



The GLOBE Program 15th GLOBE Annual Partner Meeting Organizing Committee

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EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20502

June 6, 2011

Dear GLOBE Workshop Participants:


I am delighted to welcome you to Washington, DC, for the 15th Annual GLOBE Partner Meeting and Professional Development Workshop.

President Obama has been clear in his commitment to making science and technology and science, technology, engineering, and math (STEM) education among the highest priorities of his Administration. He recognizes the important role of science and technology in addressing the great challenges that we face here in the United States and those that we share with countries around the world. Some of the most significant challenges we must confront are at the intersection of energy and the environment, including the challenge of climate change, the impacts of which pose serious threats to our collective peace, security, and prosperity. We cannot solve the great problems of our time alone as individual nations. Rather, we must work together to bolster STEM education so that future generations have the know-how to address these challenges.

On April 22, 2010, the 40th anniversary of Earth Day and the 15th anniversary of GLOBE, the White House Office of Science and Technology Policy released a report reaffirming the value of GLOBE as part of the Obama Administration's commitment to science education and environmental stewardship. In my remarks that day, I noted the importance of GLOBE as a tool for educating the next generation of climate and environmental scientists and giving students the opportunity to share in the excitement of scientific discovery in their own backyards. Our report also laid out important goals for the program ahead, including, among others, an enhanced focus on climate education to address the impacts of climate change on human society and ecosystems. I am delighted to know that you are embracing that agenda as you launch the GLOBE Student Climate Research Campaign this Fall, and I look forward to learning of your many accomplishments through those efforts.

The work you are performing is important and your dedication to advancing global engagement and learning in science and technology is impressive. I wish you a stimulating and productive meeting.

Sincerely,



John P. Holdren
Director



National Aeronautics and Space Administration
Headquarters
June 7, 2011



MESSAGE FROM NASA CHIEF SCIENTIST

Dr. Waleed Abdalati

On behalf of NASA Administrator, Charles Bolden, I am delighted to welcome you to Washington, DC, for the 15th Global Learning and Observations to Benefit the Environment (GLOBE) Annual Partner Meeting and Professional Workshop on July 18-22, 2011.

Since the establishment of the U.S. Space Act in 1958, NASA has been exploring space and studying the changing Earth using Earth observing satellites. Rapid industrialization, migration of people from countryside to cities, and increases in world population are literally changing the face of the Earth, as well as the composition of its atmosphere, its climate, the chemistry of its oceans, and biodiversity of the planet. Our ability to provide these planetary resources to meet society's expanding demands, while preserving the global environment, is one of the greatest challenges the world faces.

NASA is committed to promoting science, technology, engineering, and mathematics (STEM) education and international cooperation, and is proud to be a co-sponsor of the GLOBE Program since its beginning in 1994. The GLOBE Student Climate Research Campaign you will embark on in the fall is an excellent example of how students, teachers, scientists, and GLOBE Partners from many countries work together to explore climate-related environmental issues locally and regionally and investigate their connections to the Earth as a global system. I applaud your dedication to GLOBE and assure you of NASA's continued commitment to working with you and sharing the unique perspectives of the Earth system from space.

I wish you a successful and productive meeting, and look forward to meeting and speaking with you on Monday, July 18.

Waleed Abdalati



UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary of Commerce
for Oceans and Atmosphere
Washington, D.C. 20230

A MESSAGE FROM NOAA ADMINISTRATOR, DR. JANE LUBCHENCO

On behalf of the National Oceanic and Atmospheric Administration (NOAA), I would like to welcome you to Washington, DC. We look forward to participating with you in the GLOBE Program's 15th Annual Partner Meeting. We are honored that Washington, DC, was selected as the host city and hope that you enjoy your time here.

NOAA is an agency that enriches life through science. Our reach goes from the surface of the sun to the depths of the ocean floor as we work to keep citizens informed of the changing environment around them. We have an education mission to advance environmental literacy and promote a diverse workforce in ocean, coastal, Great Lakes, weather, and climate sciences, encouraging stewardship and increasing informed decision-making for our Nation. GLOBE's mission to promote the teaching and learning of science, enhance environmental literacy and stewardship, and promote scientific discovery aligns nicely with the work we do.

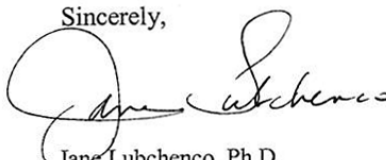
Over the past year we have worked enthusiastically to help support and grow the GLOBE Program. We value working collaboratively with our U.S. Federal agency partners and all of you in this effort. You do commendable work in implementing this unique and innovative program around the world.

Humanity is faced with significant challenges. Successful resolution undoubtedly will involve science and technology solutions. It will also require a scientifically literate global citizenry capable of understanding the complex issues at hand and of making informed decisions. NOAA is committed to contributing towards the development of an environmentally and scientifically literate public. We believe that involving students in authentic scientific research is a core component of achieving this goal and for creating a well-trained future workforce. As outlined in the NOAA Education Strategic Plan, connecting learners directly to natural resources through hands-on experiences is a key element of our educational approach. Through your work with GLOBE, you are uniquely positioned to aid in this effort. GLOBE's upcoming Student Climate Research Campaign can play a key role. Through this campaign, students will contribute to climate science studies, be empowered through increased awareness of climate-related environmental issues, and be inspired to explore and conduct science investigations of their own.

We hope that you join us in welcoming Dr. Andy Tasker to his new post as the Director of GLOBE. Andy's significant experience with the program and his talents as a leader bode well for GLOBE's future.

We at NOAA are excited for the opportunity to continue to meet and work with you over the next week. This promises to be an outstanding meeting.

Sincerely,



Jane Lubchenco, Ph.D.
Under Secretary of Commerce
for Oceans and Atmosphere

THE ADMINISTRATOR



Printed on Recycled Paper



**NATIONAL SCIENCE FOUNDATION
DIRECTORATE FOR GEOSCIENCES (GEO)
JUNE 8, 2011**



MESSAGE FROM GEO DEPUTY ASSISTANT DIRECTOR

Dr. Margaret A. Cavanaugh

On behalf of the NSF Directorate for Geosciences, it is my honor to welcome you to Washington, DC, for the 15th Global Learning and Observations to Benefit the Environment (GLOBE) Annual Partner Meeting and Professional Workshop. We are delighted to have you visit our home town!

NSF is an independent Federal agency whose mission is focused on promoting the progress of science through investments in cutting-edge research and development of the future science, technology, engineering, and mathematics (STEM) workforce. GLOBE serves as a powerful example of how NSF meets its strategic priorities of integrating scientific research and education and of building the capacity of the citizenry for addressing societal challenges through science and engineering. Our success in pursuing such endeavors depends significantly on collaboration and coordination with a globally engaged community of scientists and educators.

The *Earth System Science Projects* that NSF has supported the past five years have established important linkages between large NSF- and NASA-funded research programs and efforts to advance STEM education; we look forward to their additional contributions to the program. The goals and activities of the forthcoming *GLOBE Student Climate Research Campaign* are beautifully aligned with Foundation-wide priorities associated with the Science, Engineering and Education for Sustainability (SEES) investment area, so I anticipate there may be an even larger role for GLOBE in NSF activities in the coming years.

