Observe

Newsletter of the Institute for Global Environmental Strategies

www.strategies.org

2012

INSTITUTE *for* GLOBAL ENVIRONMENTAL STRATEGIES

PRESIDENT'S CORNER

Welcome to the 2012 edition of* Observe, *our annual overview of IGES programs, activities and achievements. As you will see in these pages, the IGES team covers a broad expanse of activities related to promoting Earth and space science education and communicating the importance of environmental information.

Set against the backdrop of extreme weather, and natural and human disasters world-wide, IGES initiatives in the area of environmental information served to promote awareness of the need to understand the changes taking place in the Earth's environment and its resources. Through initiatives like the Forum on Earth Observations V and the Alliance for Earth Observations, IGES expanded avenues of collaboration and engagement between the variety of public and private actors in the field of Earth observations. As Landsat turns 40, IGES will continue to play a critical role, helping articulate effective arguments for investing in landmark systems like these that make it possible to expand our understanding of the Earth system.

A big part of* IGES *achievements in 2011 involves our ongoing work in the area of education. From developing new modules through the Earth System Science Education Alliance (ESSEA) to coordinating and leveraging investments in educational initiatives through the NASA Earth Science Education and Public Outreach Forum, IGES continues playing a leadership role in improving and expanding Earth and space science education.

Without a doubt, our successful student engagement activities are an important component and serve as an excellent reminder of how art, science and education can be bridged to engage and motivate even the youngest students. Read on to learn more about the winners of the art, photography and environmental research contests that IGES holds each year and how students across the nation are experiencing their local environments.

The events of the past year serve as a reminder of the need to promote improved communication and collaboration at all levels of society to advance our understanding of the environmental changes taking place and to develop the tools to address them. Through our initiatives in the fields of environmental information and education, IGES will continue to do just that. I hope you enjoy this issue of Observe and that you join us as we make 2012 another year of great accomplishments.

Nancy Colleton
IGES President

IGES President Meets at Hungarian Parliament

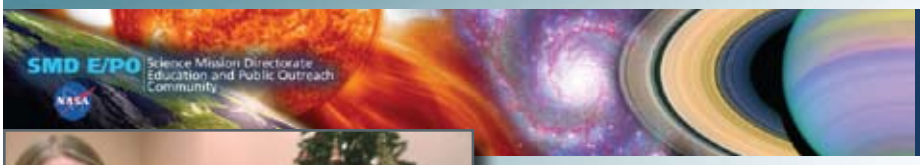
Nancy Colleton, IGES president, and Benedek Javor, chairman of the Sustainable Development Committee of the National Assembly of Hungary.

During a recent trip to Hungary, IGES President Nancy Colleton provided Benedek Javor, chairman of the Sustainable Development Committee of the National Assembly of Hungary, with a high-resolution image of the Parliament Building. Compliments of the GeoEye Foundation of which Colleton serves on the board of directors, the image was very well received and helped to illustrate the importance of imagery in environmental decision making.

Colleton was in Budapest to attend the November 19, 2011 workshop, "Learning to Change Sustainability," which was co-sponsored by the Commission on Education and Communication of the International Union for Conservation of Nature (CEC-IUCN). The workshop was held in the Parliament Building in Budapest.

Colleton also spent four days in Vác, Hungary as part of a CEC Steering Committee meeting.

Featured Articles Inside This Issue of OBSERVE



IGES Continues Playing a Key Role in NASA E/PO Activities

Last year, *Observe* featured IGES' role in the development of a new web portal for the NASA Education and Public Outreach (E/PO) community • *www.smdepo.org*. IGES is proud to celebrate the anniversary of its creation, as the portal has become a valuable resource for community updates and announcements, as well as for sharing work done by fellow community members. The web portal has also been used in correlation with professional development opportunities, including a series on social media use in E/PO work.

IGES leads NASA's Earth Science E/PO Forum, one of four within NASA's Science Mission Directorate (SMD), in partnership with the Universities Space Research Association's Lunar and Planetary Institute and NASA's Goddard Space Flight Center. The forums work together to organize and coordinate SMD education and public outreach initiatives to effectively communicate NASA Earth and space science discoveries, expertise and resources.

Recent and ongoing activities of the IGES-led Earth science forum include:

2011 NASA Earth Science E/PO Community Retreat

IGES facilitated the annual NASA Earth Science E/PO Community Retreat, held on May 24–26 in Warrenton, Va. This retreat served as a networking and planning opportunity for NASA educators for the upcoming year. It focused on theme development, in order to bring stronger, more unified content to NASA Earth science E/PO work. A panel discussion, titled "Challenges in Climate Communication," featured Bob O'Connor, National Science Foundation; Connie Roser-Renouf, George Mason University; and Debika Shome, Harmony Institute. Their lively discussion, followed by breakout sessions with each of the speakers, added to the development of the Earth science E/PO thematic approach by focusing on specific issues of discussing climate with the general public. The retreat also included sessions on multi-mission collaboration, planning for the Scientist E/PO Advocates Team (SEAT), and planning for Earth Science Week 2011.

Monthly Tag-Up

Every month, community members participate in a conference call during which they share information, learn about relevant activities and initiatives, and explore common issues.

Professional Development Webinars

Topics covered in these webinars include the use of social media in E/PO, new NASA education products, as well as other items and issues of interest to the community.

Analysis and Cataloguing of NASA Earth Science Education Products and Projects

IGES is helping to develop an online catalog for finding SMD E/PO information and resources. The Earth Science E/PO Forum leads a cross-forum team working to ensure that analysis and cataloguing is carried out in a consistent manner throughout the forums.

