American Association for Aerosol Research

PARTICULARS

Summer 2010

In this issue

President's Message

Paul J. Ziemann

Although it's now early July, here in Southern California May and June witnessed the occurrence of CalNex 2010, a 20 million dollar air quality and climate study conducted by NOAA and the California Air Resources Board in collaboration with a large number of university researchers. The massive effort included two NOAA aircraft, a research vessel, and a variety of stationary sites, and aimed to address questions about emissions of VOCs, NO_x, and greenhouse gases, ozone and secondary aerosol formation, regional and long range transport and meteorology, and climate processes in California. Although I did not participate in the study, the only complaint I heard was that there was too little air pollution. What a shame... We can hope to hear about some late-breaking results at the upcoming International Aerosol Conference in Helsinki, and at the AAAR Annual Conference in Portland.

I would like to congratulate Paul Solomon and Maria Constantini for organizing a wonderfully successful conference in San Diego, and also Cindy Twohy for what promises to be an outstanding 29th Annual Conference. I encourage you to read their articles in this issue and to come to Portland this fall for a week of stimulating science in a beautiful city.

I am pleased to report that *Aerosol Science & Technology* is doing well on all fronts. The journal publishers, Taylor & Francis, recently reported that the impact factor increased again last year, up to 2.74 for 2009, a remarkable improvement from 1.05 less than ten years ago. And according to Peter McMurry, the editor-in-chief, as of the end of June the manuscript submission rate was up 40% from last year. In addition, *Aerosol Research Letters*, the new submission option initiated last year for rapid publication of short high-impact manuscripts, is prospering, and two special journal issues are in preparation: one on aerosol measurements in the 1 nm size range, and the other on the 2010 Air Pollution and Health Conference.

Earlier this year, after evaluating proposals from a number of companies, the Board of Directors wisely voted to extend for three years the contract of Donald Dabdub, professor of aerospace & mechanical engineering at UC-Irvine, for processing abstracts for the AAAR annual conferences. Donald has been doing this for us for a number of years (originally with Susanne Hering) on a very cost-effective basis and with such a high level of quality and care that we've come to take his flawless abstract processing and critical behind-the-scene activities for granted. We are all pleased that Donald has agreed to continue to serve AAAR in this important function.

In closing, I would also like to congratulate Rick Flagan, professor of chemical engineering at Caltech and past AAAR president and editor-in-chief of Aerosol Science & Technology, for his well-deserved recent election into the National Academy of Engineering, "for leadership in invention, measurement, production, and technology of aerosols". Rick has been an active and dedicated supporter of AAAR throughout his career and this honor is important not only to him, but also to our field and to the Association.

2010 Annual Conference

Cynthia Twohy, Conference Chair, 29th Annual Conference

Dear Colleagues:

I look forward to seeing you all in Portland, Oregon for our 29th Annual Conference in 2010. The conference will be held at the Oregon Convention Center on October 25th through 29th.

The kick-off on Monday will include our popular tutorial series, covering a wide range of introductory and advanced topics. Each of the following four days will begin with a plenary lecture; the fabulous lineup this year includes Sergey Grinshpun, Barb Turpin, David Pui, and Mark Jacobson. The technical program will feature five parallel platform sessions and two large poster sessions, with numerous scheduled breaks for informal exchange. We also have four special symposia that concentrate on specific topics: Biological Aerosol Detection and Sampling, Advanced Materials for Energy Applications, Aerosols in Geoengineering, and Aerosol Drug Delivery (focusing on research from both sides of the Pacific.) The exhibit area, open Tuesday through Thursday, provides opportunities to see the latest in instrumentation and to interact with technical reps from all the leading companies offering aerosol instrumentation and services. Thursday evening will also provide the opportunity to attend a presentation with historical/societal relevance associated with the Geoengineering Symposium ("Fixing the Sky: Cautionary Tales from the History of Climate Engineering.") Thanks to my working group chairs and co-chairs for helping to put together this wonderful program.

Nearly 700 abstracts have been submitted already. Abstracts for late-breaking posters can still be accepted until August 10th! http://aaarabstracts.com/2010/

While the conference itself will be at the beautiful Oregon Convention Center in Portland, excellent lodging is available at the nearby newly remodeled Doubletree Hotel Portland, the first hotel in Oregon to achieve Green Seal certification. Please ask for the AAAR block rate, as a portion of the room rate is used by the city to subsidize our facilities cost at the Convention Center, and AAAR needs to fill the reserved block to avoid penalties.