Best wishes to you all for a successful meeting this week. I look forward to hearing about the outcomes of your activities from my colleagues.

Margaret Cavanaugh
Deputy Assistant Director
Directorate for Geosciences

2011 GLOBE Annual Partner Meeting Program Overview

Sunday, 17 July Registration and Welcome	10:30	Registration (all day)
	17:00	Welcome Reception
	20:00	Reception End
Monday, 18 July GLOBE Program Updates 09:00 – 17:00 & Posters	09:00	Opening and welcome
	11:00	Keynote speaker: Dr. Waleed Abdalati, NASA Chief Scientist
	12:00	Lunch
	13:30	Regional Projects
	15:30	Ocean For Life Live Broadcast from Channel Islands, California
	16:00	Community Presentations (concurrent sessions)
	18:30	Poster Presentation Session I
Tuesday, 19 July GLOBE Community Input 09:00 – 17:00 & Posters	20:30	Poster Presentation Session I End
	09:00	Overview of the Events for the Day
	09:15	Community Input on the Future of The GLOBE Program
	11:00	GLOBE Technology Refresh
	12:00	Lunch and Exhibits
	13:30	Update on Student Climate Research Campaign (SCRC) (concurrent sessions)
	18:30	Poster Presentation Session II
Wednesday, 20 July Optional Activities 10:00 – 17:00	20:30	Poster Presentation Session II End
	10:00	Optional Activities: 1. Embassy and Government Visits 2. Earth: The Operators' Manual (Film Viewing) 3. Visits to Washington, D.C.
	11:30	Lunch
	14:00	Optional Activities: 1. Embassy and Government Visits 2. Earth: The Operators' Manual (Film Viewing) 3. Visits to Washington, D.C.
	15:30	Presentation on Social Media
	07:00	Depart for Goddard / Patuxent – 'Exploring the Connections among Spheres'
	15:30	Leave Goddard / Patuxent
Thursday, 21 July Field Day 07:00 – 17:00 & Banquet	18:30	Banquet with guest of honor NASA Administrator Charles F. Bolden, Jr.
	20:00	Group Photograph
	22:30	Banquet End
Friday, 22 July GLOBE Community Workshops and Next Steps 09:00 – 16:00	08:00	Update on ESSPs
	09:00	Community Workshops (concurrent sessions including ESSPs)
	11:30	Lunch
	12:30	Community Workshops (concurrent sessions including ESSPs)
	15:00	Conference Summary and Next Steps
	16:00	Close of Meeting
Saturday, 23 July	All day	Optional Tours



2011 GLOBE Annual Partner Meeting Featured Speaker Dr. Waleed Abdalati, NASA Chief Scientist

Dr. Waleed Abdalati was appointed NASA chief scientist on 3 January 2011, serving as the principal adviser to NASA Administrator Charles Bolden on NASA science programs, strategic planning and the evaluation of related investments. He is currently on leave from his position as director of the University of Colorado's Earth Science and Observation Center, which carries out research and education activities on the use of remote sensing observations to understand the Earth. Dr. Abdalati is also a fellow of the Cooperative Institute for Research in Environmental Sciences at the University. His research has focused on the use of satellites and aircraft to understand how and why Earth's ice cover is changing, and what those changes mean for life on our planet. He also has served as leader of the Ice Cloud and land Elevation Satellite-2 (ICESat-2) Science Definition Team and has led or participated in nine field and airborne campaigns in the Arctic and Antarctic.



His appointment as chief scientist marks a return to NASA, where he worked from 1996-2008. From 2004-2008, he was head of the Cryospheric Sciences Branch at NASA's Goddard Space Flight Center in Greenbelt, Maryland, where he supervised a group of scientists who carried out research in the development and analysis of remote sensing observations to study the behavior of ice sheets, sea ice, and glaciers. From 2000-2004, he managed NASA's Cryospheric Sciences Program at NASA Headquarters, managing the agency's interests and research investments in cryospheric research, and serving as program scientist on the ICESat and RADARSAT missions. From 1996-2000, Dr. Abdalati was a researcher at Goddard in the Oceans and Ice Branch, where he analyzed satellite and aircraft measurements of glaciers and ice sheets to assess their contributions to sea level rise. He also served as deputy project scientist for NASA's Ice Cloud and land Elevation Satellite (ICESat).

Dr. Abdalati received a Bachelor of Science degree from Syracuse University in 1986, a Master of Science degree from the University of Colorado in 1991, and a Ph.D. from University of Colorado in 1996. In the mid 1980s, before returning to graduate school, he worked as an engineer in the aerospace industry, designing, analyzing and testing components of various spacecraft and submarine systems.

He has published more than 50 peer-reviewed papers, book chapters and NASA-related technical reports, with approximately 1,500 citations in the peer-reviewed literature. He has given featured lectures and keynote addresses to the United Nations, AIAA, SPIE, AGU and various other professional and international organizations, as well as public lectures at The Smithsonian Institution, The American Museum of Natural History, and The Adler Planetarium. Dr. Abdalati has received various awards and recognition, most notably the NASA Exceptional Service Medal and The Presidential Early Career Award for Scientists and Engineers from the White House.

2011 GLOBE Annual Partner Meeting Agenda

Sunday, 17 July 2011: Welcome Reception and Exhibits Open

Time	Activity
10:30 – 16:00	Registration Location: Foyer (registration area)
14:00 – 17:00	Poster Set up Location: Grand Ballroom A & B
17:00 – 20:00	Welcome Reception and Exhibits Open Location: Grand Ballroom A, B, C & D

Monday, 18 July 2011: GLOBE Program Updates

Time	Activity
8:00 – 9:00	Light Breakfast Location: Foyer
9:00 – 9:15	Opening and Welcome from Organizing Committee GIAC Mr. Mark Brettenny, (Chair) Africa Mr. Rajinder Mehta, Asia / Pacific Mrs. Diana Garasic, Europe / Eurasia Lic. Andrea Ventoso, Latin American / Caribbean Mrs. Zakeya Ahmed Ali Zada, Near East / North Africa Ms. Marsha Willis, North America Conference Co-Chairs Dr. Donna Charlevoix, Director, Science and Education Division, GLOBE Program Office Dr. Teresa Kennedy, Director, International Division, GLOBE Program Office Location: Grand Ballroom C & D
9:15 – 10:30	Welcome from GLOBE Program Office Dr. Andy Tasker, Director, GLOBE Program Office Location: Grand Ballroom C & D
10:30 – 11:00	Break
11:00 – 12:00	Keynote Address Dr. Waleed Abdalati, NASA Chief Scientist Introduction by Dr. Ming-Ying Wei, Science Mission Directorate, NASA Location: Grand Ballroom C & D
12:00 – 13:30	Lunch Location: OZ Restaurant
13:30 – 15:00	Regional Projects GIAC Panel Location: Grand Ballroom C & D
15:00 – 15:30	Break



Monday, 18 July 2011 (continued)