American Geophysical Union (AGU): Geophysical Information for Teachers (GIFT) Workshop 2011

IGES participated in the planning of the GIFT Workshop, as part of the 2011 AGU annual meeting. This two-day workshop brought together approximately 45 current or pre-service middle and secondary school teachers to hear from leading scientists and learn about new "take-it-to-the-classroom" activities. Presentation topics included atmospheric science, earthquakes, climate change and sustainability on Earth.

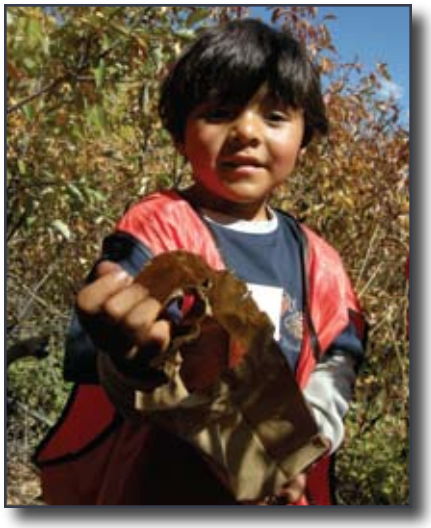
National Science Teachers Association (NSTA) 2011 National Conference

This annual four-day conference features an audience of over 12,000 educators, and presents the latest in science content, teaching strategies and research. As part of its forum activities, IGES was involved in the scheduling and staffing of the NASA SMD booth. Cassie Soeffing, IGES, helped to create an effective strategy for engaging participants in conversation at the booth, in order to find out what resources teachers need when presenting Earth science in the classroom. Additional activities included creating and distributing a master list of NASA sessions, workshops and field trips.

Top left: Andrea Jones, Brooke Hsu and IGES' Cassie Soeffing at the AGU Meeting of Opportunity.

Center: Poster session at the NASA Earth Science E/PO Community Retreat.

ESSEA | Earth System Science Education Alliance



Above: Young students working with the Colorado Wildlands Restoration Volunteers Project.

ESSEA UPDATES

K–4 Keepers Modules: You Are Never Too Young to Care for the Earth

Don't believe that you're too little
or simply just too young.
Or that your time for speaking
out has really not begun.
You can make a difference with
the choices that you make.
You can change the way things
are with actions that you take.

This verse is part of a jingle that introduces a new K–4 Earth Science System Education Alliance (ESSEA) module series, *K–4 Keepers,* aimed at involving young students in conservation activities. Each of these four modules, developed by IGES' ESSEA team, is dedicated to a specific resource—water, air, land and living things—and educates and encourages students to become "keepers" of the Earth.

The modules bring together facts and online resources to give students a better understanding of how their own actions, and those of their communities, have a real impact in the state of these resources. In doing so, they battle a common challenge that arises when explaining the scale and extent of environmental changes. People often feel that the negative impacts are just too large to handle and that they cannot make a difference. By explaining how actions at the individual and local level can have positive effects, these resources are intended to motivate even the youngest students to become involved.

Students are introduced to concepts like the "3 Rs"—recycling, reusing and reducing—to help protect the land, and how to battle "energy vampires" that waste energy, by unplugging electronics when not in use. Each module includes links to videos and online resources for kids and teachers, sample investigations and a list of the education standards aligned with each lesson.

MEAN EXTREMES: New Module for Teachers Addresses Recent Climate Trends

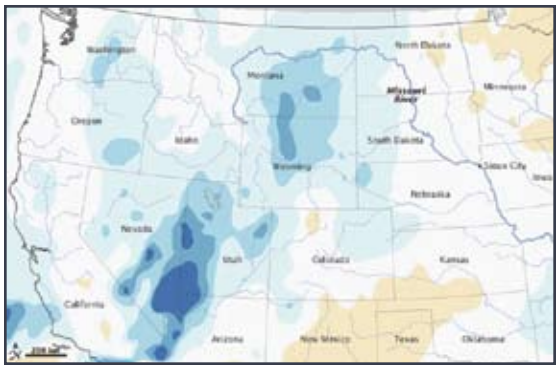
In 2011, extreme weather events seemed to strike every corner of the United States. From extensive floods, record temperatures, and powerful hurricanes to extreme drought, these events have caused mounting economic losses and lamentable casualties. In this context, should communities take action to prepare for more and more of these events in the future? Does the science suggest that these may be a feature of future climate trends? *When the Extremes Become the Means,* a new ESSEA module for middle and high school teachers

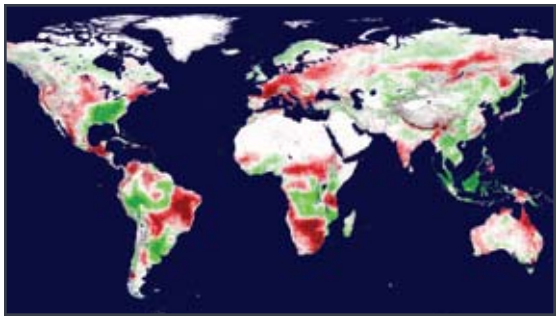
developed by Paul Adams of Fort Hayes State University, encourages students to address these questions.

This module involves middle and high school teachers in studying the link between extreme weather events and climate change to understand whether these events are due to natural fluctuations in climate or to anthropogenic-induced climate change. A key message of the module is that policy and action must be based on accurate scientific analysis, which is sometimes a challenge when looking at future climate trends. It reads: "…any planning must be based on genuine changes in the earth system and not on random variations. If weather extremes become the new weather means, what weather events must a community plan for in the next 10 to 100 years? Finding answers to this question is critical, complex, risky, and likely fraught with ambiguity."

Through a variety of outside sources, programs and activities, as well as sample investigations, this module encourages thinking about trends in weather and climate in terms of the risks associated to individuals, communities and nations.

