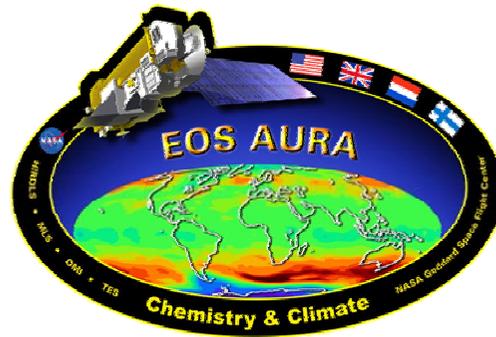


Aura Education and Public Outreach Program Update

Stephanie Stockman
Jeannie Allen
Brooke Carter
Ernest Hilsenrath



*Aura Science Team Meeting
Netherlands
November 2005*

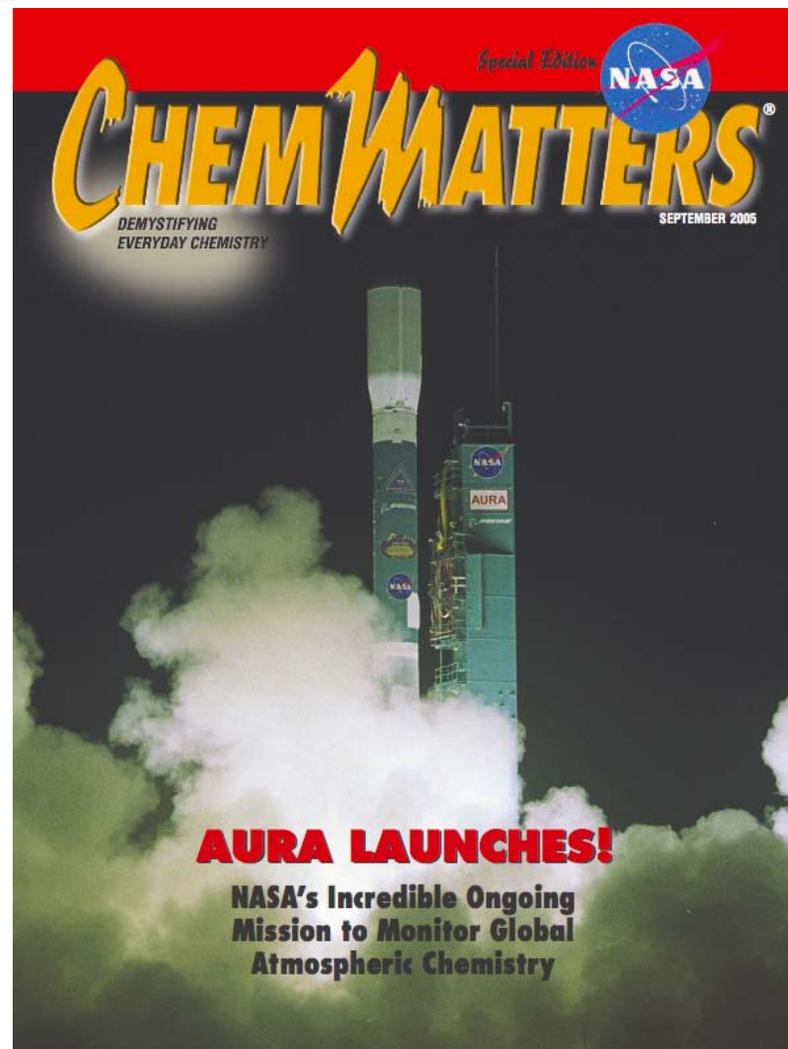
Aura EPO Components

- American Chemical Society
- GLOBE School Program and Teacher Workshops
- Smithsonian National Museum of Natural History
- Smaller Museum Programs
- Other Post Launch Initiatives



Fourth issue of ChemMatters published September 2005 with the American Chemical Society

- How the Earth Got it's Aura.
- Flight of the WB-57.
- What's so Equal about Equilibrium
- Clearing the Air-Treaties to Treatments
- Student Gardens Monitor Air Quality