15:30 – 16:00	Featured Regional Project: Near East / North Africa Ocean For Life Live Broadcast from the Channel Islands National Marine Sanctuary, California Introduction by Ms. Mary Glackin, Deputy Under Secretary for Operations, NOAA Location: Grand Ballroom C & D
16:00 – 17:00	Community Presentations (Concurrent sessions; choose presentations from Science, Education or Partnerships) Strand I – Science Location: Balance
16:00 – 16:15	<i>GLOBE for the Promotion of Student Science Research in Schools</i> Dr. Desh Bandhu, GLOBE Asia / Pacific Regional Office, New Delhi, India
16:15 – 16:35	<i>To Observe the Earth and Visualize the Future</i> Mr. John D. Moore, Albert Einstein Distinguished Educator Fellow at NSF, Arlington, Virginia, USA
16:40 – 17:00	<i>My Journey in Science as a GLOBE Alumnus (Thailand)</i> Ms. Watcharee Ruairuen, University of Alaska Fairbanks, Alaska, USA
	Strand II – Education Location: Lilac
16:00 – 16:15	<i>Engaging Within Time Limits: An Integrated Approach for Elementary Science</i> Mr. Vance David High and Dr. Jim Rye, West Virginia University, Morgantown, West Virginia, USA Mr. Todd Ensign, NASA IV&V Facility Educator Resource Center, Fairmont, West Virginia, USA
16:20 – 16:35	<i>Environmental Awareness and Community Participation for the Conservation of Environment</i> Ms. Sonal Gupta, Indian Environmental Society, New Delhi, India
16:40 – 17:00	<i>Using an Open Source Concept Mapping Program (IHMC Cmap Tools) to Assess GLOBE Student Knowledge and Integrative Thinking</i> Dr. Jodi J. Haney, Bowling Green State University, Bowling Green, Ohio, USA
	Strand III – Partnerships Location: Lavender
16:00 – 16:15	<i>Achievement of Scientific Research Learning through Student-Teacher-Scientist Partnerships (Thailand)</i> Dr. Rungrote Nilthong, School of Science, Mae Fah Luang University, and GLOBE Thailand, The Institute for the Promotion of Teaching Science and Technology, Ministry of Education, Thailand
16:20 – 16:35	<i>Exploring New York City Parks with EPA and GLOBE</i> Mr. Peter Schmidt, Queens College, GLOBE New York Metro, Flushing, New York, USA
16:40 – 17:00	<i>School to School Collaboration Between Norway, the Czech Republic and Croatia 2011-2013</i> Mr. Karl Torstein Hetland, Norwegian Centre for Science, Dalen, Norway

Monday, 18 July 2011 (continued)

17:00 – 18:00	Focus Group (optional) Location: Juniper Country Coordinator and U.S. Partner Administrative Page Tutorial (optional) Location: Orchid
18:30 – 20:30	Poster Presentation Session I Location: Grand Ballroom A & B Refreshments and hors d'oeuvres Location: Grand Ballroom A & B

Tuesday, 19 July 2011: GLOBE Community Input

Time	Activity
8:00 – 9:00	Light Breakfast Location: Foyer
9:00 – 9:15	Overview of Events for the Day Location: Grand Ballroom C & D
9:15 – 10:30	Community Input on the Future of the GLOBE Program Dr. Andy Tasker, Director, GLOBE Program Office Location: Grand Ballroom C & D
10:30 – 11:00	Break
11:00 – 12:00	GLOBE Technology Refresh Mr. David Overoye, Raytheon, and Mr. Ying Hong, GLOBE Program Office Location: Grand Ballroom C & D
12:00 – 13:30	Lunch and Exhibits Location: OZ Restaurant , Grand Ballroom A & B
13:30 – 14:25	Update on Student Climate Research Campaign – Session 1 (Concurrent sessions – choose one of three options) <ol style="list-style-type: none"> <i>Climate Foundations</i> Location: Balance <i>Intensive Observing Periods</i> Location: Lavender <i>Research Investigations</i> Location: Lilac



Tuesday, 19 July 2011 (continued)

14:30 – 15:30	Update on Student Climate Research Campaign – Session 2 (Concurrent sessions – choose one of three options) <ol style="list-style-type: none"> 1. <i>Climate Foundations</i> Location: Balance 2. <i>Intensive Observing Periods</i> Location: Lavender 3. <i>Research Investigations</i> Location: Lilac
15:30 – 16:00	Break
16:00 – 17:00	Update on Student Climate Research Campaign – Session 3 (Concurrent sessions – choose one of three options) <ol style="list-style-type: none"> 1. <i>Climate Foundations</i> Location: Balance 2. <i>Intensive Observing Periods</i> Location: Lavender 3. <i>Research Investigations</i> Location: Lilac
17:00 – 18:00	Focus Group (optional) Location: Juniper Country Coordinator and U.S. Partner Administrative Page Tutorial (optional) Location: Orchid
18:30 – 20:30	Poster Presentation Session II Location: Grand Ballroom A & B Refreshments and hors d'oeuvres Location: Grand Ballroom A & B

Wednesday, 20 July 2011: Optional Activities

Time	Activity
8:00 – 9:00	Light Breakfast Location: Foyer
8:00 – 9:00	Focus Group (optional) Location: Juniper Country Coordinator and U.S. Partner Administrative Page Tutorial (optional) Location: Orchid
10:00	Posters and Exhibits close

Wednesday, 20 July 2011 (continued)

10:00 – 11:30	Optional Activities (choose one from each session) <ol style="list-style-type: none"> Embassy and Government Visits Earth: The Operators' Manual (Film Viewing), Presentation and Q & A, Location: Grand Ballroom C & D Visits to Washington, D.C.
11:30 – 13:30	Lunch Location: OZ Restaurant
14:00 – 15:30	Optional Activities (choose one from each session) <ol style="list-style-type: none"> Embassy and Government Visits Earth: The Operators' Manual (Film Viewing), Presentation and Q & A, Location: Grand Ballroom C & D Visits to Washington, D.C.
15:30 – 17:00	Presentation on Social Media Ms. Ann Davison, VOX Global Location: Grand Ballroom C & D
17:00	Dinner on own

Thursday, 21 July 2011: Field Day and Annual Banquet

Time	Activity
6:00 – 7:00	Light Breakfast Location: Foyer
7:00	Depart hotel
8:30 – 15:30	Exploring the Connections among Spheres Explore four of Earth's spheres: the Atmosphere, Biosphere, Hydrosphere, and Lithosphere at Goddard Visitor Center and Patuxent Wildlife Research Center (catered lunch on site)
15:30	Depart field sites
18:30 – 22:30	GLOBE Annual Banquet with guest of honor NASA Administrator Charles F. Bolden, Jr.
20:00 – 20:15	Group Photograph Location: Grand Ballroom C & D

