

NO<sub>3</sub> in the atmosphere. It allows notably to quantify the role of ozone chemistry in aerosol formation. Size-segregated aerosol samplings have been performed at Trinidad Head (coastal site, Northern California) in Spring 2002 as part of the Intercontinental Transport and Chemical Transformation (ITCT) 2k2 experiment. Preliminary results of elemental analyses indicated impact of long-range Asian-originated aerosol transport at the site during ITCT-2K2 as evidenced by soil and trace species data. The isotope analyses performed on a complete set of size-segregated SO<sub>4</sub> and NO<sub>3</sub> aerosols suggest that pollution events can alter significantly the budget of formation pathways of these species.

#### A22F-03 1645h

##### Transport Pathways of North American Outflow: A Global 3-D Model Analysis Constrained by MOPITT, MODIS, and AERONET Observations

Qinbin Li<sup>1</sup> (qli@io.harvard.edu)

Daniel Jacob<sup>1</sup> (djj@io.harvard.edu)

Rokjin Park<sup>1</sup> (rjp@io.harvard.edu)

Robert Yantosca<sup>1</sup> (bmy@io.harvard.edu)

<sup>1</sup>Harvard University, 29 Oxford St., Cambridge, MA 02138

We use a global 3-D model (GEOS-CHEM) of tropospheric chemistry, fully coupled with aerosol simulation and nested over North America (1 degree by 1 degree) to examine the transport pathways and associated mechanisms of North American pollution (CO, O<sub>3</sub>, and aerosols) outflow, particularly in the summer. MOPITT CO columns as well as aerosol optical depths from MODIS and AERONET are compared with model simulated CO columns and aerosol optical depths respectively to identify outflow events and the export patterns. The relatively high resolution (1x1) over the nested domain allow a more detailed examination of outflows due to (1) frontal lifting, (2) convection, and (3) Warm Conveyor Belt (WCB). Differences in the export of CO and aerosols, as suggested by MOPITT and MODIS observations as well as seen in the model, allow determination of whether the export is ahead of or behind the frontal systems. Examining each outflow event against synoptic weather systems would answer the question whether every frontal system leads to a pollution export event. We also examine the role of the recirculation over the Gulf of Mexico in exporting pollution from southeast U.S.

#### A22F-04 1700h

##### Integrating Air Quality Data and Eulerian Modeling Results to Apportion Big Bend Texas' Sulfate Among Sources in the United States and Mexico

Bret A Schichtel<sup>1</sup> (970-491-8581; schichtel@cira.colostate.edu)

Michael G Barna<sup>2</sup> (barna@cira.colostate.edu)

Kristi A Gebhart<sup>1</sup> (gebhart@cira.colostate.edu)

William C Malm<sup>1</sup> (malm@cira.colostate.edu)

<sup>1</sup>National Park Service, CIRA Colorado State University, Fort Collins, CO 80523-1375, United States

<sup>2</sup>Cooperative Institute for Research in the Atmosphere, Colorado State University, Fort Collins, CO 80523-1375, United States

The Big Bend Regional Aerosol and Visibility Study (BRAVO) was an intensive air quality monitoring project that measured speciated fine aerosols from July through October 1999 at 36 sites throughout Texas. A primary goal of BRAVO is to identify the major emission sources that contribute to haze in Big Bend National Park (BBNP), which is located in southwestern Texas. In support of this, the Regional Modeling System for Aerosols and Deposition (REMSAD) was used to predict the sulfate concentrations in most of North America, and estimate the contribution of sulfate from ten U.S. and Mexican source regions to sulfate concentrations measured at Big Bend and the other BRAVO monitoring sites. Several biases were identified in the original REMSAD source apportionment results. For example, during October the predicted contribution of the eastern U.S. sources to eastern Texas were up to two times larger than the measured sulfate. In addition, on days with transport predominately from Mexico to southwest Texas, including Big Bend, the predicted sulfate concentrations systematically underestimated the measured sulfate. Thus, indicating an underestimation of Mexico's contributions. In order to remove these biases, the REMSAD source apportionment results were merged with the measured sulfate data using a synthesis conservation of mass inversion technique to derive daily source apportionment scaling factors. This technique essentially regresses the

