

VARIATIONS OF ATMOSPHERIC CO₂ CONCENTRATION OVER
SYOWA STATION, ANTARCTICA AND AIR TRANSPORT
PROCESS (ABSTRACT)

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Aircraft and ground-based measurements of the atmospheric CO₂ concentration have been made respectively at and over Syowa Station, Antarctica since January 1983. The minimum concentration of the average seasonal CO₂ cycle occurs in March throughout the troposphere and the maximum concentration appears in mid-August and late in September in the upper troposphere and in the lower and middle troposphere, respectively. The peak-to-peak amplitude of the cycle decreases slightly with height. The CO₂ concentration increases with height during most of the year and the height-dependent concentration difference is smaller from late winter to spring than in the remaining seasons.

To interpret these variations of the CO₂ concentration, 3-dimensional trajectory analysis was done using U. S. NMC data. From the results obtained, it is suggested that the northern hemispheric air with high CO₂ concentration is transported to the Antarctic region through the upper troposphere from late fall to winter, while the air with low CO₂ concentration is transported from southern middle latitudes into the Antarctic region through the lower troposphere in the remaining seasons. These air transport processes are especially important for variations of the CO₂ concentration over the station.

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