Friday, 22 July 2011: GLOBE Community Workshops

Time	Activity
7:00 – 8:00	Light Breakfast Location: Foyer
8:00 – 8:55	Update on ESSPs Location: Grand Ballroom C & D
9:00 – 11:30	Community Workshops (Six concurrent workshops – choose one) ESSP Projects: <ul style="list-style-type: none"> • Carbon Cycle: Using a Systems Approach to Understand Carbon, Part of the Earth's Climate System Ms. Sarah Silverberg, University of New Hampshire, Durham, New Hampshire, USA Location: Juniper • FLEXE: Ecology Unit Ms. Liz Goehring, Pennsylvania State University, University Park, Pennsylvania, USA Location: Wisdom • Seasons and Biomes Budburst Inquiry Activity Dr. Elena Bautista Sparrow and Ms. Martha Robus Kopplin, University of Alaska Fairbanks, Fairbanks, Alaska, USA Location: Lavender • Watershed Dynamics: Using GIS to Access Scientific Data and Study Water Cycle Ms. Coleen Buzby, Mr. Colin Sheaff and Dr. Kemi Jona, Northwestern University, Evanston, Illinois, USA Location: Insight
10:00 – 10:30 Break <i>Time and duration of break may be adjusted based on work-shop agenda. Continuous refreshments are available in the conference break areas.</i>	
	Evaluation and its Role in Shaping the Future of the GLOBE Program Dr. Valerie L. Williams, GLOBE Program Office, Boulder, Colorado, USA Location: Grand Ballroom Global to Local: Food and Its Environment Ms. Marsha J. Willis, University of Texas at Austin, Austin, Texas, USA Location: Lilac
11:30 – 12:30	Lunch Location: OZ Restaurant

Friday, 22 July 2011 (continued)

12:30 – 15:00	Community Workshops (Six concurrent workshops – choose one) ESSP Projects: <ul style="list-style-type: none"> • Carbon Cycle: Using a Systems Approach to Understand Carbon, Part of the Earth's Climate System Ms. Sarah Silverberg, University of New Hampshire, Durham, New Hampshire, USA Location: Juniper
13:30 – 14:00 Break	<ul style="list-style-type: none"> • FLEXE: Ecology Unit Ms. Liz Goehring, Pennsylvania State University, University Park, Pennsylvania, USA Location: Wisdom • Seasons and Biomes Budburst Inquiry Activity Dr. Elena Bautista Sparrow and Ms. Martha Robus Kopplin, University of Alaska Fairbanks, Fairbanks, Alaska, USA Location: Lavender • Watershed Dynamics: Using GIS to Access Scientific Data and Study Water Cycle Ms. Coleen Buzby, Mr. Colin Sheaff and Dr. Kemi Jona, Northwestern University, Evanston, Illinois, USA Location: Insight
<i>Time and duration of break may be adjusted based on work-shop agenda. Continuous refreshments are available in the conference break areas.</i>	West Virginia University-NASA IV&V Educator Resource Center Partnership to Build Enthusiasm/Confidence in Pre-service and In-service Teachers for Science Instruction Dr. James Andrew Rye, West Virginia University, Morgantown, West Virginia, USA Mr. Todd Ensign, NASA IV&V Educator Resource Center, Fairmont, West Virginia, USA Location: Balance Extending Elementary GLOBE into the K-4 Classroom Ms. Lynne H. Hehr, University of Arkansas, Fayetteville, Arkansas, USA, lhehr@uark.edu Dr. John Hehr, University of Arkansas, Fayetteville, Arkansas, USA, jghehr@uark.edu Dr. Anthony Murphy, St. Catherine University, Saint Paul, Minnesota, USA, apmurphy@stkate.edu Dr. Peter Schmidt, Queens College, Flushing, New York, USA, peter.schmidt@qc.cuny.edu Location: Orchid
15:00 – 16:00	Conference Summary and Next Steps Dr. Andy Tasker, Director, GLOBE Program Office Location: Grand Ballroom C & D
16:00	Close of Meeting

Post-Meeting Optional Tours

Friday, 22 July 2011, 19:00 – 22:00 Washington, D.C. After Dark Tour

Saturday, 23 July 2011, 8:00 – 16:00 Washington, D.C. in a Day Tour



Student Climate Research Campaign (SCRC)

GLOBE Student Climate Research Campaign (SCRC)

The GLOBE Student Climate Research Campaign (SCRC) aims to engage students in measuring, investigating, and understanding the climate system in their local communities and around the world. Drawing on GLOBE protocols and data, as well as other datasets, students take climate-related measurements and investigate research questions about climate.

There are three linked components to the SCRC, and teachers can use any one or all of these to enhance teaching and understanding of climate issues. The three components are: **Climate Foundations**, **Intensive Observing Periods** and **Research Investigations**. These are described over the next pages.

Climate Foundations

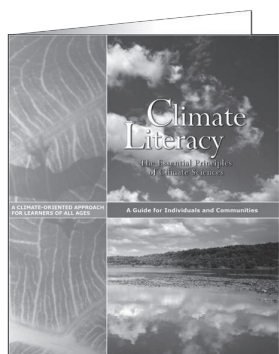
The SCRC Climate Foundational Learning Experiences introduce students to basic climate science using GLOBE protocols, together with learning activities and opportunities for teachers to participate in professional development focused on climate science. Climate Foundational Learning Experiences include:

New GLOBE SCRC Learning Activities

- From Weather to Climate – Looking at Air Temperature Data
- What is your Climate Classification?
- Exploring the Factors that Affect Seasonal Patterns
- Exploring Climate Influences
- My Climate - My Community; Exploring the links between Climate and Community

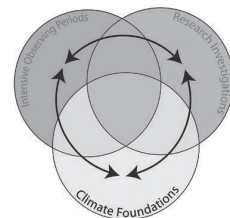
Using GLOBE to Investigate Climate

- GLOBE protocols provide collection strategies and tools for measuring key variables related to weather and climate
- GLOBE data provides a picture of local weather trends and patterns
- GLOBE Teachers Resource Guide provides content related to Earth system science and climate, the science and methodology for protocols, and appendices rich with learning activities and other resources.



Climate Connections

- Connections to Climate Literacy Principles
- Resources for educators to better Communicate Climate
- Links to Climate-focused websites
- Professional Development Opportunities



www.globe.gov/scrc



Student Climate Research Campaign (SCRC)

Intensive Observing Periods (IOPs)

The Climate and Land Cover Project (CLC)

Contribute Scientific Data for Global Climate Research

The **Climate and Land Cover Project** is a collaborative research effort between GLOBE schools and climate scientists to investigate and improve land cover classifications for climate models.

There are four opportunities to participate each year:

January – April – July – October

- Observe, classify, and record land cover data
- Interact with climate scientists
- Help refine climate models



Students in Texas help identify direction for a Land Cover photo.

The Great Global Investigation of Climate (GGIC)

Explore the Role of Precipitation and Temperature in Defining Climate



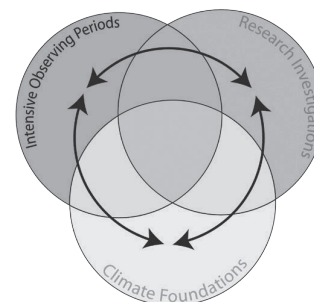
Students in Bern, Switzerland collect air temperature, precipitation and cloud data.

The **Great Global Investigation of Climate** explores the role of precipitation and temperature in defining climate and helps students answer the question “What is my climate and how has it changed?”