source apportionment estimates against the measured data. Measured data from all 36 monitoring sites were used in the analysis. Due to the inherent ill-posed nature of this inversion problem constrained least-squares regression was used allowing the coefficients to vary from 0 to 4. The synthesis inversion reduced the average eastern U.S. contribution to sulfate at Big Bend from 42 to 30%, while Mexico's contribution increased from 23 to 41%. Texas's contribution changed from 16 to 14%. In addition to the large source areas, REMSAD was used to estimate the contribution from the Carbon power plant facilities located 210 km southeast of Big Bend in Mexico. The synthesis inversion resulted in Carbon's contribution increasing from 14% to 22%.

#### A22F-05 1715h

##### Long-range Transport Of Specific Aerosol Events : A Comparison Between Model And Satellite Retrievals

Francois-Marie Breon<sup>1</sup> (fmbreon@cea.fr);

Sylvia Generoso<sup>1</sup> (00 33 1 69 08 94 58;

generoso@lsce.saclay.cea.fr); Yves Balkanski<sup>1</sup> (balkanski@lsce.saclay.cea.fr); Olivier Boucher<sup>2</sup> (boucher@loaser.univ-lille.fr); Michael Schulz<sup>1</sup> (schulz@lsce.saclay.cea.fr); Christiane Textor<sup>1</sup> (textor@lsce.saclay.cea.fr)

<sup>1</sup>Laboratoire des Sciences du Climat et de l'Environnement, CEA/CNRS Orme des Merisiers, Gif-sur-Yvette 91191, France

<sup>2</sup>Laboratoire d'Optique Atmospherique, CNRS, Universite des Sciences et Technologies de Lille, Villeneuve d'Ascq 59655, France

The POLDER-1 spaceborne instrument monitored atmospheric aerosol between October 1996 and June 1997 both over land and oceans. From the full dataset of aerosol load derived from POLDER, we have identified major aerosol events. Six large events are selected because the high concentration air masses can be followed at least for 4 or 5 days and up to 10 days. The aerosol sources for these events are identified as biomass burning, Saharan dust and what seems to be industrial/domestic sulfate, with two events for each case. To these observations, we compare the simulations from the LMDz (Laboratoire de Meteorologie Dynamique) general circulation model coupled with the INCA (Interaction with Chemistry and Aerosols) module. We investigate the long-range transport of aerosol plumes in the model, including transport speed, direction, and diffusion, as well as the deposition. Day-to-day comparisons between the LMDz/INCA results and POLDER data show that the transport of aerosols is correctly represented. Since the LMDz/INCA represents with accuracy the aerosol transport, it can be used to assimilate aerosol data.

#### A22F-06 1730h

##### Atmospheric Tar Balls: Particles From Biomass and Biofuel Burning

Mihaly Posfai<sup>1</sup> (posfaim@almos.vein.hu); Andras

Gelencser<sup>2</sup> (gelencs@almos.vein.hu); Renata

Simonics<sup>1</sup> (srenata@almos.vein.hu); Krisztina

Arato<sup>1</sup> (aratob@almos.vein.hu); Jia Li<sup>3</sup>

(jia.li@asu.edu); Peter V. Hobbs<sup>4</sup>

(phobbs@atmos.washington.edu); Peter R.

