



## **Relationships between satellite-derived cloud fields and precipitation**

### **1 K. Kawamoto**

Research Institute for Humanity and Nature, Kyoto, Japan, (kawamoto@chikyu.ac.jp / Fax: 81-75-229-6150 / Phone: 81-75-229-6162)

The aerosol indirect effects of both the first and second kinds are still uncertain in climate issues as IPCC reports indicate. In particular, the second kind which deals with precipitation and cloud lifetime is more difficult. More and more pollutants are emitted recently in China due to rapid economical growth, so this influence on the atmosphere is of quite concern from social and scientific points of view. In this paper, we try to investigate the relationship between the low-level cloud fields and precipitation over China. We focus on low-level clouds here because of more interaction with aerosols compared to middle and higher clouds. We use the cloud properties such as the particle size and vertically integrated particle number obtained from AVHRR satellite remote sensing, and precipitation data that were collected from ground-based rain gauges. Then we compared monthly-mean cloud properties with precipitation amount. As for the comparison between the particle size and precipitation, we observe larger particle size as precipitation amounts increase. And as for the comparison between the cloud particle number and precipitation, less cloud droplet number can be seen as precipitation amounts increase. These phenomena are explained mainly as follows. Precipitation substantially scavenge CCN (cloud condensation nuclei) particles from the atmosphere, therefore the number of low-level cloud droplets decrease, and the cloud particle size can get larger in the less CCN environment, when precipitation increases. Larger cloud droplet size might become drizzle more easily as well in the wet condition of rainy season. In addition, we examine geographical correspondence between the low-level cloud fields and precipitation. Of course, the cold rain process such as precipitation associated with the Asian monsoon is predominant in this region.

Thus we need to be careful to make direct comparisons as performed here. This sort of preliminary investigation would be, however, valuable as a primary step to get further understanding of the aerosol indirect effects of the second kind.