



A normalization model of Lunar surface brightness temperature:based on data obtained by CE-1 MRM and CE-2 MRM

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The Chang'E-1 Microwave Radiometer (CE-1 MRM) is a four-channel radiometer onboard the China's first lunar orbiter, Chang'E-1. It operates at 3.0, 7.8, 19.35 and 37GHz in a nadir-only viewing direction, and it is mainly used to obtain the brightness temperature distribution of the lunar surface. The Chang'E-2 Microwave Radiometer (CE-2 MRM) onboard Chang'E-2 has the same structure, working mode and scientific objective with CE-1 MRM, the only difference is that CE-2 MRM works in a lower orbital altitude. Both of CE-1 MRM and CE-2 MRM obtain a lot of observation data in different time, respectively, but since the brightness temperature they observed is significantly affected by the solar illumination which varying with, so it is difficult to make a directly comparsion between their observation results. In order to analyse the regularity of the brightness temperature on lunar surface and compare the results, we propose a normalization model and calculate the numerical difference between CE-1 MRM and CE-2 MRM. The result shows that: The brightness temperature is a function of period time of the moon, brightness temperature at lunar night (no solar illumination) has a linear dependence with period time, but a nolinear dependence in lunar day, and this regularity in 37GHz channel is the most obvious; Difference of brightness temperature between CE-1 and CE-2 in 3 channels is about 5~10K, this may due to the different data processing algorithm, and the biggest discrepence which could reach to 25K in 7.8GHz channel indicates that there would be a System deviation.