Buseck<sup>3</sup> (pbuseck@asu.edu)

<sup>1</sup>Department of Earth and Environmental Sciences, University of Veszprem, POB 158, Veszprem H-8200, Hungary

<sup>2</sup>Air Chemistry Group of the Hungarian Academy of Sciences, University of Veszprem, POB 158, Veszprem H-8200, Hungary

<sup>3</sup>Departments of Chemistry/Biochemistry and Geological Sciences, Arizona State University, Tempe, AZ 85287, United States

<sup>4</sup>Department of Atmospheric Sciences, University of Washington, Seattle, WA 98195, United States

'Tar balls,' amorphous carbonaceous spherules that are locally abundant in the tropospheric aerosol through biomass and biofuel burning, form a distinct group of particles, readily identifiable with electron microscopy. They differ from soot in lacking a turbostratic microstructure, and their morphology and composition (90 mol% carbon) renders them distinct from other carbonaceous particles. Tar balls are abundant in slightly aged (minutes to hours) biomass smoke, indicating that they likely form by gas-to-particle conversion within smoke plumes. Although the material of tar balls is initially hygroscopic, the particles become largely insoluble through free radical polymerization of their organic molecules. Tar balls are primarily externally mixed with other particle types, and they do not appreciably increase in size during aging. When they coagulate with water-bearing particles, their material

may partly dissolve and no longer be recognizable as distinct particles. Tar balls may slightly absorb sunlight. They are a widespread and previously unrecognized type of carbonaceous (organic) atmospheric particle.

#### A22F-07 1745h

##### Parameters for Modeling Aerosol Absorption: Measurements in Biomass Burning Smoke, Urban/Industrial Plumes, and NW Pacific Marine Airmasses

Jena T. Kline<sup>1</sup> (808-956-5871; jkline@hawaii.edu)

Barry J. Huebert<sup>1</sup> (808-956-6896; huebert@hawaii.edu)

Steven G. Howell<sup>1</sup> (808-956-5185; showell@soest.hawaii.edu)

Mitsuo Uematsu<sup>2</sup> ((81) 305351-6533; uematsu@ori.u-tokyo.ac.jp)

Haruo Tsuruta<sup>3</sup> ((81) 3-3792-7937; htsuruta@xd6.so-net.ne.jp)

<sup>1</sup>University of Hawaii, Dept. of Oceanography, Honolulu, HI 96822, United States

<sup>2</sup>University of Tokyo, Ocean Research Institute, 1-15-1 Minamidai, Nakano-ku, Tokyo 164-8639, Japan

<sup>3</sup>Tokyo University of Agriculture and Technology, Faculty of Agriculture, 3-5-8 Saiwai-cho, Fuchu-shi, Tokyo 183-8509, Japan

Absorbing aerosols such as elemental carbon (EC) play a large role in the Earth's radiation budget. However, the impact of EC emissions is hard to model accurately because the light absorption per mass of elemental carbon (EC specific absorption, ESA) varies with the source type and the conditions of the combustion that created it. The wavelength dependence of this absorption also varies with the size and nature of the absorbing material. We measured the ESA of ambient aerosol by measuring both light absorption at 7 wavelengths (as the reduction in light transmission through a quartz Aethalometer filter) and EC (by a thermal/chemical method) at Amami Ohshima, Japan as a part of the APEX program in the Spring of 2002. We also measured light scattering at 3 wavelengths so we could compute wavelength-dependent single-scatter albedos. We found that in smoke from sugar-cane burning the absorption varied as the inverse square of the wavelength, while in plumes from Asian mainland population centers it varied as the inverse of wavelength to the first power. We argue that models should therefore use different, wavelength-dependent "constants" for different conditions. Modelers also need to understand the degree to which the parameters they use depend on measurements that can contain large uncertainties.

