

## Automated detection of Martian dust devils in multiframe images observed by the MER/Spirit rover.

\*Kazuki Yajima<sup>1</sup>, Kazunori Ogohara<sup>2</sup>

1. Graduate School of Engineering, The University of Shiga Prefecture, 2. School of Engineering, The University of Shiga Prefecture

Currently, on the surface of Mars the activity range of rovers has spread far more than before, and the Mars environment is gradually becoming clear. Dust devil on Mars is a phenomenon in which dust rolled up from the surface rises in a spiral shape.

Martian dust devils occur everywhere, especially in the middle and low latitudes, and there are various types ranging from small ones like the whirlwind commonly seen on the planet to huge ones much more than tornadoes. In addition, dust that dust devils wind up from the surface of the Martian ground may absorb and block sunlight, sometimes changing the global circulation of the Martian atmosphere.

Therefore, in order to understand dynamics of the Mars atmosphere it is necessary to grasp the statistical nature of dust devils.

Previous studies were to count how many dust devils are present in a single image. However, in many cases, the same dust devil is seen in multiple images. Therefore, it was difficult to count the number of dust devil occurrences accurately. The number of dust devils that actually occurred has been overestimated unless we detect and count dust devils visually. In this technological study, we propose an algorithm for automatically measuring the population of dust devils correctly by combining template matching and comparison of patch standard deviation.

Keywords: Mars, image processing, dust devil