

つくば市郊外、落石岬、波照間島および南鳥島における大気中アルゴン濃度と大気ポテンシャル酸素の同時観測  
Variations in the atmospheric Ar/N<sub>2</sub> and APO observed at Tsukuba, Ochi-Ishi, Hateruma and Minamitorishima, Japan

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Atmospheric Ar/N<sub>2</sub> ratio is a unique tracer of spatiotemporally-integrated air-sea heat fluxes, and expected to be a new tool to validate changes in the global ocean heat content (e.g. Keeling et al. 2004; Cassar et al., 2008). The Ar/N<sub>2</sub> ratio is also useful to estimate thermal and biological components of Atmospheric Potential Oxygen (APO = O<sub>2</sub> + 1.1xCO<sub>2</sub>) separately, so that it will contribute to better understanding of the oceanic carbon cycle. Therefore, we have developed a high-precision measurement system of the atmospheric Ar/N<sub>2</sub> ratio and APO (Ishidoya and Murayama, 2014), which is applicable both for continuous observations and analyses of discrete flask air samples, and started systematic observations of the Ar/N<sub>2</sub> and APO at Tsukuba (36N, 140E) and Hateruma Island (24N, 124E), Japan since 2012 and at Cape Ochi-Ishi (43N, 146E) and Minamitorishima Island (24N, 154E), Japan since 2013. Clear seasonal cycles of the Ar/N<sub>2</sub> ratio were observed at all the sites, and the peak-to-peak amplitudes of the seasonal cycles were in the range of 15 - 50 per meg. The observed amplitudes were found to be significantly larger than those calculated using atmospheric transport models and the seasonal air-sea N<sub>2</sub> fluxes climatology (TransCom fluxes; Garcia and Keeling et al., 2001) with a scaling factor to convert changes in the atmospheric N<sub>2</sub> concentration to those in the Ar/N<sub>2</sub> ratio (Blaine, 2005). We will also present preliminary estimations of the thermal and the biological APO at our sites by using the observed seasonal Ar/N<sub>2</sub> and APO cycles.

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