To access the *K-4 Keepers* and the *When the Extremes Become the Means* modules—plus many more—please visit
• ***http://essea.strategies.org***



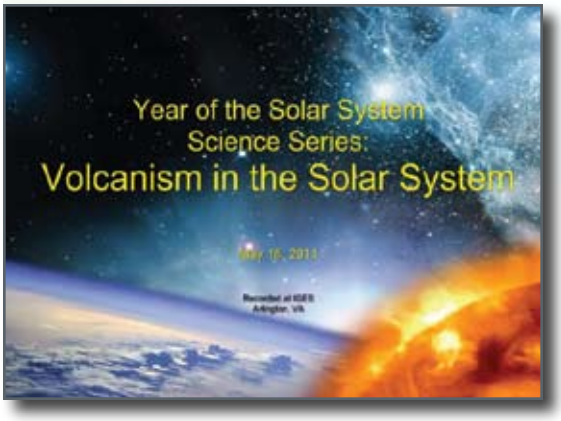


Resources incorporated into the module include this May 2011 map (top) of rainfall anomalies in the Missouri River Basin (as compared to the 1998–2010 average) and a 2003 graphic (above) of Earth's plant productivity with respect to changes between 2000–2009. Credit: NASA.

2011 ESSEA conference participants in Sugarloaf Mountain (top) and Presque Isle (above).

2011 ESSEA Annual Conference

The 2011 ESSEA Annual Conference was held on Aug. 15–18, at Northern Michigan University (NMU), Marquette, Mich. Updates on developments of the past year were presented, including those related to the GLOBE Program and COSEE (Centers for Ocean Sciences Education Excellence), as well as the work done by ESSEA partner and associate institutions. Breakout sessions on module development proved to be very successful, with a number of teaching modules proposed that have since been fully developed. The agenda also took full advantage of the location, featuring speakers who focused on education and the Great Lakes, a field trip to Presque Isle led by Carl Wozniak, NMU, and a field trip to see local banded iron formations led by Steve DeGoosh, NMU.



Examples of IGES-produced videos with captions and table of contents (top) and title slide (above).

Update on IGES Initiatives for NASA Earth and Space Science Education

Earth and Space Science Education Videos for Professional Development

IGES maintains a portal of videos for educators on NASA Earth and space science educational products and content. The site includes recordings of live events conducted by IGES and other organizations. Themes covered in 2011 include the *Year of the Solar System Science Series*, social media and space math.

To view these videos and many others, visit • ***http://video.strategies.org***

NASA Earth and Space Science Education Product Review

IGES manages the independent peer review process of NASA Earth and space science education materials. Panels of both scientists and educators review submitted products to ensure that these are of high quality and meet rigorous educational standards. Reviewers also provide feedback to product developers, ensuring that the products that pass review are up to par for teachers and informal educators to use.

To learn more, visit • ***http://nasareviews.strategies.org***

NASA Earth and Space Science Education News

IGES has developed an ongoing e-newsletter and blog with upcoming educational programs, events, opportunities and NASA Science Mission Directorate resources of relevance to the Earth and space science community.

To view the latest entries and archive, visit • ***www.smdepo news.org***

Want to stay in the loop? Subscribe to the newsletter by sending an email to • ***ese_ed_newslist-subscribe@lists.hq.nasa.gov*** • with "Subscribe" as the subject.

Student and Educator Articles on the NASA Portal

IGES develops news and feature articles for the NASA portal. These articles, geared toward students and educators of varying grade levels, explain NASA science topics and highlight NASA-supported educational materials, programs and themes in Earth and space science.

As part of this work, IGES develops and writes articles for the *Earth and Space Science Explorers Series,* which feature teachers and scientists with a variety of backgrounds and interests, all with a connection to NASA. For Earth Science Week 2011, for example, IGES developed four profiles of remarkable NASA female geoscientists and their work to better understand the Earth system. See the article on pg. 7 for more details.

Many articles are written in three versions for each of the reading levels: grades K–4, grades 5–8, and grades 9–12 and up.

To access all IGES-produced NASA articles, visit • ***http://strategies.org/NASAarticles***

To check out the *Earth and Space Science Explorers Series,* visit • ***http://science.nasa.gov/educators/earth-space-explorers***

IGES Contributes to 2011 Earth Science Week

As part of the celebration of Earth Science Week (ESW) 2011, IGES participated in the creation of materials for the NASA Global Climate Change website. Intended to promote greater public awareness of the Earth sciences, the theme of this year's ESW was "Our Ever-Changing Earth."

Earth Science and You

IGES assisted in the production of a fascinating webcast with NASA's chief scientist Dr. Waleed Abdalati, who discussed a variety of topics related to the Earth system.

The webcast is available at • ***http://video.strategies.org***

Earth Science Week Introductory Video with Theresa Schwerin

Also included in NASA's ESW website is a video featuring IGES' Theresa Schwerin who introduces a variety of NASA Earth science resources.

The video is available at • ***http://climate.nasa.gov/esw2011***

Female Geoscientists Day: Four Profiles

On Wednesday, Oct. 12, 2011, NASA celebrated Female Geoscientists Day. As part of this initiative, IGES' Laura Delgado López wrote a series of articles profiling four scientists, their work in the field, as well as their thoughts on the contributions of both men and women to our understanding of Earth. The articles were posted on the NASA portal and were also linked to the Women@NASA website.

The scientists featured were:

- Erica Alston, Langley Research Center (LARC)
- Claire Parkinson, Goddard Space Flight Center (GSFC)
- Cynthia Rosenzweig, Goddard Institute for Space Studies (GISS)
- Erika Podest, Jet Propulsion Laboratory (JPL)

To access both the high school and middle school versions of the profiles, visit • ***www.nasa.gov/audience/foreducators/esw-profiles-edlanding.html***

Top left: Screenshot of Dr. Waleed Abdalati in the ESW webcast.
Bottom left: Screenshot of IGES' Theresa Schwerin introducing NASA Earth science resources in a NASA video.