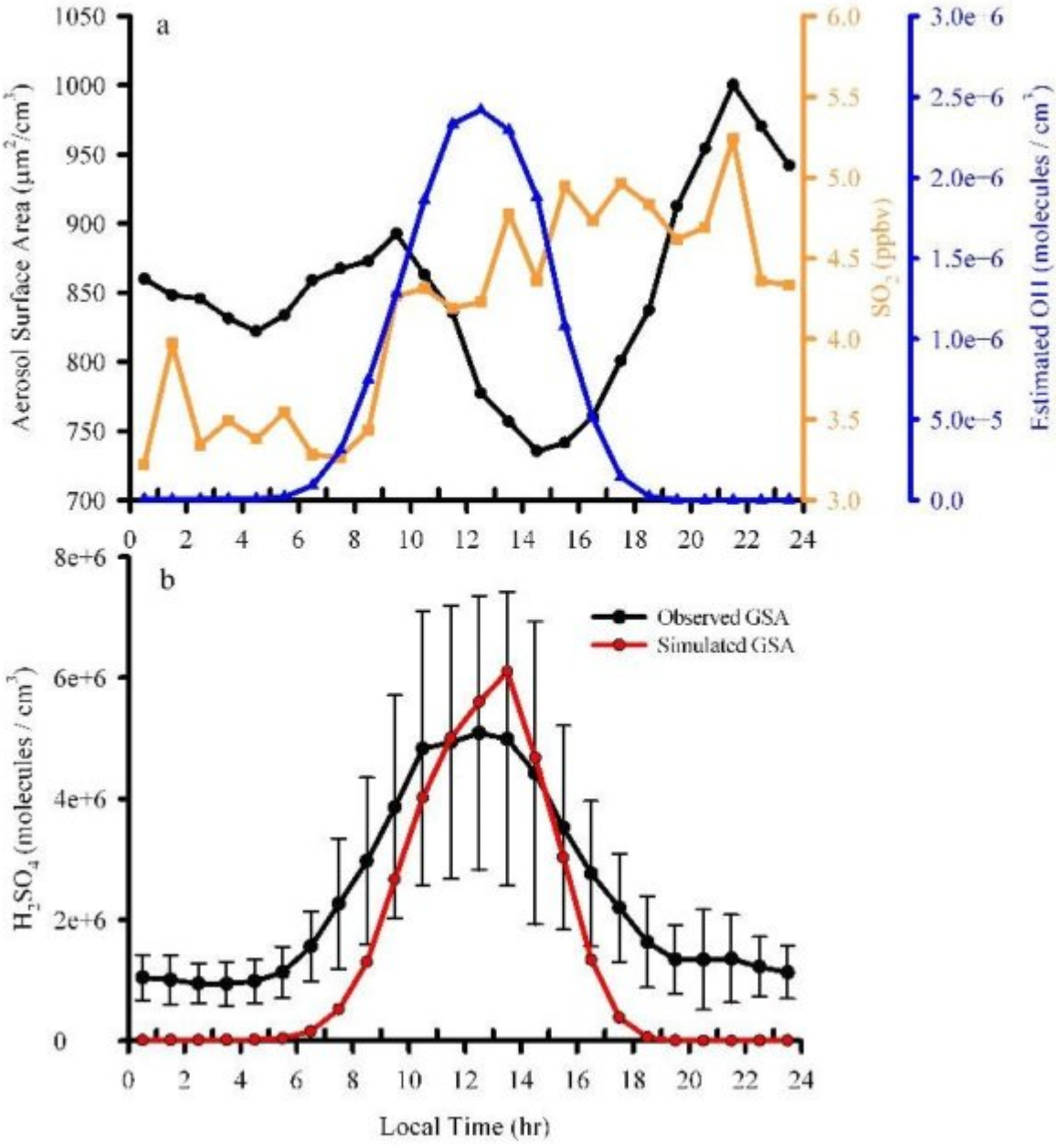
Speaking of facilities and budgets, I wanted to briefly explain what the 2010 conference registration fee includes, as there's lots more to it than just coffee breaks at the conference. A substantial fraction of your payment includes annual membership in AAAR and the subscription to *Aerosol Science and Technology*. A large portion is also needed to pay for the cost of audiovisual, meeting space, d�cor, and temporary staff at the conference venue. Additional costs include program and brochure design, name badges, printing and mailing, bank fees and supplies. And did you notice you don't have to pay a fee when you submitted your abstract like other organizations?-that's because abstract processing costs are included in your reg fee. A portion goes to support the behind-the-scenes work of wonderful people at the management company, Association Headquarters, and trust me, they're well worth it. AAAR also provides student travel grants, as well as partial funding for tutorial and plenary speakers. Students and retirees get a reduced registration rate, as well. All this considered, a relatively small percentage of the budget is allocated for food and beverage during the conference. The AAAR Board works diligently to keep the conference budget as trim as possible, so expenses closely match revenue.

