

Current status of the CAWSES-II Task Group 4: What is the geospace response to variable inputs from the lower atmosphere

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Recent developments of coupled modeling between neutral and ionized atmosphere and various observation techniques such as advanced radars, airglow imaging, and GPS networks, make it possible to study geospace response to variable inputs from the lower atmosphere. Consequences for telecommunications, re-entry and satellite operations still need to be explored. The extent to which the effects of this quiescent atmospheric variability are transmitted to the magnetosphere is yet to be resolved. We thus stand right now at an exciting research frontier: understanding the cause-and-effect chain that connects tropospheric and strato-/mesospheric variability with geospace processes. CAWSES-II Task Group 4 (TG4) will therefore elucidate the dynamical coupling from the low and middle atmosphere to the geospace including the upper atmosphere, ionosphere, and magnetosphere, for various frequencies and scales, such as gravity waves, tides, and planetary waves, and for equatorial, middle, and high latitudes. Attacking the problem clearly requires a systems approach involving experimentalists, data analysts and modelers from different communities. For that purpose, the most essential part of TG4 is to encourage interactions between atmospheric scientists and plasma scientists on all occasions. TG4 newsletters are distributed to the related scientists every 3-4 months to introduce various activities of atmospheric and ionospheric researches. Five projects are established in TG4, i.e., Project 1: How do atmospheric waves connect tropospheric weather with ITM variability?, Project 2: What is the relation between atmospheric waves and ionospheric instabilities?, Project 3: How do the different types of waves interact as they propagate through the stratosphere to the ionosphere?, Project 4: How do thermospheric disturbances generated by auroral processes interact with the neutral and ionized atmosphere?, and Project 5: How do thunderstorm activities interact with the atmosphere, ionosphere and magnetosphere? Three campaign observations have been carried out in relation to the TG4 activity, i.e., stratospheric sudden warming campaign (January-February, 2010), longitudinal campaign (September 1-November 12, 2010 and August 22-November 2, 2011), and CAWSES Tidal Campaign. In this presentation we show the current status and future plan of CAWSES-II TG4 activities of 2009-2013.

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