoon, however, no dust cloud was said to have shown any decisive variation in its shape and size, contradictory to the usual expectation. Then how should we understand when the initial dust is blown up? How is the morning status of the initial dust?

In this respect the dust which started near Eos at the southern Chryse on 18 October 2005 provided us the first example of the initial dust which has been observed from the Martian morning to the evening. It was detected just when it came into the disk from the terminator in Europe, and due to the recent developments of the rapid imaging technology and the Internet communications, it was soon recognized as a significant dust and chased by many observers hourly up until the planet reached the west coast of the US continent. One of the outstanding results of the chasing was the fact that on those nice hour-to-hour images dust cloud did not seem to show any significant variation in its shape and size.

We are happily in a position to be able to use these images, and we tried to measure the size of the dust cloud on the most of excellent images. First, we made a cylindrical map projection of 40 degrees in longitude as well as in latitude by every 0.2 degree of pixel interval. Then we chose the points inside and outside the dust by mouse. Finally we selected the threshold value above which we counted the number of pixels as dust area. We confirmed thus that the dust cloud did not show any significant development in its size from the morning to the afternoon. To finish we should further make the minute measurements on the early morning side, but we have an impression that the result will not be so different.

We are supposing this work will provide a partial answer to the question when the dust cloud could grow up.