#### A22G MCC: 3016 Tuesday 1600h

##### Reactive Chemistry in the Troposphere: Hydroxy and Hydroperoxy Radicals

*Presiding:* P I Palmer, Harvard University; P S Stevens, Indiana University

#### A22G-01 1600h

##### Direct Detection of OH reactivity in the Urban Atmosphere by Laser Induced Pump and Probe Technique

Yoshizumi J Kajii<sup>1</sup> (+81-426-77-2834; kajii@atmchem.apchem.metro-u.ac.jp)

Ayako Yoshino<sup>1</sup> (+81-426-77-2833; yoshino@atmchem.apchem.metro-u.ac.jp)

Shungo Kato<sup>1,2</sup> (+81-426-77-2833; shungo@atmchem.apchem.metro-u.ac.jp)

Jun Matsumoto<sup>1,2</sup> (+81-426-77-2833; mjun@atmchem.apchem.metro-u.ac.jp)

Yasuhiro Sadanaga<sup>1,2</sup> (+81-426-77-2833; sadanaga@atmchem.apchem.metro-u.ac.jp)

<sup>1</sup>Department of Applied Chemistry, Tokyo Metropolitan University, 1-1 Minami-Osawa, Hachioji, Tokyo 192-0397, Japan

<sup>2</sup>Japan Science and Technology Corporation, Kawaguchi Center Building 4-1-8, Honcho, Kawaguchi, Saitama 332-0012, Japan

In order to test the theory of photochemical reaction in urban atmosphere HO<sub>x</sub> radicals (OH, HO<sub>2</sub>, RO<sub>2</sub>) that are usually difficult to detect due to both high reactivity and small abundance should be essentially measured. Monitoring technologies for these radicals in the ambient air are advanced recently with enough sensitivity by use of laser induced fluorescence (LIF) technique. Even though highly important information about atmospheric photochemistry can be provided by the absolute concentration of radicals, production and loss processes of these intermediate species cannot be discussed separately under the steady state condition. In case of urban atmosphere OH radical is considered to react with more than several hundreds of VOC as well as NO<sub>x</sub>, SO<sub>2</sub>, CO and Ozone. A measurement system of OH lifetime in the atmosphere was newly developed by a laser flash photolysis/chemical perturbation method. Ambient air is introduced into a flow tube and OH radicals are generated by a pump laser (266nm) in the photolysis of O<sub>3</sub>. Concentration change of OH radicals generated by the pump laser is monitored by a probe laser (308 nm) using laser induced fluorescence technique. The decay rates of zero air where most of OH reaction partners were removed by Hot Pt oven and filters were measured with known amount of CO to obtain second-order rate coefficient of OH with CO. Resultant value agreed excellently with the previous reported value. OH reactivity was measured in the real atmosphere sampled at our campus where is considered as semi-urban area. Unexpected short lifetimes of OH were obtained. They ranged from 10 to 50 msec. In order to explain these short lifetimes of OH radicals several reaction partners were also measured simultaneously. Contributions of each reaction partners for OH radical removal will be discussed in this presentation.

## A22G-02 1620h

### Experimental studies of the kinetics of the OH-initiated oxidation of $\alpha$ - and $\beta$ -pinene

Philip S. Stevens<sup>1</sup> (812-855-0732; pstevens@indiana.edu)

Maxine E. Davis<sup>1</sup>

Craig Tapscott<sup>1</sup>

<sup>1</sup>Environmental Science Research Center, School of Public and Environmental Affairs, and Department of Chemistry, Indiana University, 1315 E. 10th St., Bloomington, IN 47405, United States

The chemical mechanism of the oxidation of  $\alpha$ - and  $\beta$ -pinene is a subject of considerable interest in atmospheric chemistry. These hydrocarbons are emitted into the atmosphere by various types of vegetation, and can contribute significantly to the production of ozone in the troposphere because of their high reactivity. The accuracy of urban and regional air quality models thus depends on a complete understanding of their oxidation mechanisms under a variety of conditions. Results of laboratory investigations of the mechanisms of the OH-initiated oxidation of  $\alpha$ - and  $\beta$ -pinene in the presence of NO using discharge-flow techniques will be presented. Indirect measurements of the rate constant for the reaction of pinene-based hydroxyalkyl peroxy radicals with NO will be discussed. The measured OH radical concentration profile in the presence of NO was compared to simulations based on various proposed oxidation mechanisms for  $\alpha$ - and  $\beta$ -pinene in order to determine the mechanism that best describes the observed radical propagation. These experiments provide a measurement of the relative efficiency of radical propagation by each biogenic hydrocarbon in the production of tropospheric ozone.

