

# 2013 Workshop: International space weather and climate

Long title

International space weather and climate observations along the 120E/60W meridional circle and over its surrounding areas

Conveners

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Description

This workshop is directed toward strategic development and deployment of scientific instrumentation for advancing research and understanding in the field. Incoherent scatter radars and other ground-based radio and optical instruments in the America Sector, sponsored by the US-NSF Geospace Facility program, have created an effective space weather and climate observing chain and have generated important discoveries shaping geospace research and application. Meanwhile, a recent major Chinese project for science and technology infrastructure provides comprehensive ground-based space weather observing in the Eastern Hemisphere, in particular along the 120E longitude. This Meridian Project consists of 15 observatories distributed from northern China to the South Pole. More recently, an innovative major facility for detecting the whole neutral atmosphere from surface up to 110 km is under development in Tibet, China as well. This detection is enabled by the Atmospheric Profiling Synthetic Observation System (APSOS) which combines ground-based lidars and THz radiometer remote sensing instruments. Based on existing capabilities and new developments, a globe-circling set of geospace observatories is envisioned, including stations in China, Russia and Australia, and extending along the 60W meridian along the Atlantic coasts of North and South America.

The purpose of this workshop is to inform and involve the CEDAR community in the opportunities associated with this new space weather and climate observing system. We invite our CEDAR colleagues and students to join this collaborative effort, define

the science focus, propose campaigns, perform coordinated experiments, share observational datasets, and conduct joint data analysis. This workshop consists of a set of invited talks, and is open for general questions and discussion within the overall community.

## Justification

Determining the dynamics and coupling of Earth's magnetosphere, ionosphere, and atmosphere and their response to solar and terrestrial inputs constitutes a key science goal for the next decade as indicated in the 2013-2022 Decadal Survey in solar and space physics. The multivariate-system nature of our research requires simultaneous and carefully coordinated sets of observations spanning the varied aspects and regions of the system utilizing both ground-based sensor networks and satellites. CEDAR: The New Dimension community plan defines a related strategic thrust - developing observational and instrumentation strategies for geospace system studies.

## Summary

### Monday

- John Foster: (Intro) Global Geospace and Space Weather Research: the Need for Distributed Observations
- Guotao Yang/ZhiQing Chen, The Successful Beginning of Chinese Meridian Project
- Weilin Pan, Mobile Rayleigh/Mie lidar for temperature and aerosol measurements in Tibet
- Xuewu Cheng, Daytime observations of sodium layer using Faraday filter lidar technique
- Tao Li, System design of a mobile DIAL ozone lidar
- Xinzhao Chu, LIDAR Exploration of Atmosphere and Geospace from 30 to 160 km Altitudes
- Alan Liu, Mesosphere and Lower Thermosphere Observations at the Andes Lidar Observatory

### Tuesday

- Tony van Eyken (TBD)
- Qian Wu: Mid-Latitude Thermospheric Wind Observations Across the Pacific
- Mike Ruohoniemi: Space weather observations with SuperDARN extended in latitude and longitude
- Dave Hysell: A DASI-chain for midlatitude aeronomy
- Juha Vierinen: Low cost low power HF radar/ionosonde for mapping 3D electron density structure of the ionosphere
- Zhipeng Ren, Tidal wind observation from a meteor radar chain located at mid- and low-latitudes along the 120E meridian in theNorthern Hemisphere
- Shunrong Zhang, Proposal: A Coordinated Observational Campaign of ISR World Days and Meridian Chain Project in 2014

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