Top to bottom: Erica Alston, credit NASA/Sean Smith; Claire Parkinson, credit Steve Graham; Cynthia Rosenzweig, credit The Journal News; *Erika Podest, credit American Latino TV.*

Elementary School Students Wonder at Weather

Lightning, hail, powerful winds and bright sunlight were all witnessed last fall at the IGES office. These were the motifs captured by the over 800 students of grades 2–4 who participated in this year's environmental art contest and who answered the call to explore weather.

In the midst of a record-breaking year of extreme weather, the 16th annual contest explored "Wonders of Weather." IGES President Nancy Colleton said of this year's theme that *"With all of the impacts the U.S. has experienced this year, we think that it is important for children to think about how the weather system works."*

Participants showed a creative flair for capturing the beautiful and the powerful ever-changing aspects of weather. From sunlight to rain and even hail, Larry Huang, a third-grader from Vancouver, Wash., who won first place and a $100 Visa gift card, seemed to capture them all in *From Rain to Sunshine.* Second place was awarded to Christopher Zhong, a second-grader from Reston, Va., for *Stormy Night.* Also recognized were Julianne Chen, a third-grader from Sunnyvale, Calif., Mandy He, a fourth-grader from Ann Arbor, Mich., and Roman Liu, a third-grader from Vancouver, Wash., who were all tied for third place. The second place winner received a $75 gift card, while the third place winners each received a $50 gift card.

"Congratulations are in order for all of our young scientist-artists, as well as their teachers and parents," said Theresa Schwerin, IGES vice president of education. *"There are several teachers who have made the art contest part of their back-to-school activities for several years,"* she noted. The contest addresses national education standards in science, geography and the arts.

To view winning entries from the 2011 contest and previous years, please visit • ***www.strategies.org/artcontest***

2011 Winning Art, *clockwise from bottom left: Second place–Christopher Zhong; First place–Larry Huang; Third place (tie)–Roman Liu, Julianne Chen and Mandy He.*

Thacher Winners Demonstrate Value of GIS for Environmental Best Practices

Left: First place winner Joseph "Jay" Arehart; Above: Second place winner Darwin Li's thematic map of the Chesapeake Bay's water quality.

Before taking action to protect the environment, we must be able to identify where, when and how changes are taking place. As the winners of the 2011 Thacher Environmental Contest demonstrate, geospatial information systems (GIS) can help us do just that.

Joseph "Jay" Arehart, who won first place and $2,000, was concerned with the need for baselines to measure pollutant levels in his hometown of Boulder, Colo. *"By establishing baselines throughout different environments, we can monitor the impact of human activity on the atmosphere,"* wrote Jay in his winning entry. He explained that while this kind of monitoring can be done in a variety of ways, GIS *"makes monitoring levels of pollutants easier."* As a first step to identifying baselines and quantifying pollution levels in the area, Jay performed chemical analysis of the nitrogen concentration of lichens, which absorb pollutants in their environment, and then used GIS to map the levels of concentration. He succeeded in drawing a *"nitrogen footprint"* of nitrogen concentration in urban and wilderness environments.

According to Jay, not only are GIS tools useful for good research practices, but they also enable another valuable element: *"they provide visual representations of what is going on within ecosystems not visible to the human eye,"* he said. Jay thinks that his work can be expanded to identify baselines of other pollutants. *"With the development of other footprints, [such as heavy metals like mercury and lead] a better understanding of the effects pollution had on ecosystems can be created,"* he added.

Second-place winner Darwin Li, from Herndon, Va., who also won $1,000, set out to create an improved approach for determining water quality in the Chesapeake Bay, the largest estuary in North America. He developed algorithms relating chlorophyll and turbidity levels in the bay to Landsat's 5 Thematic Mapper (TM) data. He used these to create a web-based monitoring system to visualize patterns in the bay, which can be accessed at • ***www.monitorthebay.com***

(Cont. on p.10)

Top: Chesapeake Bay. Credit: NASA/MODIS.
Above: GIS map of the Mill Creek watershed.
Right: Third place winner Lauren Gregory.

(Cont. from p.9)

"Remote sensing provides an economically feasible, timely and convenient way to quickly map the spatial pattern of water quality over a large area and show parameter values at every point," wrote Darwin in his paper. He suggests that a system like this can help advance two aspects of water quality: the science and the policy. By assessing the health of the Chesapeake Bay, a system like this can help evaluate effectiveness of water quality control programs, paving the way for improved policies in the future.

Also looking at conservation practices, Lauren Gregory, from Shawnee, Kan., won third place and $500 for using GIS data from 1998–2006 of the Mill Creek watershed to identify erosion rates and map points of soil erosion susceptibility. This, she explained in her paper, could be used as a tool to identify priority locations for conservation and best-management practices for erosion control, key to preventing sediment pollution and the release of pollutants trapped in soil, among other variables which impact stream quality. In addition to her recognition in the Thacher contest, Lauren's project was submitted to the city of Shawnee, where it led to the design of a watershed conservation program.

This kind of creative use of GIS tools and data to improve our understanding of the Earth is just what the Thacher contest is meant to support. In the twelve years of the award, more than $30,000 has been awarded to 9–12 grade students across the nation. *"We believe it's essential to provide an opportunity for, and recognize the exceptional work of, students like Joseph and this year's other winners in the area of environmental research,"* said IGES President Nancy Colleton. *"They will contribute greatly to our future, which is sure to feature increasing environmental challenges."*

See page 12 for information on the 2012 Thacher Contest and how to participate.

Continuity and Change Captured by Earth Day Photo & Essay Contest Winners

With camera in tow, contestants of the 2011 IGES Earth Day Photo & Essay Contest set out to capture environmental changes in their community. What they found was both beautiful and thought-provoking.

