GBOA NEWSLETTER #2 April 30, 1985

CEDAR

The Steering Committee of the ground-based optical aeronomy (GBOA) community assembled a list of the major scientific areas of interest in order to guide the development of new instrument systems over the rest of this decade. The science is sub-divided under the general theme of understanding the "Coupling, Energetics and Dynamics of the Atmospheric Regions" (CEDAR) from the stratosphere through the plasmasphere. The following is a brief outline of the major goals within the program and a brief description of the various sub-topics.

COUPLING, ENERGETICS AND DYNAMICS OF THE ATMOSPHERIC REGIONS (CEDAR)

TOPIC I: DYNAMICS AND ENERGETICS OF THE ATMOSPHERE FROM THE UPPER MESOSPHERE TO THE EXOBASE

A) Global MEAN neutral and ionospheric (E,F) circulation, temperature and composition for solar and seasonal variations.

Main concern is on the atmospheric region between 85 and 400 km with special interest between 85 and 150 km. This is a description of the quiet time state of our atmosphere considering only the slowly changing inputs due to greater than 48 hour variations in solar particulate and radiative fluxes, solar wind/IMF changes and coupling/feedback between the atmosphere and the magnetosphere.

B) Short Term Changes in (A)

Study of the short term (less than 48 hours) effects on the global MEAN picture due to the impact of major geomagnetic storms, auroral substorms, changes in the IMF and solar UV, and wave propagation from the lower atmosphere upwards.

C) Effects of Small-Scale Structures on the Neutral and Ionospheric Circulation, Temperature and Composition

Studies include the total effects on the dynamics and energetics of the atmosphere due to the detailed spatial distribution of energy input associated with the aurora, ionospheric irregularities and photochemically produced irregularities in the mesopause and lower thermosphere.

The following two topics were considered of lesser importance than TOPIC I but were actually weighted equally in their importance to our overall objective. They are listed sequentially for simplicity.

TOPIC II DYNAMICS AND ENERGETICS OF THE ATMOSPHERE FROM THE UPPER ATMOSPHERE THROUGH THE EXOSPHERE/PLASMASPHERE

A) Latitude and local time variation of concentrations of H, He and hot O in the thermosphere and exosphere. Main concern above 400 km.

It is critical in our understanding of this topic to assess the role that H, He and hot O atoms play in atmospheric interaction with the plasmasphere, polar wind, ring current and formation of the geotail.

B) Exospheric particle velocity distributions

Inherent in the determination of concentrations is the relationship between particle velocity distribution and escape processes, solar radiation pressure effects, sources and loss of satellite particles and formation of the geotail.

C) Coupling with plasmasphere/magnetosphere

The influences that must be considered include interhemispheric transport of photoelectrons, SARARCS, hot/cold plasma, high latitude outflow and velocity distributions of molecular and atomic ions.

TOPIC III DYNAMICS AND ENERGETICS OF THE ATMOSPHERE FROM THE STRATOSPHERE TO THE LOWER THERMOSPHERE

A) Coupling of dynamics and photochemistry of the upper and lower atmosphere. Main concern between 60 and 120 km.

Important to the understanding of this region are considerations of gravity wave breaking, eddy diffusion, turbulence, transport of minor species, energetic particle precipitation and the diurnal variation of the constituent density.

B) Photochemistry of the mesosphere and lower thermosphere

This topic requires an intrinsic understanding of the photochemistry of oxygen (O, O_3, O_2 metastable states), hydrogen and related emission, NO^+, O_2^+, metallic ions, neutrals, and hydronium molecules.

The various sub-committees are now in the process of reviewing these major topics and determining their role under each. Subsequently, they will define what they can accomplish using existing equipment in place, in new arrays or in new clusters and if new facilities are needed how many should be based on new technology (Class I), how many on existing technology (Class II) and how many as copies of existing facilities (Class III). In consideration of these particulars, attention should be paid to coordination between the other optical facilities being developed and the existing radar and other geophysical and atmospheric monitoring facilities.

Each sub-committee is to present their report to the community during the June 25-28 workshop in Seattle. A brief agenda follows:

June 25 (Tuesday)	Morning	- Introduction Individual Investigator Reports
	Afternoon	- Modeling Committee Report
	Evening	- Buffet Reception
June 26 (Wed)	Morning	- Spectroscopic Committee Report
	Afternoon	- Interferometer Committee Report
	Evening	- Forum and Panel Discussion with refreshments
June 27 (Thurs)	Morning	- Imaging Committee Report
	Afternoon	- Lidar Committee Report
June 28 (Friday)	Morning/Afternoon	- Individual Committees meet

An invitation letter and details, including housing and logistic information will be mailed to each of you next week. The detailed agenda will be available in June.

The time-line on our activities is as follows:

1 May - Committees submit outline of work plan and schedule to Steering Committee chairman.

27-31 May - Steering Committee and sub-committee chairmen meet at AGU to review progress.

25-28 June- Spring meeting for community consideration of sub-committee activity.

31 August - Submission of sub-committee report to Steering Committee.

1 November- Submission of Final Report by Steering Committee to NSF.

If anyone has a question about the June workshop, please send it to Ken Clark at the University of Washington. All other questions can be addressed either to me or any member of the Steering Committee.