

# Tools for Teaching Climate Science



AGU 2011 :: December 5, 2011

## Using Scientific Field Campaigns to Learn About Climate Science

NCAR's Earth Observing Laboratory (EOL) provides a unique look into current atmospheric science related to climate research. Educators and students can explore what it's like to use cutting-edge research instruments during field campaigns to address current questions regarding Earth's changing climate.

### How Do We Know?

There is a wealth of information out there about climate change and global warming, and students may be asking:

- *How do we know that the climate is changing?*
- *What will the climate be like in 20 years?*

The answers are complex, but with the help of current research of the atmosphere, scientists have a better understanding of how the different Earth systems work together.

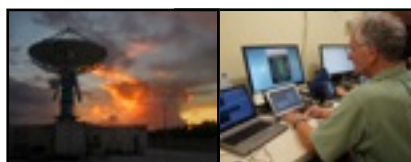
In order to study the climate, researchers (1) look at climate data from such places as tree-rings, ice cores and corals; (2) add that to modern day weather and climate research; (3) compare multiple models to actual findings; (4) integrate this information into climate models that project future weather and climate.

The Earth Observing Laboratory's outreach program provides an in-depth look into current atmospheric science field campaigns that study various aspects of weather and climate.

- Severe Weather
- Climate Processes
- Atmospheric Patterns
- Ocean-Air Interactions
- Air Chemistry

EOL develops and deploys NSF lower atmospheric observing facilities including two research aircraft and several radars, that are used for research projects around the world.

Engaging students into how and why atmospheric science research is conducted through modern and relatable teaching tools is an effective way to teach weather and climate science.

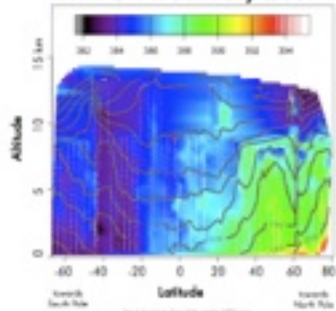


### Making the Connection

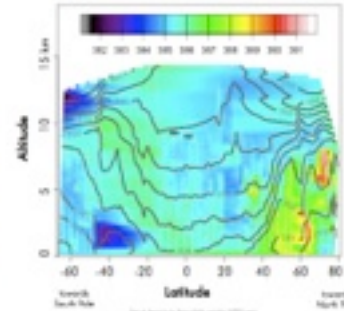
Following along in real-time with scientists can be exciting and engaging for students. By interacting with scientists in the field, students can make a clear connection to the data that is used in the classroom, creating a much more impactful learning experience.



Carbon Dioxide (CO<sub>2</sub>) ppm  
HIPPO I :: January 2009



Carbon Dioxide (CO<sub>2</sub>) ppm  
HIPPO II :: November 2009

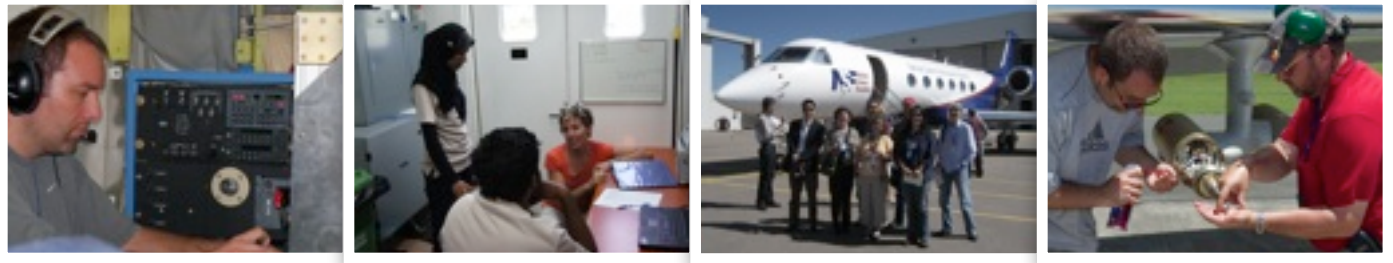


### Using Field Campaigns

Field campaigns run by EOL provide an accessible and scalable way to be involved with atmospheric science research, and can be integrated into a variety of classes:

- Earth Science
- Chemistry
- Physics
- Engineering
- Environmental Studies
- Geography
- Political Science
- Science Ethics
- Literature & Writing

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## Using Scientific Field Campaigns to Learn About Climate Science

Several online resources are available to educators that can be freely utilized to develop climate science curricula. Students can learn about and follow field campaigns all over the world; interact with researchers on Facebook; gain a better understanding of climate science and how research is conducted; and use collected data for classroom activities.

### Types of Online Resources

- Field Projects Website
- Multi-Media & Video Galleries
- Google Earth Interactive Tools
- Social Media & Web 2.0 Platforms

### Why Would Students Be Interested?

Weather and climate affects everyone around the world. From the food that we produce and eat to the air we breathe, the atmosphere impacts us daily. There is still so much to be discovered about Earth's atmosphere, students can be at the frontiers of discovery!

### What Can I Do?

Encourage students (everyone, actually!) to follow and explore NCAREOL on our social media platforms. As students are looking for careers that *make a lasting difference to society*, this is a great way to encourage a career in science. After all, science needs more than just scientists.

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### Web 2.0 Resources



[www.eol.ucar.edu/field\\_projects](http://www.eol.ucar.edu/field_projects)



[www.facebook.com/ncareol](http://www.facebook.com/ncareol)



[www.youtube.com/ncareol](http://www.youtube.com/ncareol)



[www.twitter.com/ncareol](http://www.twitter.com/ncareol)

