

## Development of a whole atmosphere-ionosphere model GAIA for higher accuracy and its application toward data assimilation modeling

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The origins of upper atmospheric variations do not only come from the solar activities and rotation, but also from the Earth's lower atmosphere. In order to now-cast and forecast the upper atmospheric disturbances and variations, we have developed a whole atmosphere-ionosphere coupled model called GAIA. The model incorporates the Japanese meteorological reanalysis (JRA) into its lower atmospheric part as well as the daily F10.7 index, in order to reproduce the effects of realistic forcing both from the lower atmosphere and solar irradiance. We have validated the model through the comparison of its long-term run with observations of ionosphere and ionosphere, and found out that further development of the model is necessary for higher accuracy.

In this talk, we will show the results from several updates of the model, such as improvement of ionospheric dynamics and energetics, and increase of model resolution. We have developed the interface of GAIA to data assimilation system and will show future plan.

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