

Rayleigh lidar at Esrange operated by Bonn University. The lidar provides a mean state profile in the stratosphere and mesosphere up to 95 km altitude for the Hygrosonde-II campaign period as well as profiles before and after the rocket and balloon flights. Meteorological data for the stratospheric analysis have also been obtained from the ECMWF analysis. An analysis of the obtained distribution of middle atmospheric water relates its details to the large-scale motions and the dynamics of the region (Khaplanov et al., Middle Atmospheric Water Vapour and Dynamics During the Hygrosonde-2 Campaign, 16th ESA-PAC Symposium, 2003). At the time of the Hygrosonde-II measurements the Odin satellite was configured in aeronomy mode and provided continuous water measurements using sub-mm limb sounding. A comparison of these remotely sensed measurements during Odin passes over Esrange with the local Hygrosonde-II/SKERRIES measurements will be presented.

URL: <http://www.misu.su.se>

SA51B MCC: Level 1 Friday 0830h Meteors and the Mesopause III Posters

Presiding: J Friedman, National Astronomy and Ionosphere Center, Arecibo Observatory; D Janches, National Astronomy and Ionosphere Center, Arecibo Observatory

SA51B-0509 0830h POSTER

Global Measurements of the Atmospheric Effect of the Leonid Shower

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The nadir-viewing Global Ozone Measuring Experiment (GOME) UV/VIS spectrometer from ERS-2 is used to study the temporal variations of the column densities of metal species, including neutral/ionized Mg, Fe, and neutral Si. ERS-2 orbits the Earth 14 times per day at 795 km with an equatorial crossing time of 10:30 AM. GOME has a spectral range of 237 to 793 nm, with a wavelength resolution of 0.2 nm in the 237 to 316 nm region, and measures all wavelengths simultaneously, performing a complete spectral scan in 1.5 seconds. There are 5 wavelength channels. The 2 channels comprising the 237 to 316 nm range are integrated for 12 seconds giving a spatial resolution of 100 by 960 km. All other channels are integrated for 1.55 seconds giving a spatial resolution of 40 by 20 km. Metal data are examined from November 1996 to delineate changes in the mesospheric and thermospheric abundance of meteoric material resulting from the Leonid meteor shower. Global data from the month of November are analyzed before, during and after the shower to sort out Leonid effects from other temporal effects. In order to better quantify column amounts of different neutrals and ions and resolve the identity of unidentified spectral features, simulations of individual spectra are conducted and compared to actual data.

SA51B-0510 0830h POSTER

Statistics of meteor-head echo observations using the Jicamarca 50 MHz radar

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We present the statistical results of recent observations of meteor-head echoes obtained with the high power-aperture Jicamarca 50 MHz radar. Our observations were concentrated at the beginning on Leonids events, specifically 2001 and 2002, nonetheless we have recently started observations at different seasons in 2003. Statistics are presented for most of the meteor parameters we are able to estimate, including among other the absolute velocities, azimuth and elevation of velocity vectors, and decelerations. So far we have not seen any evidence of Leonids signatures. Moreover, the velocity distribution of the meteors with respect to the Earth's frame of reference is clustered around the Apex, within $\pm 10^\circ$ transverse to the Ecliptic and no more than a few degrees in heliocentric longitude in the Ecliptic plane. Preliminary estimates of meteor fluxes, based on the meteor decelerations, are compared to the Arecibo estimates and those obtained with optical instruments.

SA51B-0511 0830h POSTER

MAGIC Collector - Direct Sampling of Meteoric Dust in the Mesosphere

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Recondensation of evaporated meteoric material is thought to form particles in the nanometer size range. Notwithstanding the lack of direct evidence of these particles, it has been suggested that these small particles of meteoric origin may play a key role in a number of mesospheric processes related to noctilucent clouds, polar mesosphere summer echos, charge balance and neutral chemistry. We will present a recently developed instrument, MAGIC (Mesospheric Aerosol - Genesis, Interaction and Composition), designed for *in situ* collection of neutral nanometer-size particles in the mesosphere. The instrument will for the first time allow us to bring these particles from the mesosphere into the laboratory and to study their properties in detail. The MAGIC instrument is intended to be carried on a sounding rocket and with a mass of less than 1.5 kg, the collector is completely self-contained and requires no telemetry. MAGIC collectors are currently being built at NRL, and two rocket flights in collaboration with the Virginia Polytechnic Institute and the University of Stockholm, are scheduled in the spring of 2004 from Wallops Island, Virginia, and in the winter of 2004/5 from Esrange, Sweden.

SA51B-0512 0830h POSTER

Metal and ion layers observed by resonance lidars and incoherent scatter radar at Arecibo

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Observations of the mesopause-region potassium and sodium layers using the resonance lidar technique have been carried out at the Arecibo Observatory (18.35°N, 66.75°W) for a number of years. These observations have often coincided with E-region observations by the incoherent scatter radar. In this presentation, we examine the seasonal and diurnal variability of K/Na/ion layer content and height. In particular, we have found that sporadic layers are far more prevalent in summer than other times of year. We have also developed algorithms to study the layer structures in detail, including the densities and trajectories of thin metal layers. The neutral metal layers will be compared to the ion layers to reveal whether and how the two phenomena are dynamically and chemically linked.

SA51B-0513 0830h POSTER

Observation and Modeling of Mesospheric Potassium Over Arecibo Observatory

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Nighttime observations of the atmospheric potassium layer were performed at the Arecibo Observatory using lidar to determine the seasonal variation in the concentration of the potassium metal atom layer. The K layer shows nightly and seasonal variation; the nightly variation was due to the presence of sporadic layers. The seasonal variability is less in the layer width, while the column abundance exhibits a semiannual variation. To understand the seasonal behavior of the K layer a one dimensional model has been developed. The model includes a meteoric deposition, vertical transport through eddy diffusion, and a full chemical scheme. To identify molecular reservoirs and sinks for the K atom, ab initio calculations were performed to estimate the thermochemistry. Rate constants for the reaction between the metal bicarbonate and atomic H, as well as ion-molecule reactions, were obtained by considering detailed balance mechanism and transition state theory. Reactions $KO^+ + N_2$, $K^+ \times O_2 + O$, $K^+ \times O_2 + N_2$, and $KHCO_3 + H$ can be considered as routes that may cycle species, which can play a role as major sinks of potassium ion or neutrals in the mesospheric cycle. These studies of the metal layer contribute to a better understanding of chemical and dynamical changes that affect atmospheric composition.