



Detection of global tropospheric clouds and polar stratospheric clouds over Antarctica using thermal infrared spectral data observed by TANSO-FTS/GOSAT

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Global tropospheric cloud distribution was derived from thermal infrared band data observed by Thermal And Near infrared Sensor for carbon Observation – Fourier Transform Spectrometer (TANSO-FTS) onboard Greenhouse gases Observation SATellite (GOSAT). It is expected that this band has ability to detect optically thin clouds compared with Cloud and Aerosol Imager (CAI) which is the other sensor on GOSAT. In addition, polar stratospheric clouds (PSCs) which can be harder to detect than the tropospheric clouds because of high reflectivity or low temperature of the surface and their low optical thickness were also detected. We have modified CO₂ slicing method which was developed as one of the cirrus cloud detection techniques using thermal infrared band data to detect thin clouds more stably. The pseudo spectral channels were defined as sets of several actual spectral channels between 700cm⁻¹ and 750cm⁻¹ which have weighting function peak height in a same height range for each 0.5km. These pseudo channels were optimized with simulation studies using a multi-scattering radiative transfer code, Polarized radiance System for Transfer of Atmospheric Radiation (Pstar) 3 for several temperature profile patterns prepared based on latitudes and temperature at 500hPa. GOSAT data was analyzed with the combination of these pseudo channels determined for each of observation points from these simulations and the results were compared with the observational results from Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) / Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO). The comparisons about global cloud are based on the coincident observations in 2010. Monthly occurrences of Antarctic PSCs were compared for each grid area from June to September in 2010. As a result, the correlation coefficients in each month are 0.76, 0.71, 0.75, and 0.61 relatively. Though that is low value in September, it can be explained by decrease of occurrences.