There are four opportunities to participate each year:

March – June – September – December

- Classify your local climate
- Interact with climate scientists
- Post your climate classification online



www.globe.gov/scrc



Student Climate Research Campaign (SCRC)

Research Investigations

Building on the Climate Literacy: *The Essential Principles of Climate Science* framework, students learn about complex interactions between the oceans, atmosphere, land, and living systems that control climate.

Schools are encouraged to develop and participate in their own climate research investigation by:

- Exploring: **“What is my climate, and how has it changed over time?”**
- Developing collaborations with local scientists and other schools worldwide
- Investigating a climate issue of local relevance and
- Identifying local, regional or national climate datasets for the scaling of their study from weather to climate

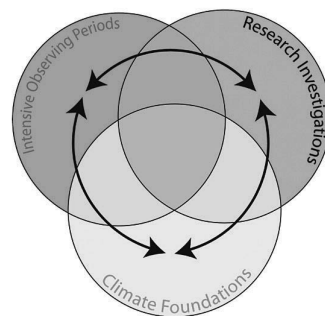


Four campaign research themes highlight connections between the processes that regulate:

- global climate systems and the behavior of local climate and weather;
- the sensitive dependence of ecosystems on climate;
- the role that climate change plays in regulating air quality and its impact on human health;
- and the carbon cycle, including human inputs.

SCRC Climate Data & Visualization Page www.globe.gov/scrc/scrc-data

- Long term Air Temperature and Precipitation Data in Google Earth
- 30-year climate data sets for 80 cities worldwide
- Interactive Koppen-Geiger Classification map
- Display of climate classifications of GLOBE Schools
- Visual display of GLOBE Climate Zones
- Interactive Latitude & Longitude coordinate locator



www.globe.gov/scrc



NOAA Climate Portal and Climate Literacy Resources

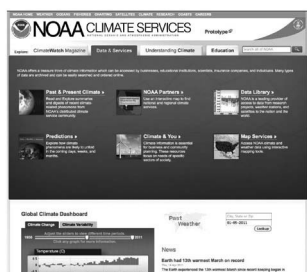
NOAA Climate Portal and Climate Literacy Resources

With the rapid rise in the development of Web technologies and climate services across NOAA, there has been an increasing need for greater collaboration regarding NOAA's online climate services. The drivers include the need to enhance NOAA's Web presence in response to customer requirements, emerging needs for improved decision-making capabilities across all sectors of society facing impacts from climate variability and change, and the importance of leveraging climate data and services to support research and public education. To address these needs, NOAA embarked upon an ambitious program to develop a NOAA Climate Portal.

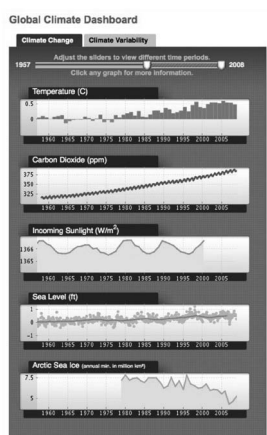
At this time, the NCS Portal prototype only scratches the surface of the many climate datasets, products, and services available across NOAA. The NCS Portal will be a central component of NOAA's commitment to enhancing the access to and extensibility of climate data and services, timely articles and information, education resources, and tools for engagement and decision-making.

The NOAA Climate Services Portal, for its initial prototype, has focused on developing the infrastructure and capacity to showcase a wide breadth of climate information to our users. The process of adding content to this infrastructure is in its early stages and has initially focused on several datasets and products from NOAA's National Climatic Data Center, Coastal Services Center, and Climate Prediction Center, among others. The initial intent is to highlight some of most popular datasets/products based on customer usage of the data.

Climate Services Portal Prototype



NCS Portal Dashboard



New ClimateWatch Magazine



Education



Understanding Climate



Climate Literacy: The Essential Principles of Climate Science

"Climate information can be used to reduce vulnerabilities or enhance the resilience of communities and ecosystems affected by climate change. Continuing to improve scientific understanding of the climate system and the quality of reports to policy and decision-makers is crucial."

"This guide is a first step for people who want to know more about the essential principles of our climate system, how to better discern scientifically credible information about climate, and how to identify problems related to understanding climate and climate change" said Tom Karl, the Chair of the Subcommittee on Global Change Research. "Having one product endorsed by the nation's top federal science agencies, as well as leading science centers and associations, makes this document an essential resource."



NOAA Climate Portal and Climate Literacy Resources

What is Climate Science Literacy?

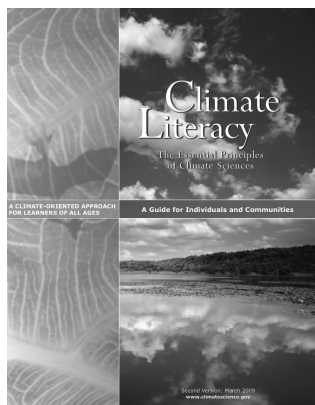
Climate Science Literacy is an understanding of your influence on climate and climate's influence on you and society. A climate-literate person

- understands the essential principles of Earth's climate system,
- knows how to assess scientifically credible information about climate,
- communicates about climate and climate change in a meaningful way, and
- is able to make informed and responsible decisions with regard to actions that may affect climate.



Why Does Climate Science Literacy Matter?

- During the 20th century, Earth's globally averaged surface temperature rose by approximately 1.08°F (0.6°C). Additional warming of more than 0.25°F (0.14°C) has been measured since 2000. Though the total increase may seem small, it likely represents an extraordinarily rapid rate of change compared to changes in the previous 10,000 years.
- Over the 21st century, climate scientists expect Earth's temperature to continue increasing, very likely more than it did during the 20th century. Two anticipated results are rising global sea level and increasing frequency and intensity of heat waves, droughts, and floods. These changes will affect almost every aspect of human society, including economic prosperity, human and environmental health, and national security.
- Scientific observations and climate model results indicate that human activities are now the primary cause of most of the ongoing increase in Earth's globally averaged surface temperature.
- Climate change will bring economic and environmental challenges as well as opportunities, and citizens who have an understanding of climate science will be better prepared to respond to both.
- Society needs citizens who understand the climate system and know how to apply that knowledge in their careers and in their engagement as active members of their communities.
- Climate change will continue to be a significant element of public discourse. Understanding the essential principles of climate science will enable all people to assess news stories and contribute to their everyday conversations as informed citizens.



Climate Science Literacy is an Ongoing Process

No single person is expected to understand every detail about all of the fundamental climate science literacy concepts. Full comprehension of these interconnected concepts will require a systems-thinking approach, meaning the ability to understand complex interconnections among all of the components of the climate system. Moreover, as climate science progresses and as efforts to educate the people about climate's influence on them and their influence on the climate system mature, public understanding will continue to grow.

Climate is an ideal interdisciplinary theme for lifelong learning about the scientific process and the ways in which humans affect and are affected by the Earth's systems. This rich topic can be approached at many levels, from comparing the daily weather with long-term records to exploring abstract representations of climate in computer models to examining how climate change impacts human and ecosystem health. Learners of all ages can use data from their own experiments, data collected by satellites and other observation systems, or records from a range of physical, chemical, biological, geographical, social, economic, and historical sources to explore the impacts of climate and potential adaptation and mitigation strategies.

