April-June, 2010

Up To Date

NASA IV&V Facility Educator Resource Center Newsletter

NASA IV&V Facility Educator Resource Center

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Featured Event: GLOBE Training

WVU students estimate cloud cover

The GLOBE (Global Learning and Observations to Benefit the Environment) Program enables students, teachers, and scientists from around the world to collect and share data about our planet.

Through the ERC, three recently held GLOBE workshops trained students and teachers on GLOBE protocols.

In the top left photo, at a training held in Martinsburg, students from WVU are using their bodies to estimate the amount of cloud coverage.

In the northern panhandle, Oak Glen HS students and teachers trained on GPS units and did water quality studies at a local state park. The top right photo shows students recording data on the number and types of macro-invertebrates as they studied the health of a stream.

Educators from Fairmont Youth Academy are shown testing a variety of water quality parameters such as dissolved oxygen, pH and conductivity in a pond.

GLOBE materials and activities help students to realize that environmental processes are not bound by rivers, mountains, or country boundaries but are truly global in scope.

Oak Glen HS students collect macro-invertebrates

Fairmont Youth Academy tests water quality using the ERC's probeware

Telescopes-Glenville State College and Barbour County Girl Scouts

Faculty and interns from Glenville State College and Girl Scout Leaders in Barbour county were the first groups certified to check out the ERC's fourteen telescopes.

Glenville State used the telescopes with high school seniors who had a week long learning experience on the Glenville campus followed by a weekend at the National Radio Astronomy Observatory in Green Bank. While there they used the telescopes during a Star Party held by NRAO staff.

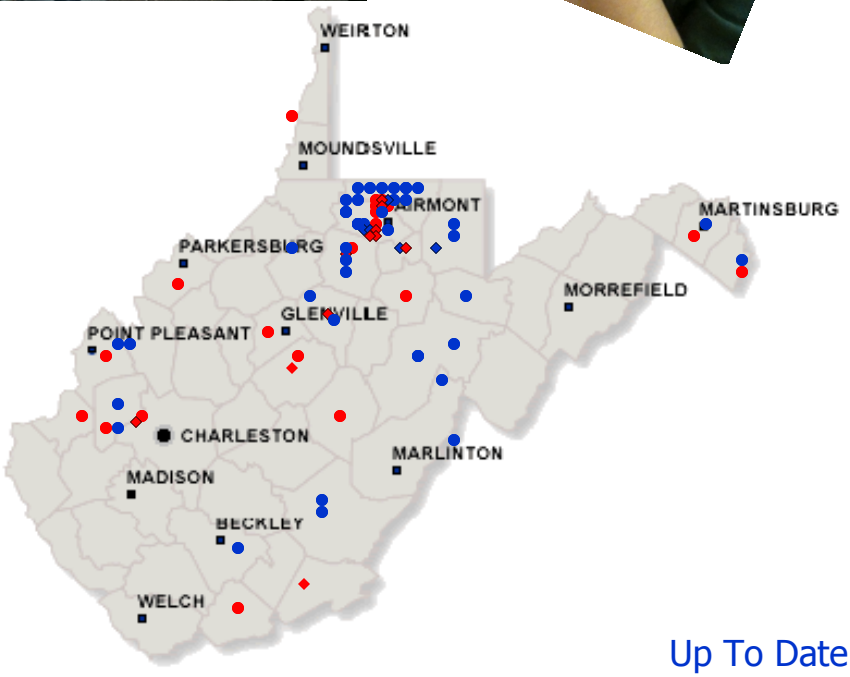
Amy Phillips, ERC intern, prepares a Firstscope for use.

Girl Scout Leaders were certified in an evening workshop at Belington Middle School. After learning the basics of operating a telescope, the leaders studied objects in the universe easily viewed with the scopes. Summer experiences for the girls can now be enhanced with activities that include viewing the universe. Astrophotography equipment to attach to the NexStar 4 SE scope will become available this fall to take photos of the sky objects the students view.

Advanced Rocketry with Marshall Space Flight Center

Educators from around the state gathered for a day filled with fun as they built and launched a variety of rockets. Miranda Martin of Marshall Space Flight Center joined Todd Ensign and Pam Casto of the ERC to lead the attendees in discovering science concepts that can be taught using puff rockets, straw rockets, water rockets and advanced model rockets with an egg payload. The educators were provided with materials for their classrooms and ideas on how to use rocketry to meet national and state educational standards.

Where in WV is the ERC?