In *Shades of Red and Orange*, first-place winner Jager Parks, a seventh-grader from Norfolk, Va., captured *"the changing of the day,"* (top) as he wrote in his accompanying essay. Jager described the fiery spectacle as *"a sign of the cycle of life, an unending cycle."* At the same time, he noted how the context of that beautiful scene is, of course, continually changing. For Jager, that is not necessarily negative. *"In the future this picture may become even more beautiful and vivid because as the sun ages it becomes deeper [with] more marbled shades of red and orange. How fortunate for us to live on this Earth!"*

Bryn Taylor, an eighth-grader from Cocoa, Fla., who won second place for her picture *Fast Food*, described a rich scene of the coming of spring in Florida's riverbeds (above). As part of this teeming environment, an *"unlucky mullet"* is being snatched up by a great blue heron, who will take his catch to feed his offspring. Bryn notes that this is part of the cycle of life too, but that changes taking place in the environment can threaten the health of species like these: *"Even as this magnificent heron spends his days feeding and living in the warm bath that is spring, he is not even aware of how much his environment is changing."* Bryn wrote a reminder of some of the effects that overwatering, and the use of contaminating pesticides and fertilizers, can have in the riverbed environment. That side of the story is for people to realize and take action. For the heron, life goes on: *"when he wakes up in the morning he'll fly off to his favorite fishing hole, ready to fish again."*

Third-place winner Emma Sams, a sixth-grader from Redondo Beach, Calif., captured a comical but illuminating picture of a staring goat, titled *Goats Clear Palos Verdes* (right). *"These goats were brought here to eat all the invasive, non-native weeds so native plants and insects will return to the area,"* she explained in her essay. Taking the place of harmful insecticides and lawnmowers, and contributing to help avoid wildfires and eliminating the need for people to put themselves at risk, Emma noted that the goats are there for much more than to pose for her camera. With the goats clearing the way, *"it will be a lovely place to visit once the beautiful plants grow."*

More than 250 students from across the nation participated in the fifth annual Earth Day Photo & Essay Contest. *"The winning pictures are truly stunning, and together provide a picturesque window into the changes happening in our environment,"* said IGES President Nancy Colleton. *"We're thrilled that middle school students could both engage in the art of photography and at the same time learn so much about the world around them."*

To view the archive of past winning photos and to learn about the 2012 Earth Day Photo & Essay Contest, please visit • ***www.strategies.org/EarthDayPhoto***

2012 Thacher Environmental Research Contest for Grades 9–12

Entries due by April 16, 2012

From the movement of Hurricane Irene up the east coast of the United States to images of the receding ice in polar regions, scientists and decision-makers rely upon satellites and other observing instruments to understand the extent and impact of environmental changes. These tools are offered to the public with ever-increasing accessibility, turning people into citizen scientists.

IGES' annual Thacher Environmental Research Contest, provides high school students (grades 9–12) with the opportunity to conduct innovative research on our changing planet and win cash prizes for their efforts. Students must demonstrate the best uses of the latest geospatial tools and data to study the Earth.

Entries for the 2012 Thacher Contest can be submitted by individuals or teams. Cash awards will be given to the top three projects—$2,000 for first place, $1,000 for second place and $500 for third place. In the case of team entries, the cash award will be split equally among the winning team members. Winners also will be featured in an *Encyclopedia of Earth* article.

In addition to the student prizes, teachers of the first-, second- and third-place students or teams will receive a $200 amazon.com gift card. If participation is part of an after-school club or other activity independent of school, the student or team can identify an adult 'coach' who would be eligible for this award (e.g., a parent, club leader, etc.).

Entries must be received by April 16, 2012. IGES plans to announce the winning entries by May 23, 2012.

Eligible geospatial tools and data include satellite remote sensing, aerial photography, geographic information systems (GIS) and Global Positioning System (GPS). The main focus of the project must be on the application of the geospatial tool(s) or data to study a problem related to Earth's environment.

Geospatial tools and data have numerous uses in science research, ranging from climate prediction to archaeology. They can be used to improve our understanding of Earth systems, including interactions within and among the atmosphere, biosphere, geosphere and hydrosphere. They also can be used to improve the quality of our lives by supporting activities such as weather prediction, natural hazards monitoring, agriculture, land-use planning, coastal management, transportation, public health and emergency response.

The Thacher Environmental Research Contest (formerly the Thacher Scholars Award) was founded in honor of former IGES board member Peter Thacher, who was a leader in promoting the use of satellite remote sensing. Thacher was former deputy executive director of the United Nations Environment Program, NASA advisor and, at the time of his death, president of the Earth Council Foundation/U.S.

For more information on the 2012 Thacher Environmental Research Contest, please visit: ***www.strategies.org/ThacherContest***

Forum On Earth Observations V

Experts Agree: A National Stragegy for Environmental Intelligence Is a Critical Need

Organized by IGES and the Alliance for Earth Observations, the Forum on Earth Observations V: Creating a National Strategy for Environmental Intelligence brought together leaders from the Earth observations community to examine U.S. environmental information capabilities and the need for a national strategy that ensures the continued capture and delivery of this critical information.

Top: Fernando Echavarria, Department of State, and Kit Batten, USAID.

Above: Scott Hausman of NOAA, Stephen Ambrose of NASA, and Helen Wood of NOAA exchange views during a networking break.

Right: Forum V participants.

This unique, one-day conference took place on June 14 against the backdrop of a record-breaking spring season of extreme weather and amid a highly uncertain U.S. budgetary and policy context. Government, business and academic leaders from a variety of fields agreed that there is a pressing need for a national strategy that ensures the long-term and timely delivery of environmental intelligence—actionable information that enables individuals, governments and businesses to make critical decisions.