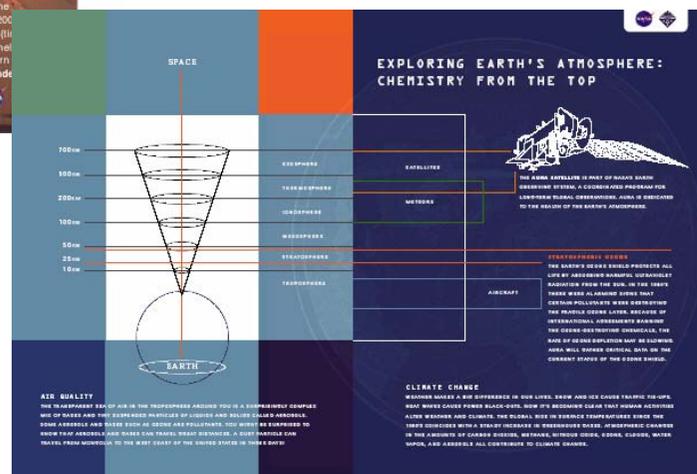
Aura Poster - Developed with the American Chemical Society



Submitted to NASA Earth Science Education Product Review

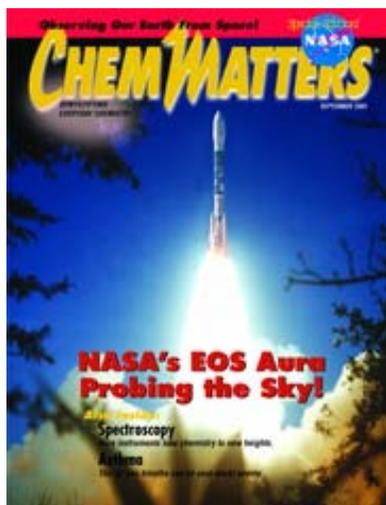
Possible inclusion in IPY packet

13,000 posters available



Post Launch Activities with ACS

- Multi-media CD



- Include Aura ChemMatters Issues and Teachers Guides

- Video interviews with Aura scientists and engineers

- Aura Launch Video

- Visualizations of Aura data

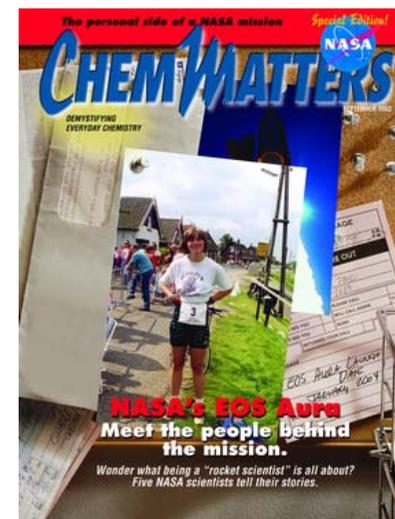
- Aura articles from Earth Observatory

- High School Chemistry Clubs

- Pilot after school program

- Aura EPO is providing content and activities

- Looking for Aura team members to interact with clubs in their area



GLOBE-A Train Atmospheric Sciences Workshop for Teachers Summer 2006 and 2007

- 2006 workshop at NASA Langley hosted by Cloudsat/Calipso
- 2007 workshop at JPL hosted by Aura
- Participants will learn GLOBE protocols for surface ozone, aerosols, UV, and clouds.
- Focus will be on NASA educators who work with NASA Explorer Schools
- Funded jointly by Aura, CALIPSO, and CloudSat



"This workshop will have a huge impact in my classroom,"

"I gained a new understanding and appreciation for Earth science as a whole system."

Betty Strong, science teacher at the Navajo Preparatory School in Farmington, NM.