## A22G-03 1635h

### Quantum Yields of OH From the Photolysis of HOOH in Ice

Liang Chu<sup>1</sup> (530-754-6272)

Cort Anastasio<sup>1</sup> (530-754-6095; canastasio@ucdavis.edu)

<sup>1</sup>Atmosphere Science Program, Department of Land, Air, and Water Resources, University of California, One Shields Avenue, Davis, CA 95616-8627, United States

Hydrogen peroxide (HOOH) is a common constituent of snow and cirrus ice clouds. Based on its behavior in aqueous solution, photolysis of HOOH on snow/ice should form hydroxyl radical (OH), a process that might be significant as a loss of HOOH as well as a source of OH. In turn, the formation of OH should lead to the oxidation of organic carbon and halides and subsequent release of these oxidation products (e.g., carbonyls, carboxylic acids, and reactive molecular halogens). Determining the importance and rate of OH generation from HOOH photolysis on snow and ice requires knowing the quantum yields for this process as a function of temperature and other environmental variables (e.g., pH and ionic strength). Since these values have not been previously measured, our goal in

this work was to determine these quantum yields (i.e.,  $\Phi_{HOOH \rightarrow OH}$ ). Our first step was to measure the molar absorptivities of HOOH between 274 K to 298 K so that we could extrapolate to ice temperatures. There was no temperature dependence of the HOOH molar absorptivity in our measurements, suggesting that the HOOH molar absorptivity is similar in the quasi-liquid layer of ice at low temperatures. Our initial experiments measuring  $\Phi_{HOOH \rightarrow OH}$  as a function of temperature (243 - 268 K) show that the values roughly follow the same temperature dependence previously reported for aqueous solution (Zellner et al., 1990). In addition to these results we will also report how  $\Phi_{HOOH \rightarrow OH}$  varies as a function of ionic strength and pH. The implications of our measurements for ice particle and snowpack chemistry will also be discussed. Zellner, R.; Exner, M.; Herrmann, H. J. Atmos. Chem. 1990, 10, 411.

## A22G-04 1650h

### Studies of the HO<sub>2</sub> + C<sub>2</sub>H<sub>5</sub>O<sub>2</sub> and C<sub>2</sub>H<sub>5</sub>O<sub>2</sub> + C<sub>2</sub>H<sub>5</sub>O<sub>2</sub> Reactions Using Near-IR Kinetic Spectroscopy

Leah Nani S Alconcel<sup>1</sup> (1-818-393-7933; Leah.Alconcel@jpl.nasa.gov)

David J Robichaud<sup>1</sup> (1-818-393-7508; David.J.Robichaud@jpl.nasa.gov)

Mitcho Okumura<sup>2</sup> (1-626-395-6557; mo@its.caltech.edu)

Stanley P Sander<sup>1</sup> (1-818-394-2625; Stanley.P.Sander@jpl.nasa.gov)

<sup>1</sup>Jet Propulsion Laboratory, 4800 Oak Grove Drive M/S 183-901, Pasadena, CA 91109-8099, United States

<sup>2</sup>California Institute of Technology, 1200 E. California Boulevard M/S 127-72, Pasadena, CA 91125, United States

It is well known that hydroperoxy (HO<sub>2</sub>) and alkylperoxy (RO<sub>2</sub>) radicals participate in cycles that produce tropospheric ozone from photochemical hydrocarbon oxidation. Kinetic data for the reactions of these species are often contradictory or insufficient. In this study, the temperature and pressure dependencies of the hydroperoxy and ethylperoxy cross-reaction and the ethylperoxy self-reaction rates will be reported. The self-reactions of alkylperoxy radicals leads to the secondary formation of hydroperoxy radicals and hence competing self- and cross-reactions. Simultaneous monitoring of the hydroperoxy radical signal via near-IR frequency modulation (FM) spectroscopy and the ethylperoxy radical signal via UV absorption spectroscopy permits unique characterization of the peroxy species. This technique, when used to measure the rate constants under a range of conditions, will aid in understanding the complex alkylperoxy radical chemistry. The rate constant measurements provided by this study will represent a significant step towards generating more accurate atmospheric models, particularly for the remote troposphere, where NO is not the dominant sink for alkylperoxy radicals.