Delivering the first keynote address of the day, Carl Hedde, senior vice president and head of Risk Accumulation at Munich Reinsurance America, Inc., discussed the recent and costliest disasters in the United States and abroad, which he described as *"game-changing events."* Highlighting the business impact of these events across continents, Mr. Hedde described the mounting economic losses of these disasters. Fortunately, businesses are increasingly utilizing a variety of tools, such as Earth observations information, to make decisions to better adapt and reduce risk. Environmental information, he concluded, *"is the basis of how we make decisions down the road."*

Dr. Gerald Nelson, senior research fellow at the International Food Policy Research Institute (IFPRI), highlighted the role of Earth observations data in addressing the food security challenges of the future. In a context of costly and dangerous uncertainty produced by climate change, accurate Earth observations data—to account for the state of the Earth's resources, how they are changing, and what are those drivers of change—is absolutely critical. *"We need regular observations…that means observations made using standard methods that occur*

(Cont. on p.14)

Top: David Hayes presenting his keynote speech.

Center: Panelists Richard Engel, Thomas Karl and Charles Wald.

Bottom: Panelists Sharon Hays, Richard Hieb and Carol Lane.

Top right: Forum V participants applauding during the lunch program.

(Cont. from p.13)

year after year, after year, everywhere on the planet. And these observations need to be made freely available to all," he said.

In his keynote address titled "Measuring to Manage," the Honorable David Hayes, deputy secretary of the U.S. Department of the Interior (DOI), described the impact of climate change on DOI's management strategy of the nation's resources. *"Our need for relevant, timely, understandable, collected data has never been more acute,"* he said. With an incentive to increase measurements and understand the variety of impacts on these resources, Deputy Secretary Hayes emphasized the role of information to enhance decision making. He reiterated that environmental information is only valuable to the extent that it can be accessed and used by decision makers.

In addition to these keynote speeches, a roundtable and three panels were also convened. These discussed the following themes:

- Environmental Intelligence: Three Perspectives on U.S. Needs
- Linking Environmental and Business Intelligence
- U.S. Earth Observations, Contributing beyond Our Borders
- Innovative Solutions for Environmental Intelligence

Among the panelists were:

- Thomas R. Karl, Director, National Climatic Data Center, NOAA

- Charles F. Wald (General USAF, Ret.), Director and Senior Advisor, Aerospace and Defense Industry, Deloitte Services LP
- Michael Freilich, Director, Earth Science Division, Science Mission Directorate, NASA
- Carol Lane, Vice President and Lead Executive, Corporate Strategy and Federal Relations, Ball Aerospace & Technologies Corp.
- Kathryn Sullivan, Assistant Secretary of Commerce for Environmental Observation and Prediction; Deputy Administrator, NOAA
- Richard L. Engel (Major General, USAF Ret.), Director, Environment and Natural Resources Program, Strategic Futures Group, National Intelligence Council
- Sharon Hays, Vice President, Office of Science and Engineering, CSC
- Bill Nye, "Bill Nye the Science Guy," Executive Director, The Planetary Society

NASA, USGS, NOAA, Ball Aerospace & Technologies Corp., CSC and Lockheed Martin sponsored this year's Forum.

For more information, please visit • ***www.ForumOnEO5.com***

2011 Alliance Awards Recognize Leaders in the Field

The inaugural annual Alliance Awards recognized leaders who have made a significant contribution to the field of Earth observations, as judged by their peers. Members voted on outstanding individuals or organizations in the categories of Leadership, Stewardship and Innovation.

ALLIANCE FOR EARTH OBSERVATIONS

LEADERSHIP

Senator Barbara Mikulski (D-MD)

For her leadership as chairwoman of the Senate Appropriations Committee Subcommittee on Commerce, Justice and Science, and her support of the science and innovation within NASA, NOAA and other agencies that will continue to help our country prepare for the impacts of a changing climate.

STEWARDSHIP

Thomas R. Karl, Chair, Global Change Research Subcommittee, USGRP; Director, National Climatic Data Center, NOAA

For his leadership in communicating the importance of accurate, timely and sustained climate and weather data for long-term modeling, planning and forecasting, and for his contributions to U.S. climate efforts, including the NOAA Climate Service, the National Assessment, U.S. Global Change Research Program (USGCRP), and working with his counterparts in the Department of Defense to improve U.S. climate models.

INNOVATION

Center for Southeastern Tropical Advanced Remote Sensing (CSTARS)

For its innovative action during the Deepwater Horizon disaster. CSTARS provided unprecedented, daily coverage of an expanse from Texas to Florida—never before has the government used such extensive, sustained, unclassified remote sensing data to cover a disaster like this. CSTARS' proactive approach to changing licensing rights allowed greater data coverage, which was instrumental for federal, state and local responders to have rapid access to the data.

Top: IGES President Nancy Colleton, Senator Mikulski and Bill Nye.

Center: Thomas Karl and Bill Nye.

Bottom: Hans Graber and Ret Turner from CSTARS with Bill Nye.

ALLIANCE FOR EARTH OBSERVATIONS

Alliance for Earth Observations: Fostering Improved Public-Private Engagement

Since 2003, the Alliance for Earth Observations has worked to ensure the rapid and broad delivery of the most timely, comprehensive and accurate environmental information for improved decision making. Through continued stakeholder engagement with leaders from the public and private sectors, Alliance activities in 2011 focused on advocating for a comprehensive national strategy that secures long-term investments in Earth observations and strengthens the environmental intelligence supply chain.