Now for the fun part. You probably know Oregon is famous for its coastline and natural beauty, but did you know the city of Portland has lots to offer as well? First, it has a wonderful public transit system, with light rail between the airport and the conference center and hotel. From there, it's just a short continuing hop across the Willamette River to the downtown district. Downtown has many fabulous restaurants, as well as Powell's City of Books, the largest new and used bookstore in the world. Other attractions include the Oregon Museum of Science and Industry and traditional Japanese and Chinese gardens. Oh, and did I mention our world-renowned wines and beer? The average high

temperature in October is 18°C (64°F) during the day (but you might want to pack that umbrella or hooded parka!) To find out more, visit the TravelPortland website. We won't have formal tours at the conference, but will provide information on interesting things to do nearby if you have a couple spare hours.

This will be an excellent technical conference at a great venue that you certainly don't want to miss. We look forward to seeing you in October at the 29th Annual Conference of the American Association for Aerosol Research.

Aerosols in the Spotlight



Gaseous H2SO4 (GSA) can initate new particle formation and, upon uptake, significantly modify pre-existing aerosol's morphology, hygroscopicity, and optical properties. In-situ measurements of GSA is fundamental to fully comprehend the evolvement of aerosol in the atmosphere and its interaction with solar radiation. From 7 July to 25 September 2008, Drs. Jun Zheng and Renyi Zhang from the Texas

A&M University conducted the first GSA measurement in Beijing, China - host of the 2008 Summer Olympic Games - to investigate the role of GSA in nucleation events and aerosol aging process. Diurnal profile of GSA (shown as black trace in Fig. b) is dominated by photochemical production and condensation loss onto pre-existing particle surface, indicating the ubiquitous contribution of GSA to aerosol aging process. Simulation of GSA (red trace in Fig. b) based on SO2, OH radical (estimated from J(O1D) and J(NO2) measurements), and aerosol surface area (all shown in Fig. a) can capture the general trend of daytime GSA variation within the measurement uncertainties.

"In Case You Missed It"

This issue focuses on organic aerosol - its effects on people and the planet, its sources, and its possible control.

Heart Health Effects of Exposure to Aerosols

Exposure to particulate matter, both short-term and longer-term, increases the risk of cardiovascular disease. Physicians now have concrete recommendations for advising patients to reduce their exposure to aerosol particles. This May, the American Heart Association released a scientific statement emphasizing the "causal relationship between PM2.5 exposure and cardiovascular morbidity and mortality." In this report, Dr. Robert Brook and his coauthors note the strength of the scientific evidence linking air pollution to heart attacks and cardiovascular disease. This conclusion was also made in EPA's most recent Integrated Science Assessment for Particulate Matter. This recognition of the cardiovascular health effects of aerosol by physicians is significant and may lead to changes in behavior improving public health.

http://www.newsroom.heart.org/index.php?s=43&item=1029
http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546

Carbon Particles in the Atmosphere

A new paper by Yanju Chen and Tami Bond describes how organic aerosol particles from wood combustion may affect the radiative balance. They measured the light absorption of particles extracted from filters collected over different wood types and sizes burning at different temperature. They found that the organic carbon particles absorbing the most light are not water soluble and core wood temperature has the greatest influence on light absorption. Overall, this type of organic carbon particle would be slightly cooling except over very bright surfaces.

(Y. Chen and T. Bond, Atmos. Chem. Phys., 2010, 10, 1773.)

http://www.atmos-chem-phys.net/10/1773/2010/acp-10-1773-2010.html

Tami also recently shared her knowledge about Black Carbon in testimony before the House Committee on Energy Independence and Global Warming. Other witnesses were Veerabhadran Ramanathan, Drew Shindell, and Conrad Schneider. This hearing demonstrates that Congress is currently interested in aerosol science and its relevance for understanding climate impacts as well as air quality and health. As Congress continues to gather information on the importance of aerosols to the climate system, we can hope this will lead to action in the near future.

