



Institute for Space Weather Sciences Colloquium

Thursday, 10th of October 2024, 1pm ET

via Zoom, meeting ID: 917 2169 7568, password: isws

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Studying Energy Coupling between the Earth's Atmospheric Regions: from High to Mid-latitudes Using Ground-based Techniques

The sun-earth system is complex where energy and momentum transport from one region of the atmosphere to the other with varying effects. The earth's upper atmosphere is sandwiched between two regions – the magnetosphere above and the lower atmosphere below. The energetic events in the sun drives the magnetosphere and in turn the ionospheric response. The lower atmosphere also has energetic events in the form of thunderstorms and hurricanes. These tropospheric weather events also tend to launch energy into the upper atmosphere impacting the ionosphere. How the energy and momentum propagation from both these sources impact the ionospheric dynamics is a subject of active research. In this talk, I will talk about various ways to investigate this coupling between lower and upper atmosphere and focus on two specific techniques to study these – the Incoherent Scatter Radars (ISRs) and a network of all-sky cameras. An ISR is a standalone instrument that is the most precise remote sensing tool for estimating the fundamental ionospheric parameters in a relatively narrow region. The all-sky cameras observing the nighttime emissions from the earth's thermosphere and ionosphere, when used in a network fashion can shed light on coupling processes that take place over 1000s of kms. I will primarily use examples from high-latitude ISRs and mid-latitude all-sky imager network that have been used to study the coupling mechanisms.



Dr. Bhatt has a B.E. in electronics and communications from the Gujarat University. Her M.S. degree in electrical engineering is from Utah State University. Her Ph.D. in electrical engineering is from Cornell University. Her post-doctoral appointments include MIT's Haystack Observatory and Cornell University.

Dr. Bhatt works to understand the physics of ionospheric plasma during auroral precipitation at high latitudes by using the SRI-operated Sondrestrom incoherent scatter radar facility in Kangerlussuaq, Greenland,. Studying aurora using both radio and optical techniques provides unique insights into the amount of energy deposited into the earth's ionosphere during solar storms and resulting auroral precipitation. Dr. Bhatt also studies global scale ionospheric processes that span continents—in particular, the propagation of large-scale waves in the ionosphere in response to forcing from solar or lower atmospheric events.