

清浄地域の窒素酸化物の日内濃度変動解析

Analyses of the diurnal variation of nitrogen oxides in the remote area.

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Nitrogen oxides consist of NO, NO₂, NO₃, HONO, N₂O₅, gaseous nitric acid (HNO₃), particulate nitrate (NO₃⁻(p)) and so on. NO reacts with oxidants and gives NO₂. The other N-containing species are generated by the reaction of NO₂ and oxidants. Nitrogen oxides have various characteristics; NO₂ is a precursor of O₃, HNO₃ and NO₃⁻(p) are stable against photochemical degradation, making them transportable over long distances so that HNO₃ and NO₃⁻(p) being adverse effects to the environment over larger regions. We have been observing total odd nitrogen species (NO_y), HNO₃ and NO₃⁻(p) at the Cape Hedo, Okinawa, Japan.

The diurnal variations of NO_y, HNO₃ and NO₃⁻(p) from March to December were analyzed to reveal the effect of local emission and photochemistry. We discuss the data from March to December in 2008. NO_y and HNO₃ concentrations had peak values at 10:00 and 14:00, respectively, while NO₃⁻(p) concentration minimized at 14:00. We analyzed the relationship between the meteorological conditions and the diurnal variations of NO_y, HNO₃ and NO₃⁻(p). The diurnal variation of HNO₃ was independent of the seasonal variations and the origins of air mass. The diurnal variation of HNO₃ in each month had the same pattern. The variations of HNO₃ concentrations were more sensitive to the local effect than the long range transport. This suggests HNO₃ photochemical production in the local regions. We also analyzed the relationship between wind velocity and the diurnal variations of HNO₃ and NO₃⁻(p). The concentration of the sea salt particles increases with the increase of wind velocity. The heterogeneous reaction of HNO₃ with sea salt particle can be promoted when the wind velocity is large.

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