Surface Ozone Project; Ozone Biomonitoring Gardens

(I. Ladd and J. Fishman, LaRC)

Ozone biomonitoring garden program developed by LARC, and U.S. National Park Service, Great Smoky Mountains NP as part of the “Hands on the Land (<http://handsonthealnd.org>)

Includes the USDA Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and Natural Resource Conservation Service

The Aura EPO is helping to set up sites for ozone monitoring stations and “ozone biomonitoring gardens” at federal research visitor centers including the GSFC Visitor Center and U.S. Fish and Wildlife Service’s Patuxent Wildlife Visitor Center

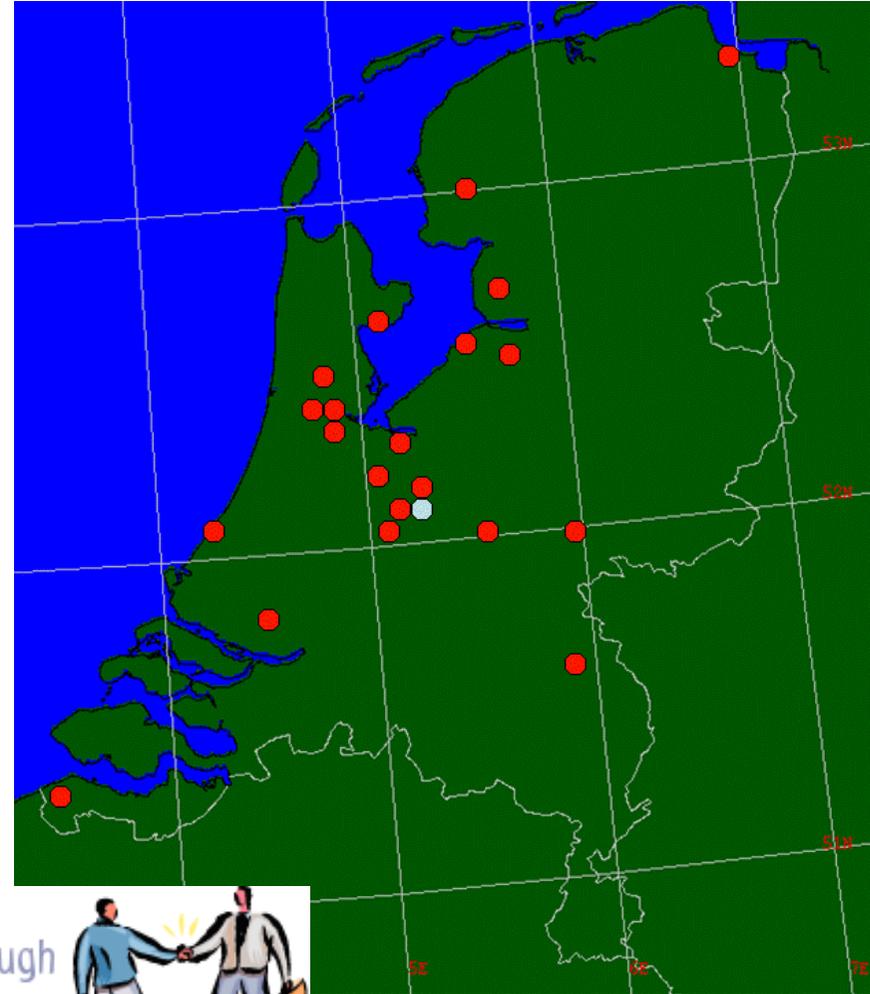
Aura EPO partners, including the Maryland Science Center participated in a Summer 2005 workshop



GLOBE in the Netherlands

http://www.knmi.nl/globe/index_en.html

- Aerosol monitoring project run by KNMI and the Foundation for Environmental Education (SME)
- Involves the validation of satellite AOT using a handheld sunphotometer
- Featured in article on NASA Earth Observatory (<http://earthobservatory.nasa.gov/Study/Partnerships/>)