The 13-page guide includes information on how people can help reduce climate change and its impacts. It also defines important terms and concepts used when talking about climate and approaches to adaptation and mitigation. For print copies of the guide, e-mail outreach@noaa.gov or call 301-713-1208.

www.climate.gov

Advertisements

Hop-on Hop-off Double Decker Bus Tours

Your hop-on hop-off tickets are valid for either 24 or 48 hours - whichever you purchase - giving you a good orientation of all the city has to offer. Each of the individual tour routes takes 60 to 90 minutes if you stay on the bus...but the hop-on hop-off facility enables you to visit any of the attractions along each route, such as the Arlington National Cemetery, the U.S. Capitol Building, the White House, the Smithsonian Museum, and the Memorials.

The tours feature entertaining and informative narration. If you're new to Washington, one option to consider is to ride an entire loop to get a good feel for what you will want to go back and visit as you hop-off and hop-on at various stops on the loop. In a full day, you can make approximately 5-6 stops to visit many, but not all, of the hundreds of available attractions.

Price: \$32.95 per person - 48 hour pass

Price: \$27.95 per person - 24 hour pass




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Program components pricing and availability subject to change. ©2011 SeaWorld Parks & Entertainment, Inc. All rights reserved.



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Exploring the Connections among Spheres

Exploring the Connections among Spheres

Join us on Thursday, 21 July, as we travel to NASA's Goddard Space Flight Center and Patuxent Wildlife Research Center to explore four of Earth's spheres: the Atmosphere, Biosphere, Hydrosphere, and Lithosphere! Components of GLOBE protocols and learning activities will be highlighted in these short explorations of Earth science. Please note: these are not workshops but rather engagement activities that you can use with your teachers and students in building excitement around hands-on scientific exploration.

We will travel by bus to Goddard and Patuxent. Since traffic in the Washington, D.C. metropolitan area can be quite a challenge to our schedule, we will depart at 7:00 am in order to have an early start. Breakfast will be available beginning at 6:00 am and lunch will be catered on-site. We will be outside for some of these explorations (weather permitting), therefore please dress appropriately.

NOAA's Science on a Sphere (located at NASA Goddard) will display a newly-developed presentation on GLOBE. The following pages provide more information on Goddard and Patuxent and a descriptions of presentations and presenters.



Atmosphere



Hydrosphere



Biosphere



Lithosphere



Exploring the Connections among Spheres



The **Goddard Space Flight Center (GSFC)** is named in recognition of Dr. Robert H. Goddard (1882–1945), the pioneer of modern rocket propulsion in the United States. GSFC is a major NASA space research laboratory, established on 1 May 1959 as NASA's first space flight center. Since it was established, Goddard Space Flight Center has remained on the cutting edge of development and technology.

Facilities at Goddard provide for the construction and development of spacecraft software, scientific instruments as well as the spacecraft themselves. GSFC conducts scientific investigation, development and operation of space systems, and development of related technologies. Goddard scientists can develop and support a mission, and Goddard engineers and technicians can design and build the spacecraft for that mission. GSFC is the largest combined organization of scientists and engineers dedicated to increasing knowledge of the Earth, the Solar System, and the Universe through observations from space in the United States. GSFC is a major U.S. laboratory for developing and operating unmanned scientific spacecraft.



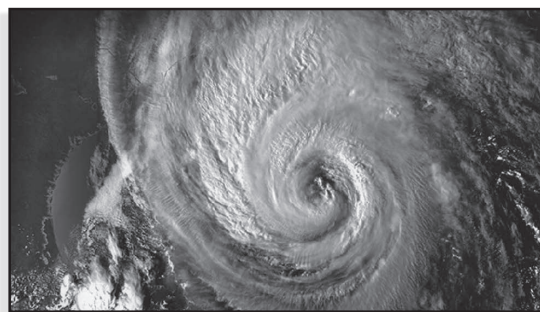
NASA Goddard Space Flight Center

GSFC also operates two spaceflight tracking and data acquisition networks (the Space Network and the Near Earth Network), develops and maintains advanced space and Earth science data information systems, and develops satellite systems for NOAA, the National Oceanic and Atmospheric Administration. Goddard has built and operated more research satellites dedicated to the study and protection of our home planet and has developed more planetary instruments than any other institution on Earth.



Science on a Sphere (SOS) displaying North and South America.

During your visit to Goddard, you will have the opportunity to see the Science on a Sphere (SOS) including a newly-developed presentation on GLOBE. The NASA Goddard Gift Shop offers post cards, publications, patches, models, space-related educational toys, games, clothing and other NASA souvenirs.



NOAA 12, a U.S. weather satellite built at Goddard, captured this image of Hurricane Isabel as it made landfall on the Outer Banks of North Carolina on 11 September 2003.

www.nasa.gov/centers/goddard

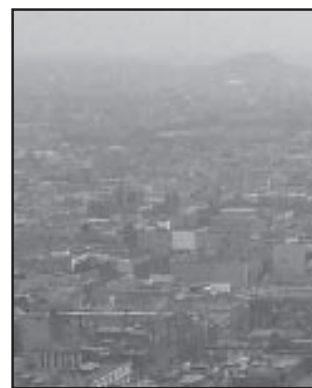


Exploring the Connections among Spheres



Who cares about the air? You and me, and anyone who breathes; GLOBE students working with atmosphere protocols; and NASA scientists who use instruments, aircraft and spacecraft to better understand our planet's thin gas layer.

During the Exploring the Connections among Spheres Day, find out about several NASA measurement approaches to learn more about the composition of the atmosphere. Learn which GLOBE protocols can be compared to and extend these measurements. Find out how soil, water and life may affect what is in the air you breathe.



A large urban area, as seen from a research aircraft. Credit: Nancy Marley. Source: <http://science.larc.nasa.gov>



Dr. Lin Chambers

An atmospheric scientist at NASA Langley Research Center in Virginia, Dr. Lin Chambers has developed authentic science experiences for students for more than 14 years. She helped develop the GLOBE contrail protocol, and she currently serves as the EPO Lead for NASA's DISCOVER-AQ (air quality) airborne campaigns. She also leads the S'COOL and MY NASA DATA projects for NASA.



Sapelo soil profile; source: www.nrcs.usda.gov

What do a brick, a carrot, lipstick, and antibiotic ointment all have in common? They wouldn't exist without soil! Learn more during the Exploring the Connections among Spheres Day. Find out just exactly what the soil does. Complete a fascinating GLOBE learning activity on how soil filters water and how that relates to the rest of the Earth. Learn the many ways this precious natural resource provides for our survival and quality of life. Explore how the soil interacts with the world's atmosphere, water, plant and animal life.



A Master Trainer with the GLOBE Program, award-winning educator Izolda Trakhtenberg has worked in environmental education for over twenty years. She helped develop the training methodology for the GLOBE Program's soil characterization protocols, and she currently works as a consultant for NASA as an environmental educator. She develops educational materials and trains teachers, students, and members of the general public in Earth science and environmental education. She is also known as the "Soil Lady."