You can read the full testimony here:

http://globalwarming.house.gov/pubs?id=0016

What Does it Take to Form a Particle?

Based on recent smog chamber experiments at the Paul Scherrer Institute, Axel Matzger and his colleagues conclude that the combination of only one sulfuric acid and one organic molecule initiates the process of nucleation. Additionally, laboratory experiments by Renyi Zhang's group have recently produced data indicating that heterogeneous reactions of alkylamines with sulfuric acid effectively contribute to the growth of new particles. Both of these new results push us closer to understanding the rate of particle formation.

(A. Metzgera *et al*., *Proc. Natl. Acad. Sci. U.S.A.,* 2010, 107, 6646-6651.)
http://www.pnas.org/content/107/15/6646.abstract
(L. Wang et al., Environ. Sci. Technol., 2010, 44, 2461-2465.)
http://pubs.acs.org/doi/abs/10.1021/es9036868

Aerosol Particles Emitted From Ships

Near the Port of Los Angeles, one of the largest shipping ports in the world, Andrew Ault and his coworkers recently measured the chemical composition of aerosol particles of various size ranges using single-particle mass-spectrometry. They measured two types of plumes: one containing primarily fresh soot particles representative of diesel combustion from both ships and trucks and a second composed of particles containing carbon, vanadium, and sulfate. This second plume type originates from ships burning bunker fuel, which is a lower cost fuel that should only be used when ships are 200 miles from shore. This work suggests that vanadium may be a good tracer for ship plumes and that the oxidation of sulfur dioxide by vanadium and other metals may explain the high sulfate levels measured in California.

(A.P. Ault et al., Environ. Sci. Technol., 2010, 44, 1954.)

http://pubs.acs.org/doi/abs/10.1021/es902985h

We expect to learn more about emissions from ships from the CalNex field study occurring May through July, 2010.

http://www.esrl.noaa.gov/csd/calnex/

Can We Control Biogenic SOA?

Annmarie Carlton and her coworkers recently published a modeling study investigating what portion of biogenic secondary organic aerosol could be removed from the atmosphere by controlling emissions of anthropogenic pollutants. They found that when anthropogenic emissions of five pollutant classes (nitrogen oxides, ammonia, sulfur oxides, reactive non-methane carbon and primary carbonaceous particles) were removed, the model predicted that aerosol formed from biogenic emissions would be decreased by more than 50% in the Eastern US. This suggests that perhaps particles should be classified as controllable and noncontrollable rather than biogenic and anthropogenic.

(A.G. Carlton et al. *Environ. Sci. Technol.*, **2010**, *44* (9), 3376-3380)

http://pubs.acs.org/doi/abs/10.1021/es903506b

2010 AAAR Air Pollution and Health International Specialty Conference

Since its inception in 1982, AAAR has organized three international specialty conferences. The third "*Air Pollution and Health: Bridging the Gap from Sources to Health Outcomes*" took place in San Diego, California on March 22-26, 2010 (http://aaar.2010specialty.org/). The two previous conferences, "PM and Health" and "PM Supersites and Related Studies" were held in Pittsburgh, PA, 2003 and Atlanta, GA, 2005, respectively. Air Pollution and Health was chaired by Dr. Paul A. Solomon (EPA) and Dr. Maria G. Costantini (Health Effects Institute). Three committees were established to organize the conference and perform outreach to different scientific and policy communities. Committee members are listed at the conference website.

The primary purpose of the third international conference was to bring together researchers to engage in discussion and to disseminate results from scientific studies designed to better understand the linkages between sources of air pollution and health outcomes across the source-to-health effects continuum. The conference was multi-pollutant, focusing across five key science areas: sources, atmospheric sciences, exposure, dose, and health effects. The conference was driven by nine policy-relevant science questions (Table 1) or guiding themes (bold text Table 1) that integrate various parts across these five science areas. Results presented and synthesized from this conference will help reduce the uncertainty in our understanding of the linkages between sources and air pollutants, human exposure, and health effects.

Air Pollution and Health was a huge success with over 500 presentations and 533 attendees, exceeding the expected number by over 150. Over 25% of the attendees were from outside the United States representing science research in nearly 40 different countries from across the globe. Each policy-relevant science question was addressed to the extent possible by its own plenary session, each consisting of three to four experts on the subject, 34 plenary speakers in all. The plenary sessions were supported by 16 platform (112 speakers) and 4 poster sessions, the latter consisting of a total of 360 poster presentations. Two panel discussions were held on Friday, one on

air quality modeling to support health effects research and the other on climate change, air quality, and health.