## A22G-05 1710h

### Development of a Chemiluminescence Method for Gas-Phase HO<sub>2</sub> Detection

Jun Zheng<sup>1</sup> (1-631-344-5530; juzheng@ic.sunysb.edu)

Judith Lloyd<sup>2</sup> (1-516-876-2728; LloydJ@oldwestbury.edu)

Stephen Springston<sup>3</sup> (1-631-344-4477; srs@bnl.gov)

<sup>1</sup>State University of New York at Stony Brook, Marine Sciences Research Center Stony Brook University, Stony Brook, NY 11794-5000, United States

<sup>2</sup>State University of New York at Old Westbury, Chemistry Department PO Box 210, Old Westbury, NY 11568, United States

<sup>3</sup>Brookhaven National Laboratory, Atmospheric Sciences Division Building 815E, Upton, NY 11973, United States

Hydroperoxyl Radical (HO<sub>2</sub>) is a highly reactive intermediate species that participates in photochemical processes in the troposphere. Accurate measurement of HO<sub>2</sub> will facilitate the verification of the ozone production mechanism used by the atmospheric chemistry community. HO<sub>2</sub> is also the major source of H<sub>2</sub>O<sub>2</sub>, which is responsible for the oxidation of SO<sub>2</sub> in droplets. Here, we describe a new HO<sub>2</sub> detection method based on flow injection analysis (FIA) with a chemiluminescence detector. Gas-phase HO<sub>2</sub> is first scrubbed into a pH 9 borax buffer solution, then injected into a chemiluminescence detector, where HO<sub>2</sub> and its conjugate base O<sub>2</sub><sup>-</sup> react with MCLA, a synthetic analog of the luciferin from the crustacean Cypridina, to emit light at 465 nm. This technique shows high sensitivity (DL = 0.1 nM in liquid phase or 1 pptv in gas phase) and selectivity for the HO<sub>2</sub>

/ O<sub>2</sub><sup>-</sup> system. A unique feature of our technique is the calibration with a radiolytic method that uses a <sup>60</sup>Co gamma ray source to quantitatively produce stable aqueous HO<sub>2</sub>/ O<sub>2</sub><sup>-</sup> standards. This calibration method is highly reproducible, producing an instrument response that varies less than 5% from day to day. We tested our instrument in the meteorology field at Brookhaven National Laboratory (BNL), which is considered a clean remote rural site with background ozone levels about 30 ppbv. On July 17, 2003, a clear sunny day, with a steady NW wind, HO<sub>2</sub> started to build up after sunrise and reached a maximum of 9 pptv at about 3 pm local time, approximately two hours after the maximum solar intensity. Our technique has the advantages of simplicity, low cost and ease of operation. It is especially suitable for field measurements, where space and energy resources are usually limited.

## A22G-06 1725h

### Hydroxyl and Peroxy Radical Chemistry in Rural Central Pennsylvania

William Brune<sup>1</sup> (brune@ems.psu.edu); Xinrong Ren<sup>1</sup> (xur1@psu.edu); Terry Shirley<sup>1</sup>; Andrew Metcalf<sup>1</sup>; Angelique Olinger<sup>1</sup>; Robert Lesher<sup>1</sup>; Gavin Edwards<sup>2</sup>; Christopher Cantrell<sup>2</sup>

<sup>1</sup>Pennsylvania State University, 503 Walker Building, University Park, PA 16802, United States