Izolda Trakhtenberg



Exploring the Connections among Spheres

Patuxent

75 years of wildlife
conservation
research



The **Patuxent Research Refuge**, established in 1936 by executive order of President Franklin D. Roosevelt, is the nation's only National Wildlife Refuge created to support wildlife research. The Refuge has grown from the original 2,670 acres (1,080.5 hectares) to its present size of over 12,800 acres (5,179.9 hectares) and encompasses land formerly managed by the Departments of Agriculture and Defense. Throughout decades of change, Patuxent's mission of conserving and protecting the nation's wildlife and habitat through research and wildlife management techniques has remained virtually unchanged. Patuxent Research Refuge is one of over 540 refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System is the world's largest network of lands and waters dedicated to protecting wildlife and their habitat.



Patuxent Wildlife Research Center's Visitor Center

Patuxent Research Refuge supports a wide diversity of wildlife in forest, meadow and wetland habitats. The land is managed to maintain biological diversity for the protection and benefit of native and migratory species. During the fall and spring migrations, many waterfowl species stop to rest and feed. Approximately 270 species of birds have been documented on the Refuge.



Great Blue Heron (Ardea herodias)
Photo by Marshall Iliff

Increasing forest fragmentation in the area due to urban development has damaged many populations of neotropical migratory birds. The Refuge is one of the largest forested areas in the mid-Atlantic region and provides critical breeding habitat and an important nesting area for these species.

Patuxent Research Refuge consists of three areas: 1) North Tract, formerly a military training area; 2) Central Tract, where administrative offices and the study sites of many research biologists are located; and 3) South Tract, where the National Wildlife Visitor Center is located. The National Wildlife Visitor Center and North Tract are the only areas open for visitor activities such as hunting, fishing, wildlife observation, wildlife photography and educational programs.

During your visit to Patuxent, you will have the opportunity to view interactive exhibits focusing on global environmental issues, migratory bird routes, wildlife habitats, and endangered species recovery efforts as well as visit *Wildlife Images*, the bookstore operated by the Friends of Patuxent (a non-profit cooperating association) offering a variety of conservation books and other educational materials.

www.fws.gov/northeast/patuxent



Exploring the Connections among Spheres



We are mostly water. The surface area of Earth is primarily covered by water. Therefore, exploring and learning about water seems quite important.

We will overview and dive into GLOBE's multifaceted hydrology investigation during Exploring the Connections among Spheres. We will use some of the tools from this investigation to learn about a local lake. We will discuss connections to the Chesapeake Bay watershed and to other components of Earth's systems.



Redington Lake and the National Wildlife Visitor Center at Patuxent. Source: Steve Noyes/Fish and Wildlife Service Volunteer



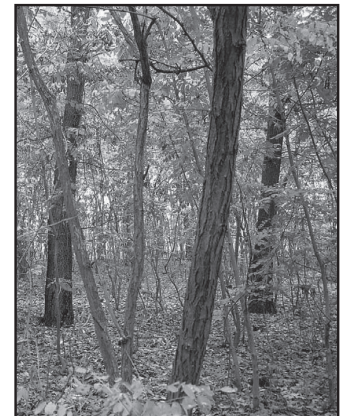
John McLaughlin (left) and Christos Michalopoulos of NOAA.

Dr. Christos Michalopoulos and Mr. John McLaughlin, of the Office of Education of the National Oceanic and Atmospheric Administration, will collaboratively lead this session. Christos has a background in marine science and John studied physical oceanography. Both have worked at the GLOBE Program Office, are experienced GLOBE master trainers and have served as editors for the GLOBE Teachers Guide.



Step into a satellite pixel during Exploring the Connections among Spheres and become a Scene Component Investigator (SCI)! Find out more about remote sensing, Land Cover/Land Use studies from space and monitoring changes in Land Cover/Use, including field validation. Learn how GLOBE Land Cover Protocols can be used to investigate and determine the landscape components that make up the footprint of the Landsat satellite and how to contribute to ground truthing of upcoming NASA global urbanization data sets.

Land Cover/Use is a fundamental surface property, influencing the cycling of matter and nutrients within and between the various Earth systems. Therefore, changes in Land Cover/Use such as urbanization can have profound effects on the water, energy and carbon cycles. New global datasets provide us with unprecedented opportunities to study these changes globally to observe humanity's impact on the Land.



Source: Karcagi Nagykun Református Gimnázium, Hungary, GLOBE School Land Cover site photo



Dr. Eric Brown de Colstoun

Dr. Eric Brown de Colstoun is a Physical Scientist and Coordinator of Earth Science Education and Public Outreach at NASA Goddard Space Flight Center. Dr. Brown de Colstoun's expertise in remote sensing is varied, having used data collected at local to continental and global spatial scales, with a variety of instrumentation, and covering the spectral, temporal, spatial, and bidirectional domains of remote sensing. Currently, his research interests include the study of various aspects of land cover, land use, and land cover/use change from the Landsat satellite, as well as the consequences of these changes on the Earth.



Exploring the Connections among Spheres

GLOBE & DISCOVER-AQ

A Focus on Air Quality

In July 2011, a team of NASA and partner organization scientists is flying in and around the Baltimore, Maryland, and Washington, D.C. area taking detailed measurements of air pollution. The mission, called **DISCOVER-AQ**, is taking a closer look at the air quality near the surface of the Earth, helping us better understand the ingredients making up the air we breathe.

GLOBE teachers and students can join the **DISCOVER-AQ** team in making air quality measurements using GLOBE protocols, as well as learning how to access related data from **DISCOVER-AQ** and the global Aeronet network. Relevant GLOBE protocols (i.e. temperature, humidity, aerosols, ozone, water vapor) relate closely to ground-based, flight and satellite measurements scientists are collecting during this campaign.

DISCOVER-AQ continues through 2014 in a variety of locations with GLOBE connections as noted in the box below.

Scheduled Flight Campaigns

2011: Baltimore-Washington, D. C.

2012: SEAC4RS, Southeast Asia

2012: DC3, Central USA

2013: Sacramento, California
& Houston, Texas

2014: Location To Be Determined



Map displaying the domain of investigation for 2011 DISCOVER-AQ campaign. Lines indicate flight tracks (wide lines indicate tracks flown repeatedly), circles and triangles denote ground stations with a variety of atmospheric measurements, including some where weather balloons and ozone sondes will be launched.

For more information, visit: <http://discover-aq.larc.nasa.gov/education.php>

Questions? Contact Amber Richards at:
amber.l.richards@nasa.gov



UMBC



"DISCOVER YOUR AQ"



Country Coordinator and U.S. Partner Administration Page Tutorial



Three sessions: Monday, 18 July, 17:00 – 18:00, Orchid Room
Tuesday, 19 July, 17:00 – 18:00, Orchid Room
Wednesday, 20 July, 8:00 – 9:00, Orchid Room

Participants will receive hands-on assistance with navigation of the GLOBE administrative pages critical in maintaining GLOBE Country Contacts, and Partner Implementation Plans for all GLOBE Countries. These pages also allow GLOBE Country Coordinators and U.S. Partners to access their Annual Surveys from prior years and to access and complete the surveys for the current year.