Special lunch time presentations took place on Tuesday (EPA's National Monitoring Programs) and on Wednesday (Air Pollution and Health: Policy and Research within the United States: Perspectives by Senior Government Officials). For the latter, speakers included Dr. Alfredo Armendariz - EPA Region 6 Administrator; Daniel Costa, National Program Director for Air Research EPA, ORD; Ms. Lydia Wegman, EPA, OAR; Dr. John Balmes, Board Member, CARB; Ms. Lenore Lamb - Director of Environmental Services, Pala Band of Mission Indians; and Dr. Barry Wallerstein - Executive Officer, SCAQMD.

Over a dozen groups supported the conference allowing for a low registration fee, travel support as requested, and many extras that helped make this conference a success. Sponsors are presented in Table 2 and we are indebted to their generosity. The conference also included an exhibition of some of the latest instrumentation in air pollution measurements and related items (Table 2).

What remains? Authors were provided the opportunity to submit manuscripts for publications related to their presentations in one of 7 special journal issues (see publications policy on the conference website). The journals of choice cover the breadth of the conference scope from sources to health effects. Based on intent to submit information received to date, sufficient papers should be submitted to support 6 of the general conference special journal issues. An additional special issue is being prepared by the plenary speakers where each plenary speaker team is answering to the extent possible the science question they addressed during the meeting. An integrated synthesis paper also is being prepared. Publication of the general conference special issues should be no later then March 2011 where as the plenary special issue should be published by May 2011.

The conference chairs are thankful to all those that helped organize and support the conference and especially to those who attended this landmark event, for without your support, the conference would not have been a huge success.

Paul A. Solomon
Maria G. Costantini

Table 1. Science Questions

1. **Pollutants and Sources Associated With Health Effects.** How does our understanding of the health effects of air pollutants (singly or in mixtures) help identify pollutants that can be linked to sources the control of which would provide maximal health benefits? (Overarching Theme)
2. **Reliability of Methods, Models, and Approaches.** How reliable are methods (measurements and models) and approaches (epidemiological and toxicological) for studying and quantifying the links between air pollutants (species and or sources) and adverse health effects?
3. **Pollutant Characterization and Population Exposure.** How do relevant pollutant properties vary in space and time from sources and in ambient air; what are the implications of these variations for population exposure?
4. **Relation between Exposure and Dose.** What advances have been made in understanding the relationships between exposure, both spatially and temporally, and estimates of dose that tie to health outcomes?
5. **Mechanisms of Action and Biomarkers of Exposure and Effects.** Are patterns emerging that relate component(s) of air pollution and/or source types to mechanisms? What is the status of identifying and measuring biomarkers of exposure and/or adverse health effects from air pollution?
6. **Susceptible Populations.** Who are the susceptible populations, what drives different susceptibilities to the same or different air pollutants, and are there susceptibility traits associated with specific health outcomes that are common among the subpopulations?
7. **Confounding or Other Factors.** What roles do confounding or other factors have in increasing, decreasing, or obscuring attribution of the true health effects from ambient air

pollutants?

8. **Accountability.** Do actions taken to improve air quality result in reduced ambient concentrations of relevant pollutants, exposure, and health effects, and have we encountered unintended consequences?
9. **Regulatory and Policy Implications.** What are the policy implications of our improved understanding of the source to health effect paradigm?