<sup>2</sup>NCAR Atmospheric Chemistry Division, NCAR, Boulder, CO 80303, United States

Atmospheric OH reactivity and hydroxyl (OH), hydroperoxy (HO<sub>2</sub>) and total peroxy radicals were measured at a rural agricultural site in central Pennsylvania during May and June, 2002. The total peroxy radicals consist of HO<sub>2</sub> + organic RO<sub>2</sub>. The results for about 40 days of measurements are presented. Diurnal cycles show that the daytime maximum mixing ratios were up to 0.6 pptv (1.4x10<sup>7</sup> cm<sup>-3</sup>) for OH, 40 pptv (9x10<sup>8</sup> cm<sup>-3</sup>) for HO<sub>2</sub>, and 45 pptv (1x10<sup>9</sup> cm<sup>-3</sup>) for HO<sub>2</sub>+RO<sub>2</sub>. A box model was constructed to predict the steady state OH, HO<sub>2</sub> and HO<sub>2</sub>+RO<sub>2</sub>. This model used the Regional Atmospheric Chemistry Mechanism (RACM) and was constrained to the measured OH reactivity and previously measured VOC distributions. The model calculations generally agree with the radical measurements. For OH, the model is able to match the measurements for day and night, with a measured-to-modeled ratio of 0.87 on average. Nighttime OH was reproduced surprisingly well, perhaps because the largest OH source was HO<sub>2</sub>+NO. The measured-to-modeled ratio for HO<sub>2</sub> is 1.0 on average, although daytime HO<sub>2</sub> is under-predicted by about 3 pptv while nighttime HO<sub>2</sub> is over-predicted by about 2 pptv. The average measured and modeled HO<sub>2</sub>+RO<sub>2</sub> agree well during daytime, but the modeled value was twice the measured value during nighttime. Measured HO<sub>2</sub>+RO<sub>2</sub> was about 1.5 times larger than measured HO<sub>2</sub> in daytime and 1.5-2.0 times larger at night, suggesting that RO<sub>2</sub> was 0.5 to 1 times HO<sub>2</sub>. The production of HO<sub>x</sub> (HO<sub>x</sub>=OH+HO<sub>2</sub>) during daytime was dominated by the O<sub>3</sub> photolysis and O<sup>(1D)</sup> + H<sub>2</sub>O, while nighttime HO<sub>x</sub> production was mainly from O<sub>3</sub> + alkenes. The maximum instantaneous O<sub>3</sub> production calculated from HO<sub>2</sub> and RO<sub>2</sub> reactions with about 10 ppb hr<sup>-1</sup> at midday; the total daily O<sub>3</sub> production was 53 ppbv d<sup>-1</sup> on average.

## A22G-07 1745h

### Estimating HO Radical Concentrations for the Central California Ozone Study

Wendy S Goliff<sup>1</sup> (775-674-7026; wendyg@dri.edu)

William R Stockwell<sup>1</sup> (775-674-7058; wstock@dri.edu)

<sup>1</sup>Division of Atmospheric Sciences, Desert Research Institute, 2215 Raggio Parkway, Reno, NV 89512-1095, United States

The Central California Ozone Study (CCOS) is a multi-year program of meteorological and air quality monitoring, emission inventory development, data analysis, and air quality simulation modeling. Among the goals of this study was the execution of a large-scale field study in summer 2000 to acquire a comprehensive database to support modeling and data analysis. The CCOS field measurement program was conducted during a four-month period from 6/1/00 to 9/30/00. Additional data were collected during ozone episodes (intensive operational periods (IOPs)) to better understand the dynamics and chemistry of the formation of high ozone concentrations. Measurements of volatile organic compounds (VOCs) as well as actinic flux measurements were input into a chemical box model employing the Regional Atmospheric Chemistry Mechanism to produce estimates of hydroxyl (HO) concentrations for CCOS. These estimates of HO were compared with those simulated by a full 3-d air quality model.