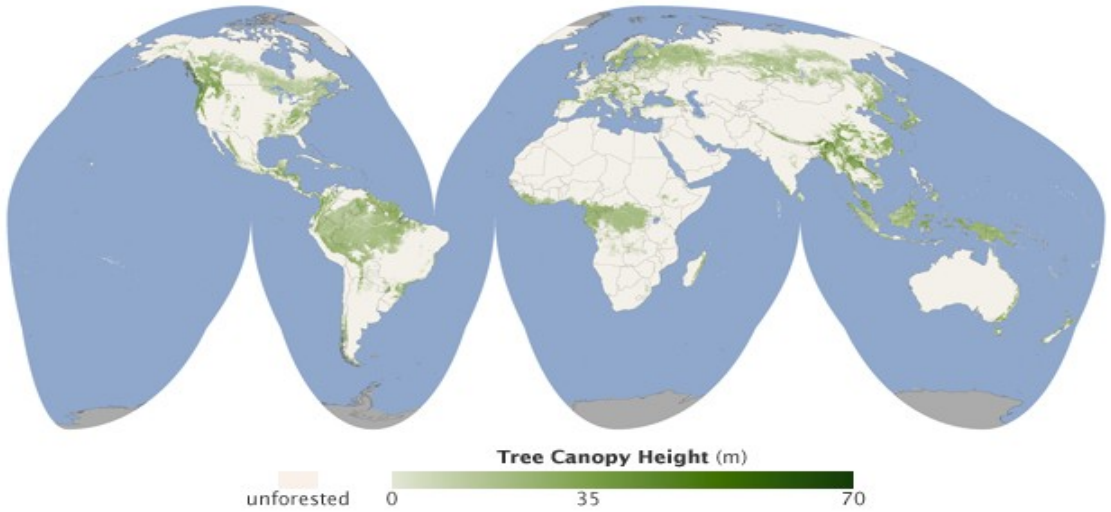


- **April-May-June Equipment Loan**
- **April-May-June Workshops**

NASA Update: Forest Canopy Height

Using NASA satellite data, scientists have produced a first-of-its kind map that details the height of the world's forests. Although there are other local- and regional-scale forest canopy maps, the new map is the first that spans the entire globe based on one uniform method.

The work -- based on data collected by NASA's ICESat, Terra, and Aqua satellites -- should help scientists build an inventory of how much carbon the world's forests store and how fast that carbon cycles through ecosystems and back into the atmosphere. Michael Lefsky of the Colorado State University described his results in the journal Geophysical Research Letters.



A first-of-its-kind global map shows forest canopy height in shades of green from 0 to 70 meters (230 feet). For any patch of forest, the height shown means that 90 percent or more of the trees in the patch are that tall or taller. Areas without forest are shown in tan. Credit: NASA Earth Observatory/Image by Jesse Allen and Robert Simmon/Based on data from Michael Lefsky.

The new map shows the world's tallest forests clustered in the Pacific Northwest of North America and portions of Southeast Asia, while shorter forests are found in broad swaths across northern Canada and Eurasia. The map depicts average height over 5 square kilometers (1.9 square miles) regions), not the maximum heights that any one tree or small patch of trees might attain.

Temperate conifer forests -- which are extremely moist and contain massive trees such as Douglas fir, western hemlock, redwoods, and sequoias--have the tallest canopies, soaring easily above 40 meters (131 feet). In contrast, boreal forests dominated by spruce, fir, pine, and larch had canopies typically less than 20 meters (66 feet). Relatively undisturbed areas in tropical rain forests were about 25 meters (82 feet), roughly the same height as the oak, beeches, and birches of temperate broadleaf forests common in Europe and much of the United States.
Scientific interest in the new map goes far beyond curiosities about tree height. The map has implications for an ongoing effort to estimate the amount of carbon tied up in Earth's forests and for explaining what sops up 2 billion tons of "missing" carbon each year.

Humans release about 7 billion tons of carbon annually, mostly in the form of carbon dioxide. Of that, 3 billion tons end up in the atmosphere and 2 billion tons in the ocean. It's unclear where the last two billion tons of carbon go, though scientists suspect forests capture and store much of it as biomass through photosynthesis. There are hints that young forests absorb more carbon than older ones, as do wetter ones, and that large amounts of carbon end up in certain types of soil. But ecologists have only begun to pin down the details as they try to figure out whether the planet can continue to soak up so much of our carbon emissions and whether it will continue to do so as climate changes. Source: nasa.gov

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The NASA Independent Verification and Validation Facility Educator Resource Center's goal is to serve teachers, informal educators, and preservice teaches to enable them to reach their goals. Through a grant with Fairmont State University, the NASA IV&V Facility ERC provides materials, equipment for loan, and professional development workshops both at the facility and around the state of West Virginia (scheduled upon request) for educators that reflect NASA's current research and technology.

We're on the web!

http://erc.ivv.nasa.gov

FAIRMONT STATE UNIVERSITY

NASA Update: Aura — Understanding the Air We Breathe

PASADENA, Calif. -- A NASA-led research team has expanded the growing global armada of remote sensing satellites capable of studying carbon dioxide, the leading greenhouse gas driving changes in Earth's climate.

The newest addition is the Tropospheric Emission Spectrometer (TES) instrument on NASA's Aura spacecraft. TES measures the state and composition of Earth's troposphere, the lowest layer of Earth's atmosphere, located between Earth's surface and about 16 kilometers (10 miles) in altitude. While TES was not originally designed to measure carbon dioxide, a team led by Susan Kulawik of NASA's Jet Propulsion Laboratory, Pasadena, Calif., has successfully developed and validated a TES carbon dioxide tool.

Carbon dioxide is the most important human-produced greenhouse gas. Its current global average concentration in Earth's atmosphere is about 389 parts per million by volume, increasing by about two parts per million each year. This concentration varies seasonally and by hemisphere. Estimates are challenging, as it varies by less than two percent globally in the mid-troposphere.

Currently, about 55 percent of human-produced carbon dioxide remains in the atmosphere; the rest is stored in the ocean and by land plants, but exactly where remains a mystery. Recent studies have shown carbon dioxide emissions from fossil fuel combustion have been increasing faster than predicted, while the southern hemispheric oceans' capacity for storing carbon dioxide may be diminishing.

Scientists want to better understand carbon dioxide sources and sinks so they can more reliably predict future atmospheric carbon dioxide levels, assess the impact of land use changes on atmospheric carbon dioxide, develop mitigation strategies and verify international treaties.

Source: nasa.gov