Table 2. Sponsors and Exhibitors

Sponsors

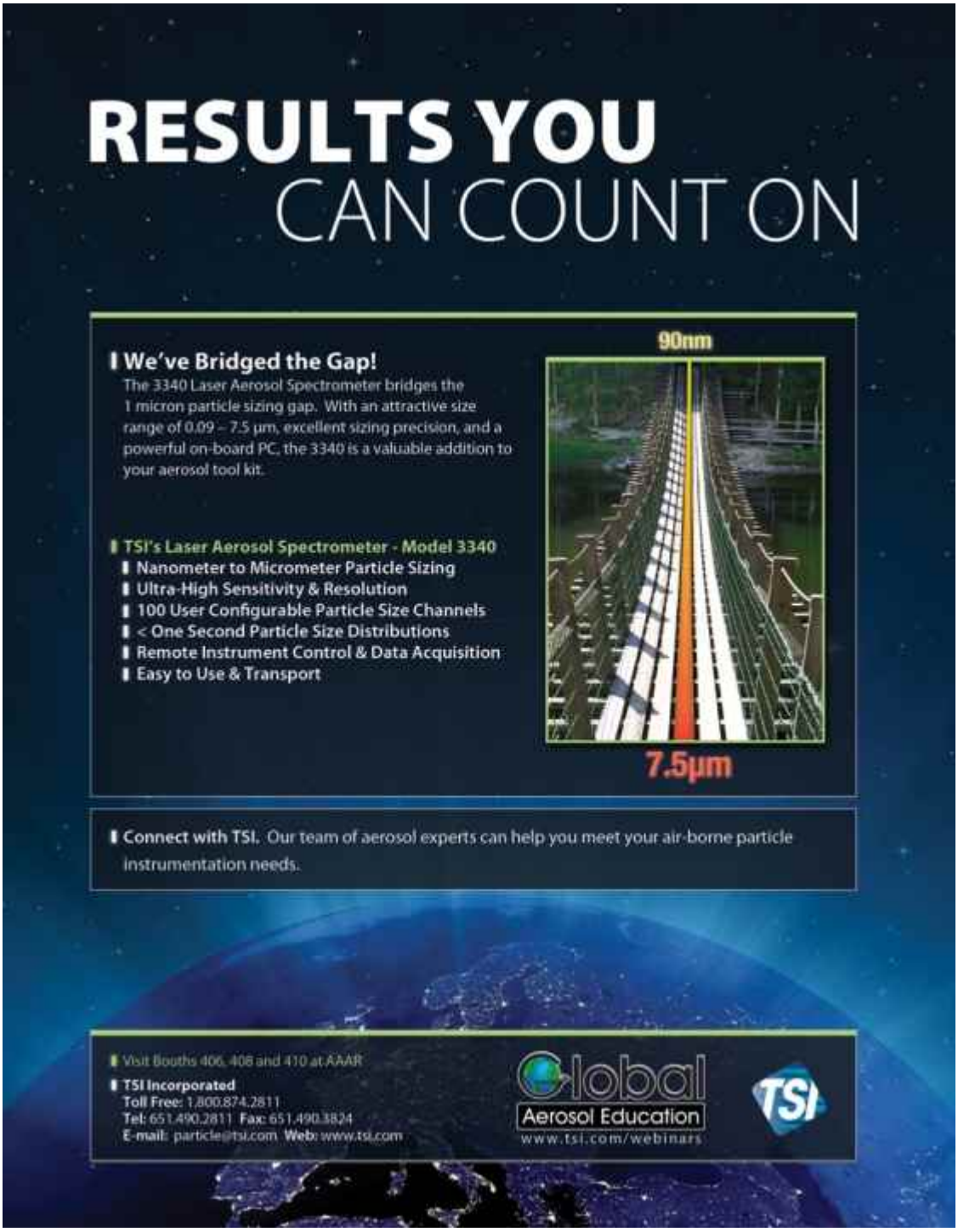
Environmental Protection Agency
Health Effects Institute
American Chemistry Council
American Petroleum Institute
California Air Resources Board, Research Division
Electric Power Research Institute
NARSTO
National Aeronautics and Space Administration
National Institute for Public Health and the Environment (RIVM)
National Oceanic and Atmospheric Administration
South Coast Air Quality Management District
Southern Company

Organizational Sponsors

Air & Waste Management Association
International Society of Exposure Sciences
Springer

Exhibitors

American Ecotech
BGI
Ecochem Analytics
Hi-Q
Magee Scientific
MSP Corporation
Sunset Laboratory, Inc.
Tisch Environmental
TSI, Inc.
U.S. EPA Clean Air Research Program
URG Corporation



Important Announcements

The AAAR 2011 elections will open next week so keep an eye out for that email with instructions on how to vote. It is important for every member to take part in this process. This year, we are also electing the working group co-chairs, so your vote not only affects the future of Association, but the conference as well.

Remember, if you would like to discontinue receiving a paper copy of "Aerosol Science & Technology" (you will still have access to the electronic versions online), please send a note to Deanna Bright (info@aaar.org), subject "AS&T" journal, letting her know to remove your name from the list.

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Contact Information

American Association for Aerosol Research
15000 Commerce Parkway
Suite C
Mt. Laurel, NJ 08054
856-439-9080
F: 856-439-0525
info@aaar.org
www.AAAR.org