Based on the supposition that it might be caused by the decomposition of atmospheric CO_2 in the process of degradation of photoelectrons of auroral X-rays, a quantitative explanation of the observed amount of CO increase was attempted by means of the currently existing theory of electron and photon transportation.

In the course of calculation it was shown that the slow electron near the dissociation threshold (5.45 eV) was playing a role of predominant importance because of the resonance effect and also its characteristic transparency to air molecules.

It suggests the importance of the direct effect of auroral electrons to dissociate CO_2 in the middle atmosphere.

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EXTRACTION OF CLOUDS FROM SATELLITE IMAGERY IN THE ANTARCTIC (Abstract)

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Extraction of clouds from satellite imagery (NOAA-7 AVHRR) in the Antarctic is attempted. In the place where the surface is covered with snow or sea-ice, like the Antarctic, discrimination of cloud and snow or sea-ice is difficult. However, extraction of clouds from the satellite imagery is in urgent need for the study of cloud climatology in the Antarctic. It is already known that the cloud extraction under the sunlight is possible by calculating the difference in the brightness temperature between channel 3 (3.7 μm) and channel 4 (11 μm) (or channel 5 (12 μm)) owing to the difference in albedo. If the brightness temperature of channel 3 is extremely larger than that of channel 4, the field of view (FOV) is occupied by cloud. In this study, some techniques for the extraction of clouds are proposed using the brightness temperature T_{B3}, T_{B4} and T_{B5} for channels 3, 4 and 5, respectively. 1) Even without sunlight, if T_{B3} is larger than T_{B4} (or T_{B5}), the FOV is occupied by cloud. 2) The thin cloud extraction is possible by calculating the difference between T_{B4} and T_{B5}. If T_{B4} minus T_{B5} is larger than 1.8 K, the FOV is occupied by thin cloud. 3) The cloud extraction over the sea is easily made by calculating the ratio in albedo between channel 1 (visible) and channel 2 (near-infrared). If the ratio is nearly equal to unity, the FOV is occupied by cloud. These are explained by radiative properties of clouds; the relation of cloud emittances ε_3, ε_4 and ε_5 for channels 3, 4 and 5, respectively, is expressed as $\varepsilon_5 > \varepsilon_4 > \varepsilon_3$, and relation of cloud reflectances ρ_1 and ρ_2 for channels 1 and 2 is $\rho_1 \approx \rho_2$.

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