

Atmospheric Neutral Analyzer for mass-resolved velocity distribution measurements: Verification of mass analyzer

SHIMOYAMA, Manabu^{1*} ; HAYASHI, Ayuko¹ ; ITO, Fumihiko¹ ; HIRAHARA, Masafumi¹

¹STEL, Nagoya University

In order to understand the temporal and spatial variability of the ionosphere-thermosphere system, simultaneous measurements of the composition and density of the neutral atmosphere and the velocity distribution of individual species are essential. However, most conventional types of instruments for neutral atmosphere lack the simultaneous capability of measuring neutral atmospheric velocity and resolving neutral mass.

We have designed the Atmospheric Neutral Analyzer (ANA) instrument to measure the detailed, mass-resolved 2-dimensional velocity distribution of neutral species, from which the corresponding density, mass composition, bulk velocity and temperature were derived. In this presentation, we will report the results from laboratory experiments for the performance verification on the prototype of mass analyzer along with the detailed and overall design determined by numerical simulation.

Keywords: neutral upper atmosphere, velocity distribution function, mass analysis