The total mercury concentration in mosoon precipitation in Yangtze Delta

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Precipitation is the key role for the water-soluble Hg (II), which is the oxidized product of the elemental mercury (Hg) in atmosphere, to enter the earth surface ecosystem. Lots work shows that due to the “washing out” process, the mercury concentration at the early stage of the rain is highest and then gradually decreases. There are negative correlation between the mercury concentration and the amount of precipitation. However by the 1 year measurement of the mercury in precipitation in Yangtze Delta, we find that in summer season the mercury concentration in precipitation changes according to the types of the rain.

The hourly precipitations for each rain from six observation sites of Yangtze Delta have been being collected since Dec. 2008. The total mercury concentration and particle mercury concentration have been checked. The results show that in summer the mercury concentration in precipitation ranges from 0.04 to 0.22μg/L. In June, the rain season of East Asia, Yangtze Delta is controlled by the special frontal rain, called plum rain, and the mercury concentration in precipitation keeps constant during each rain process and there are no negative correlation between precipitation and mercury concentration. It is because the month long semi-static frontal causes the cloud droplet could form and evaporate in cloud boundary for several time and the in-cloud scavenging process become the main process for the mercury going to the droplet. In July and August the negative correlation appears, when in convective precipitation the mercury scavenging is controlled by out-cloud scavenging and then particle mercury concentration is higher.

Brightness temperature distribution of the moon: result from Chinese Chang’E-1 Lunar Orbiter

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We have obtained the γ ray, X-ray, UV-VIS-IR images of the moon from the past Lunar Orbiter, Clementine, Lunar Prospector and SMART-1 spacecrafts. In microwave frequency, Lunar Radar Sounder of KAGUYA (Japan) and MINI-SAR of Chandrayaan-1 (India) has obtained the active radar image of the moon. But the passive microwave radiometry was absent aboard these lunar orbiters.

Astronomers had observed the moon for a long history using ground-based radio telescope, brightness temperature (TB) distribution map of the nearside had been obtained (eg. [1]). The farside of the moon has not covered and spatial resolution should be enhanced. We also had known that heat flow and thickness of lunar regolith could be retrieved [2, 3].

A microwave radiometer was onboard Chang’E-1 lunar orbiter, which was working at the frequencies of 3GHz, 7.8GHz, 19.35GHz, and 37GHz. The global TB map of the moon had been derived in the figure below using the first month data. The offwhite strip was filled with the second month data. Other TB map and retrieval results from TB data would be present in the future.

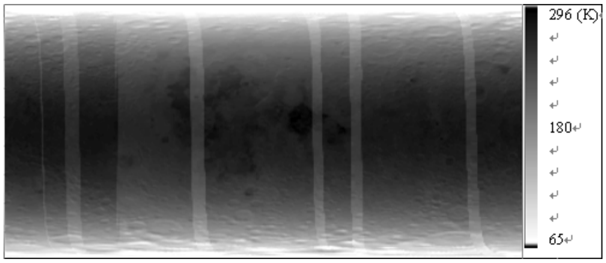

Figure 1: Daylight TB of the moon at 37.0 GHz.

The moon maps show that TB in higher latitude zone was lower than that in low latitude. Crater could be identified easily from the map, which suggests that TB is mainly controlled by lunar topgrapgy. TB of dark mare regions is higher than highland, more absorbing of microwaves, accounted for more abundant titanium-containing mineral ilmenite than highland.

[1] Gary (1967) *Astrophys. J* **147**, 245-254. [2] Keihm and Langseth (1975) *Science,* **187**(4171) 64-66. [3] Keihm and Gary (1979) *PLSC 10th*, 2311-2319.