Enhancing **Research** and **Education** through **Partnerships**

by Jeannie Allen • design by Robert Simmon
January 25, 2005

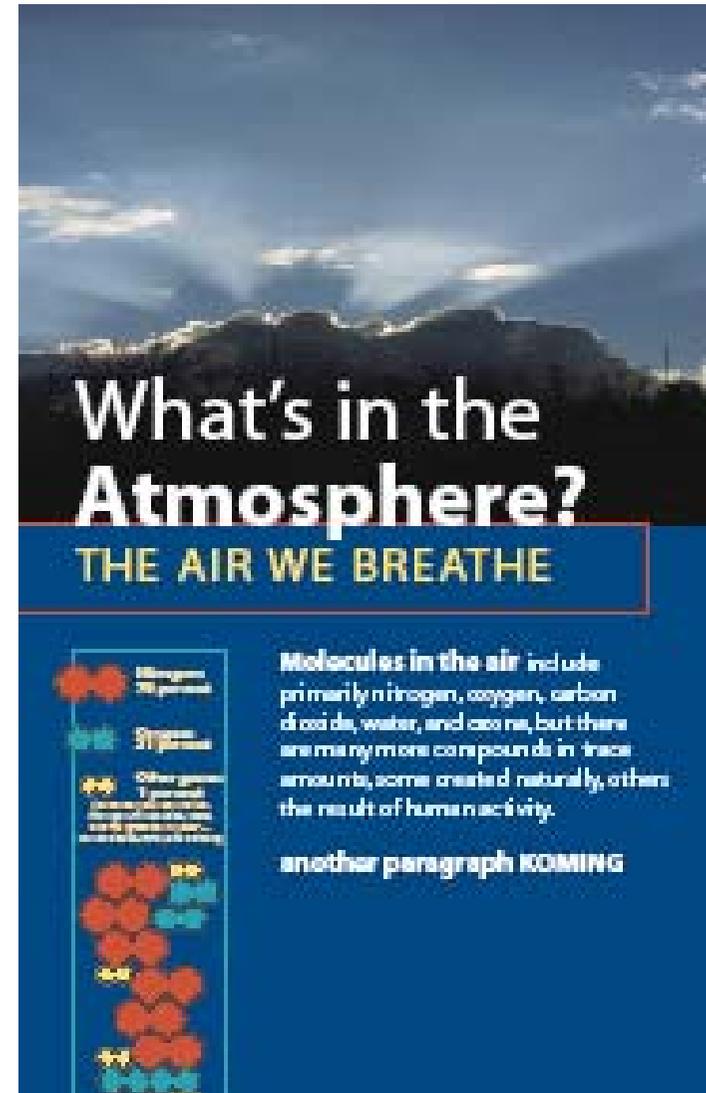


Smithsonian NMNH Exhibit

“Change is in the Air”

The exhibit will answer three main questions:

- ***What is the atmosphere?***
 - How the atmosphere formed, its properties, how it works, and how it is connected to other global systems.
- ***How is the atmosphere important to our lives?***
 - How the atmosphere has changed over the last 100 years and impacted our culture; how do those changes affect human and environmental health; and what can individuals and societies do to regain a healthy atmosphere.
- ***How do we study the atmosphere?***
 - Identifying some of the scientists studying the atmosphere, showing some of the tools used in scientific research, showing what has been learned about the atmosphere, and exploring how we make predictions for the future.



Educational Goals and Objectives

- Demonstrate to visitors that the atmosphere is a dynamic and interconnected system.
 - *Learning objective: Visitors will be able to briefly describe how the atmosphere is connected to one other earth process.*
- Demonstrate that the atmosphere affects visitors' lives directly and daily.
 - *Learning objective: Visitors will be able to describe three of their daily activities that are affected by – or affect – the atmosphere.*
- Demonstrate that NASA and other scientists study the atmosphere.
 - *Learning objective: Visitors will be able to identify one way scientists are studying the atmosphere.*



Atmosphere PROTECTS

For billions of years, our atmosphere has been a:

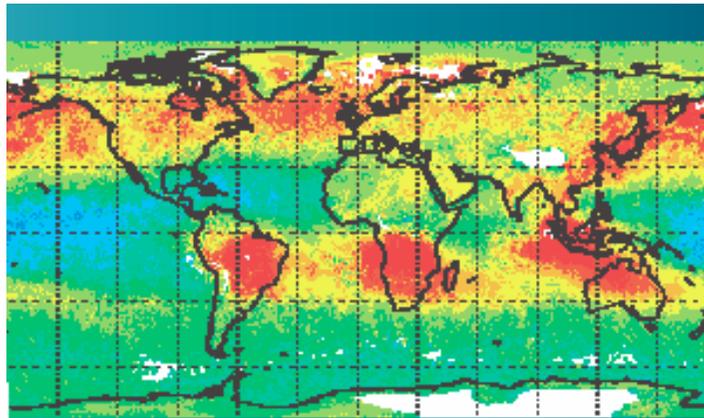
- Shield against bombarding meteorites
- Shade against destructive ultraviolet radiation
- Blanket against the cold

But human activity threatens two of our atmosphere's protective duties.

First, the stratospheric ozone layer—the part of the atmosphere that protects us from the sun's ultraviolet radiation—has deteriorated.

Second, the level of "greenhouse gases" in the atmosphere, including carbon dioxide, water vapor, and methane, is rising, and they're raising Earth's temperature by increasingly retaining the sun's heat.

A landscape photograph showing a sunset or sunrise over a body of water, with a dark sky above and a bright horizon line.



Atmosphere **Transports**

Here's what's hitchhiking a ride in our atmosphere:

Pollen

Over 100 different types of pollen grains are transported from the Great Plains to the East Coast.

Pollen

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Pollen

Over 100 different types of pollen grains are transported from the Great Plains to the East Coast.

Pollen

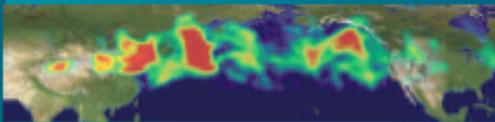
Over 100 different types of pollen grains are transported from the Great Plains to the East Coast.

Pollen

Over 100 different types of pollen grains are transported from the Great Plains to the East Coast.

The air is never still. Stirred by the heat of the sun, air moves across the globe in vast currents. In its travels, air picks up intriguing baggage, from tiny amounts of gases or chemicals to particles of dust, smoke, pollution, or bacteria and other microscopic organisms.

Anything that gets into moving air moves too. Air's hitchhikers can travel thousands of miles from where they started, affecting air quality and transforming life across continents.



Do you know where your air has been? What's in your air? Air contains many gases, some naturally occurring, some augmented by human activity. Air also carries particles (particles, such as smoke) that you can see and smaller particles called aerosols that you can't see.

Atmosphere

CHANGE IS IN THE AIR

What's so hot, so fast, and so clean?
 Surrounds and protects us throughout our lives?
 Makes Earth habitable?
 Is so fragile it needs our care and protection?
OUR ATMOSPHERE!
 But what can you see as well as about the air? **Arctic Look.**
 It's like your breath away!



ARCTIC

A Friend Acting Strangely

Earlier spring. Earlier. Later fall. Frost-free. More intense storms. Reduced sea ice.

What do these changes mean for the Arctic, its wildlife, its people—and for the rest of the planet?

Explore the forces and consequences of the Arctic's changing climate—as documented by native residents and scientific sites.

Out of Thin Air

ANCIENT ATMOSPHERES

In the 4.6 billion years of Earth's history, the composition of the atmosphere has changed from a hazy, unfamiliar mix to today's mostly blue skies. As the atmosphere developed, life began in its simplest form. The evolution of living things changed the atmosphere, and those changes in turn altered life.

Although it's difficult to know just what the atmosphere has been like for billions of years, paleontologists, geologists, and paleoclimatologists make deductions from rocks, soil, fossils, and ice cores. With every new find, they improve and refine their understanding of ancient atmospheres.

