

over the open ocean. Dimethylsulfide undergoes a photooxidation reaction with OH radical during the daytime, but with NO<sub>3</sub> radical during nighttime. This reaction has two pathways: hydrogen abstraction and OH addition to the sulfur atom. The oxidation of DMS produces sulfur dioxide (SO<sub>2</sub>) and methanesulfonic acid (MSA or CH<sub>3</sub>SO<sub>3</sub>H) as intermediate products, and non-sea-salt sulfate (nss-SO<sub>4</sub><sup>2-</sup>) as an end product. We considered the reaction processes in detail to obtain quantitatively the concentrations of SO<sub>2</sub>, MSA and nss-SO<sub>4</sub><sup>2-</sup>. The calculated concentrations are consistent with the observed values. It is concluded that DMS is a dominant source of aerosol particles included nss-SO<sub>4</sub><sup>2-</sup> in the marine atmosphere. The calculation indicates that most nss-SO<sub>4</sub><sup>2-</sup> must be produced by heterogeneous reactions of SO<sub>2</sub> through cloud droplets. Other processes, MSA oxidation and homogeneous SO<sub>2</sub> oxidation, are inefficient in producing abundant nss-SO<sub>4</sub><sup>2-</sup>.

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## ON SO<sub>2</sub> MEASUREMENT IN THE OCEAN ATMOSPHERE (ABSTRACT)

Yasunobu IWASAKA<sup>1</sup>, Masahiko HAYASHI<sup>2</sup>, Seizi KOGA<sup>2</sup>  
and Hiroshi TANAKA<sup>2</sup>

<sup>1</sup>*Solar Terrestrial Environment Laboratory, Nagoya University,  
13, Honohara 3-chome, Toyokawa 442*

<sup>2</sup>*Water Research Institute, Nagoya University, Furo-cho,  
Chikusa-ku, Nagoya 464-01*

Seasonal change in content, size, and molecular state of aerosols containing sulfur suggested that geochemical cycle of sulfur in the Antarctic atmosphere is strongly controlled by long range transport of gaseous and particulate sulfur from the sub-Antarctic ocean. Sulfur dioxide gas is a key component for study on the geochemical cycle of various gases and particles containing sulfur.

A new type detector was developed to measure SO<sub>2</sub> in the ocean atmosphere where usually SO<sub>2</sub> content is at background level. This detector can measure SO<sub>2</sub> of 10 ppt level or lower in about 10 minutes, and will be useful to study behavior of SO<sub>2</sub> in a remote area which is not polluted by human activity.

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