

## SPACE PHYSICS SEMINAR

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## Equatorial Spread F - A space weather problem finally resolved?

Thursday, April 3, 2014 725 Commonwealth Ave. Refreshments at 3:30pm in CAS 500 Talk begins at 4:00pm in CAS 502

## Abstract:

The forecastability of equatorial spread F (ESF), an important aspect of terrestrial space weather, is considered experimentally and theoretically. Ionospheric state parameters including plasma number density and vector drift profiles were measured at the Jicamarca Radio Observatory in campaigns in 2013. Neutral winds were measured by the red-line Fabry Perot interferometer at Jicamarca. Coherent radar backscatter from plasma irregularities associated with equatorial spread F (ESF) was also recorded. A numerical simulation of ionospheric irregularities, initialized and forced using parametrizations derived from a combination of measurements and empirical models, was used to model the ESF activity observed. Simulations were able to recover the salient features of the irregularities, thanks in part to the inclusion of important but often neglected physics (nonequipotential magnetic field lines and plasma shear flow). White noise was used to "seed" irregularities in the simulations, suggesting that atmospheric gravity waves did not play a central role in the phenomenology. The forecast problem appears to be one of forecasting the relevant background ionospheric state parameters.