As part of these efforts, Alliance activities throughout the year promoted awareness of two key concepts:

1) Environmental intelligence—the most accurate and timely information about our planet that enables governments, communities, companies and individuals to make sound decisions; and

2) The environmental information supply chain—the critical but fragile supply chain that bridges government investment with private sector activities to make environmental intelligence possible. The new Alliance logo, unveiled in 2011, better captures the interconnected nature of this supply chain: the combination of remotely-sensed data from a variety of platforms and its role in helping us monitor and understand the changing state of Earth, its resources and environment.

Key Alliance accomplishments in 2011 include:

- Convening the Forum on Earth Observations V;
- Co-sponsoring the Ocean Coastal Science Community Welcome Reception;
- Organizing a panel on the role of environmental information in risk management at the E2DS'11 conference;
- Participating at the National Academy of Science Summit for Managing Extreme Events;
- Co-organizing a panel discussion on private sector needs and opportunities in climate services as part of the WCRP Open Science Conference;
- Convening Hill meetings with Senate and House staff;
- Organizing member-only briefings with EARSC Secretary General Geoff Sawyer and NOAA Assistant Administrator for Weather Services and NWS Director Jack Hayes;
- Authoring and signing on to letters of support for key issues such as the FY2012 and FY2013 budget for relevant agencies; and
- Sending weekly e-blasts to members with the latest in research, policy and relevant reports related to the environment and Earth observations.

The Alliance for Earth Observations continues being a private sector voice and a leader in advocating for continued investments in critical Earth observation systems. It is committed to fostering improved awareness in the public and policy-making community of the importance of environmental information for addressing risks, supporting national security and growing the economy.

For more information about the Alliance for Earth Observations, please visit • ***http://alliance.strategies.org***

Center top: NOAA Administrator Jane Lubchenco, AGU Executive Director Christine McEntee, and Consortium for Ocean Leadership President Bob Gagosian at the Ocean Coastal Science Reception.

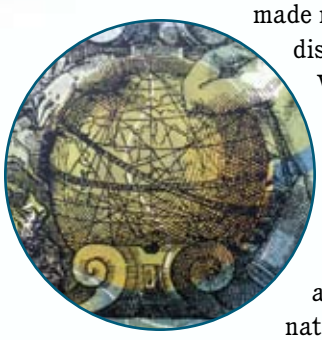
Center bottom: Environmental information and risk management panel at the E2DS'11 conference. Credit: IHS Jane's.

MUSINGS BY THE IGES TEAM

Teaching Science as Process

by ***Brandi Bersnoskie***
Science Communications Manager

In elementary and secondary schooling, science is often divorced from the collective engaged in it—students learn about the scientific method as a path to truth, to a final end product; they memorize facts and the names of those scientists who made remarkable discoveries. What they do not discern until much later is the political and social nature of science. Ideas compete for prominence. Scientists have disagreements of a non-scientific nature that may impact their work. They must often persuade organizations to fund their projects. Even Christopher Columbus had to find patrons who were willing to fund his voyage across the ocean, a voyage that rested on the theory that the Earth was round, when most of the European world believed differently.



The political and social dimension of science makes it neither haphazard nor arbitrary. The key is to understand that science, which involves specific processes like the scientific method, is itself a process.

Science in today's world is invariably more complex than it can seem to be in school. Science is often global in character. It is embedded in discourses and forms of life so deeply that it is no longer clear what the boundaries are between the scientific theories and their applications.

In our day-to-day activities, scientific theories and research even impact how we conduct our lives politically and morally. Shawn Lawrence Otto writes in *Fool Me Twice: Fighting the Assault on Science in America* that "science pushes the boundaries of knowledge…pushes us to constantly redefine our ethics and morality, and that is also political."

Scientific theories are not alone when it comes to undergoing revisions. The scientific process also continues to change. The internet, for example, has made it possible for more collaboration than ever before. It is also providing global access to theories as they are published as well as raw scientific data.

A greater understanding of science as a process early in science education will help students become conscious consumers of information. As adults, they will be able to critically read and respond to scientific articles and stories. They will understand that while the scientific method is fallible (because humans are fallible), it is also self-correcting.

The body of scientific knowledge changes over time. Science is constantly being rewritten, and part of that rewriting happens because of people's choices: scientists shape their research designs, and politicians and investors choose which research projects to fund. The outcome of such research adds to the picture of the world we possess. As it continually changes, we may never have the entire picture, so it is important to act on the current scientific knowledge we do possess, and to remember that science is not a product. ***Science is integrated into our lives because it is a process—a social and political one—and we must approach it as such, beginning with education.***

Bicycling to Work Part V: Riding with Mass Transit

by John Ensworth
Senior Science Education Specialist

In previous issues of *Observe*, I have looked at some of the comfort and safety aspects of commuting to work by bicycle. This time, I will explore what you can do if weather or distance keeps you from coming in on two wheels, or if business travel presents an opportunity for cycling new terrains.

BUS

While you may have time for a daily commute of 8–10 miles, 25 or more miles might be too hard to accommodate—particularly twice a day. The bus is a great way to cut down on a large chunk of your daily commute without removing biking from your routine altogether.

In most metropolitan areas, buses have a bike rack that can hold two bikes up front. This rack usually has a release that lets the platform swing down flat, sticking out about three feet from the bus. You'll have to lift your bicycle up onto the groove and pull a stability arm over the front wheel (locate this before lifting your bicycle). It may seem like a meager amount of support for your expensive 'horse' and the bicycle will shake back and forth as the bus goes over potholes and uneven pavement, but after years of use, I've never had it fail nor have I heard of any failing.

Since only a couple of bikes fit on the racks, there is a possibility that this option is unavailable on a busy day. Plan to arrive early and carry a lock in the event you need to leave your bike at the bus stop.

SUBWAY

Taking your bike with you on the subway gives you the same flexibility of a bus to shorten your commute, and it can be simpler since you will just need to walk your bicycle onto the subway car and ride. The challenge is making space for your bike, while still accommodating the movement of other passengers.

