

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

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Studying the geospace response to variable inputs and waves from the lower atmosphere is particularly important since the induced variability competes with the solar and magnetic driving from above. 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 TG 4 is to encourage interactions between atmospheric scientists and plasma scientists on all occasions. Four project 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?, and Project 4: How do thermospheric disturbances generated by auroral processes interact with the neutral and ionized atmosphere? A joint project with TG2 is also proposed for the topic of "Project 5: How does climate change affects atmospheric waves in the ITM?".

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