Other Exhibit Features

- Milky Way zoom-in to Smithsonian on Washington Mall
- Aura 1/8 model
- TOMS Engineering Model
- Antarctic Ozone Hole Movie 1996-2004 (TOMS+OMI)
- “Funny Garbage” - Cartoon illustrating reactivity of O_2 and O_3
- Terra Incognita - Interactive: Earth with Low, Existing, High O_2 , O_3 , CO_2

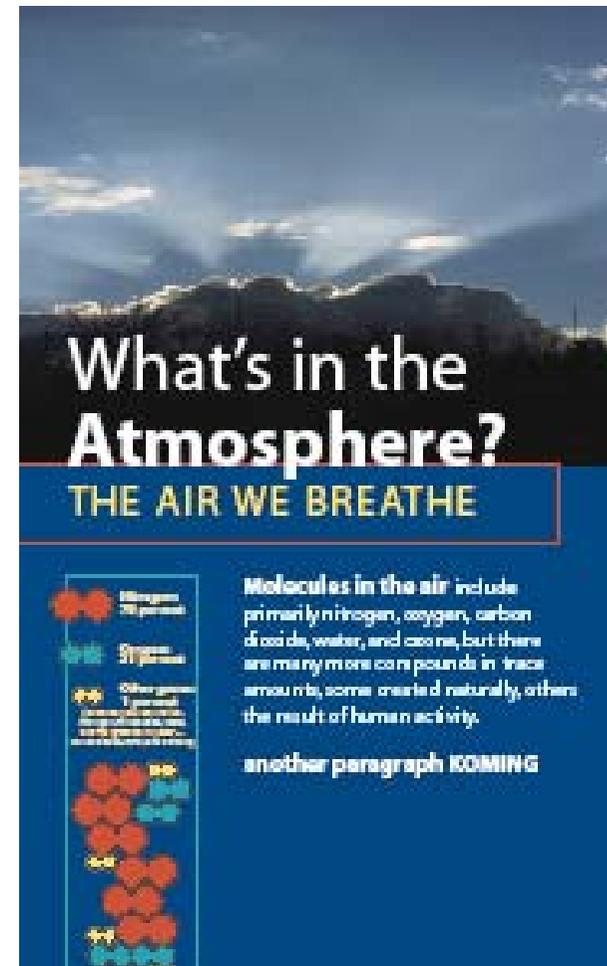
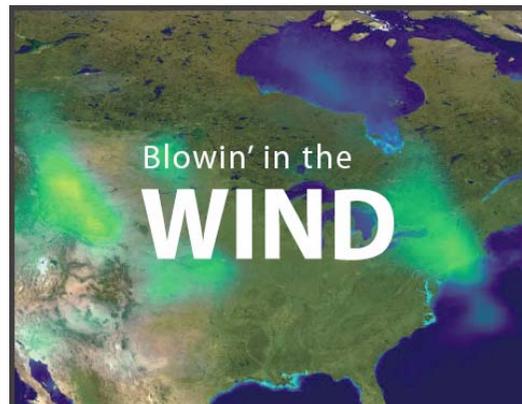
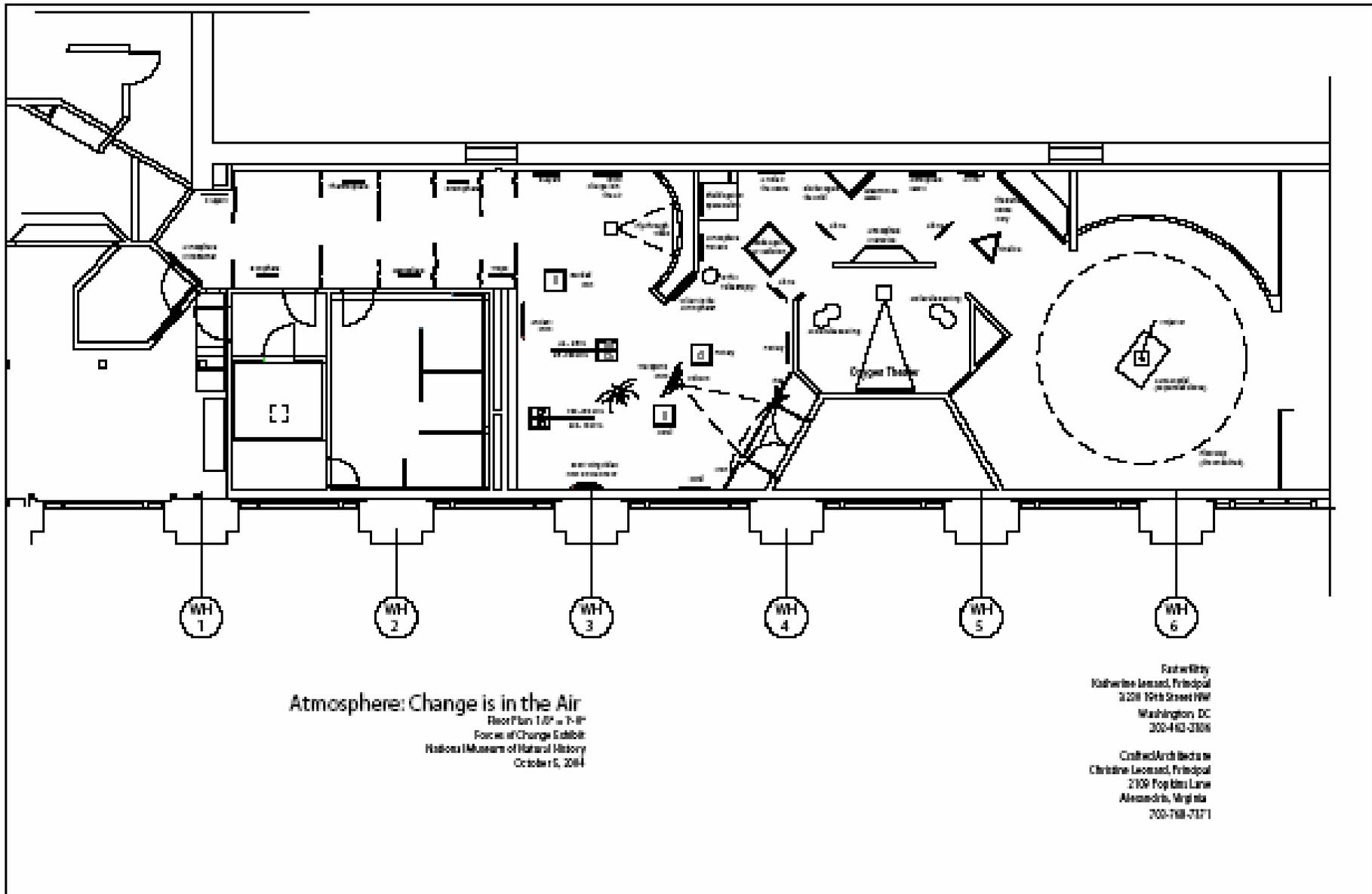


Exhibit Educational Extensions

- **Forces of Change Web Portal**
 - On-line version of the physical exhibit
 - On-line version of a computer interactive
 - Curriculum components
 - Current atmospheric conditions interactive
- **GLOBE partner site on the Mall**
- **Will become traveling exhibit jointly by Aura and the Smithsonian**





January 2006!!



Working with Small Museums

Earth Explorer Institutes “Earth by Aura: Ultraviolet Radiation Data Collection By and For the Public”

- **Funded through NASA Education Office and NASA Earth Sciences**
- **Includes Maryland Science Center in Baltimore and Bishop Museum in Honolulu**
- **Project materials will be shared by other Museums in the EEI network**



What's Next? Additional Post Launch Activities

- **Articles for Earth Observatory including validation campaigns**
- **Aura Science and Validation results brochure**
- **Aura poster for exhibits and education presentations**
- **Aura “The Movie”**
- **Aura “The Poster**
- **Aura Involvement in IPY**
- **Explore expanding Aura GLOBE effort to Finland**