The key here is to do some research before taking your bike with you to the station and learning the do's and don'ts for your city. In the metro rail system of the District of Columbia, for example, the Bike N' Ride program has a specific set of rules and guidelines for bikers to follow when using the system, such as age restrictions, which gate and railcar to use, and what to do in the event of an emergency. As in many other cities, bikes are allowed inside railcars at any point during the day except during the designated rush hours. In this case, you may want to look into shifting your workday to allow a leg of your commute by subway.

In the event of a business trip that involves taking a train, you should also carefully research the rules for transporting your bike. Make sure to consider elements such as going through security and checking luggage, as well as additional costs that may be involved.

TAXI

Nothing is more flexible than a taxi for door-to-door service. Though certainly not for daily use, taking your bike on a taxi may be necessary in the event of bad weather or an emergency.

If you can load the bicycle yourself, most taxis will allow you to put it in the trunk at no extra fee (but you may want to tip a bit more). Plan to keep a bungee cord packed among your standard items so you may hold the trunk lid down. Most importantly, when calling for your taxi, please alert the dispatcher that you need to transport a bike.

PLANE

When a business trip involves travel to a different state or country for a week or more, you may want to use this opportunity to keep up your riding and explore new trails. It may even be feasible to commute from the hotel to where you will be working during your stay.

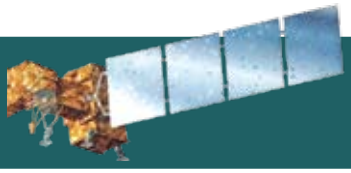
Most airline websites have information about traveling with special items like bicycles, their allowed dimensions, and associated costs by destination. United Airlines, for example, specifies extra handling fees for bicycles ranging between $50 and $200, depending on your destination. American Airlines in turn, charges $150, though the price may change for packages smaller than 62 inches and weighing less than 50 lbs. These dimensions will be standard when packing your bike inside of a case or box, which you can easily get at a bike shop. Alternatively, you may want to look into getting a foldable bicycle, which comes up at about the size of a normal piece of luggage when folded up. If you travel by plane often, this is a good option to explore.

Use these tips and tricks to be informed and plan ahead. With a little bit of research, mass transit can help you shorten your commute to a manageable level while you continue to improve your health, reduce your carbon footprint… and cruise along!

Top left: www.bikeplan.com.

NASA's famous Earthrise image.

Visualizing Earth



by ***Laura Delgado López***
Earth Observations Associate

For many of us, the so-called Earthrise picture still gives us goose bumps. Taken by an Apollo astronaut from the unique vantage point of the Moon in 1968, the first picture of the Earth from space has seen countless reproductions and has lit the faces of millions around the world. This image, which captured the beautiful but lonely state of the planet in the wide expanse of outer space, allegedly heralded the birth of the environmental movement by bridging the idea of Earth as both our home and our sole responsibility. It also serves as a perfect example of remote sensing (and one of the most remote!) and how it impacts our understanding and appreciation of the planet.

(Cont. on p.20)

(Cont. from p.19)

Just four years later, with the launch of the United States' first land remote-sensing satellite Landsat, another hallmark of our understanding of Earth was reached. Six successful Landsat satellites later, a program once mired with numerous setbacks has been heralded as one of the most important contributions of the United States to the world. Landsat has since then enabled activities like mapping and imaging that contribute to a myriad of fields—from agriculture and health to resource management and food security. Just as importantly, the United States began to implement an open access data policy, putting this resource at the fingertips of millions of people around the world.

Since that first launch, our ability to "see" has been advanced by technologies that augment the capacity of our senses. A combination of private and governmental space-based (radar and high-resolution imaging satellites), airborne and in situ systems gives decision makers unprecedented ability to visualize Earth, its resources, and natural and anthropogenic-induced changes to the environment. NASA's Suomi NPP satellite, the first of a next-generation Earth observation satellite system, was launched in October 2011 to support ongoing measurements critical for advances in weather and climate science.

It is said that a picture is worth a thousand words. Certainly those reproduced by these different sources of data are often the key to communicating very complex relationships and trends and to transmit meaning across cultures and sensibilities. Perhaps one of their most valuable benefits derives precisely from their ability to foster this greater understanding and invite continuing inquiry and exploration of the Earth. Consider the satellite images that the United Nation's Intergovernmental Panel on Climate Change (IPCC) has relied on to capture the visual changes of ice coverage in the Arctic as a result of climate change, or the maps and imagery that communicated the magnitude of the disaster in Japan after the 2011 Tohoku earthquake and tsunami.

From beautiful maps to intriguing images of the ocean floor and the mountains of the deep, our understanding of the planet we live on is intimately tied to how we see it. The tools that help us visualize it play an important part in this process, becoming an invaluable asset in our decision making—from checking out the radar to determine whether the storm will make landfall in our area, to seeing the effects of a successful reforestation program in a lush part of the world.

As we mark the 40th anniversary of Landsat and begin to take in the contributions of new systems like Suomi NPP, we can begin to wonder: what will we see in the decades to come? What new questions and answers will these tools provide? More importantly, how will these alter our worldview? We'll just have to wait…and see.

Center: View of the eastern hemisphere on NASA's popular 'Blue Marble,' taken by the VIIRS instrument aboard the Suomi NPP satellite. Credit: NASA/NOAA.

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About IGES

The Institute for Global Environmental Strategies is a trusted leader in Earth and space science education, communication and outreach, and in fostering national and international cooperation in global Earth observations. These efforts—designed to improve understanding of, and response to, natural and human-induced changes in the Earth system—require multidisciplinary approaches to complex and critical environmental, economic and societal challenges.

Located in Arlington, Va., IGES was established in 1994 and is a 501(c)3 nonprofit organization supported by public and private entities.