Assistance includes:

- How to navigate the GLOBE website, using newly developed links and tools as well as pages located on the Classic GLOBE website.
- How to post GLOBE Teacher and Trainer Workshops and register participants.
- How to manage workshop related links such as participant rosters, participant documents, partner resources, issue completion certificates, and provide post-workshop summaries.
- How to post additional Partner events in the GLOBE database such as Conference or Recruitment presentations, and mentoring opportunities for GLOBE teachers.
- How to update contact information.
- How to submit and/or update Partner Implementation Plans..
- How to use Partner Support tools such as those that facilitate managing contact lists for GLOBE teachers and GLOBE schools.

GLOBE Regional Desk Offices contacts:

Mr. Mark Brettenny (South Africa), Africa Region: africa@globe.gov

Dr. Desh Bandhu (India), Asia / Pacific Region: asia-pacific@globe.gov

Mr. Matthijs Begheyn (Netherlands), Europe / Eurasia Region: europe@globe.gov

Ms. Amalia Aubone (Argentina), Latin America / Caribbean Region: latinamerica-caribbean@globe.gov

Mrs. Siham Salman (Lebanon), Near East / North Africa Region: neareast@globe.gov

Ms. Nandini McClurg (U.S.), North American Region: northamerica@globe.gov

Advertisements

Friday, 22 July 2011

Washington D.C. After Dark Tour

The Washington D.C. After Dark Tour shows you our national monuments and federal buildings flooded in lights. From the illuminated dome of the U.S. Capitol Building to the World War II Memorial, these are exciting sights to see.

Step off the coach and visit: the Jefferson, Lincoln, Vietnam, Korean and FDR Memorials. View from the coach: The U.S. Capitol, Kennedy Center, Library of Congress, Supreme Court, House and Senate Office Buildings, Federal Triangle, Pennsylvania Avenue, The White House, Capitol Reflecting Pool, Georgetown and Marine Corps (Iwo Jima) Memorial.

Price: \$36.95 per person



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In 2012 we will proudly continue our partnership with NSTA with another professional development program to Costa Rica, featuring inquiry-based scientific research using GLOBE protocols and interaction with the Costa Rican GLOBE program.

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Saturday, 23 July 2011

Washington D.C. in a Day Tour

Take a day and see Washington D.C.! This tour brings the best of Washington right to you. You can't find a better way to see the city!

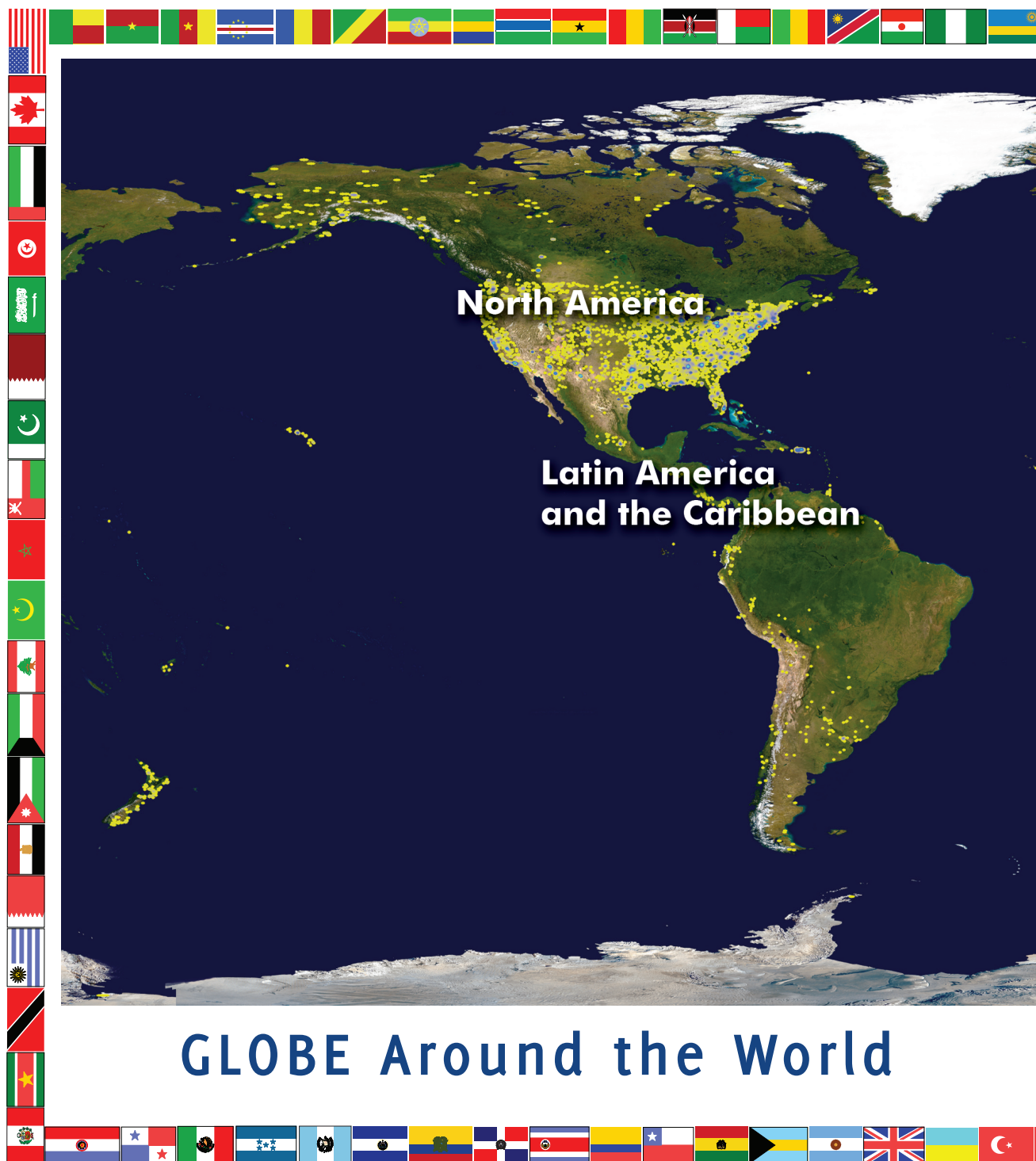
Step off the coach and visit the newly renovated Ford's Theatre. You'll also stop at the U.S. Capitol Building and the White House Visitor Center. Head to the World War II Memorial and spend time visiting the Smithsonian Museums - including the Air & Space Museum and the newly renovated American History Museum.

View from the coach: the FBI Building, Federal Triangle, Ellipse, Tidal Basin, National Archives, Washington Monument, House and Senate Office Buildings, U.S. Botanical Gardens, National Gallery of Art, U.S. Navy Memorial and Grant Memorial.

Price: \$42.95 per person

Students at the 2008 South Africa GLOBE Learning Expedition (GLE) measuring water quality.





Africa Region (22)

Benin	Gabon	Niger
Burkina Faso	Gambia	Nigeria
Cameroon	Ghana	Rwanda
Cape Verde	Guinea	Senegal
Chad	Kenya	South Africa
Republic of Congo	Madagascar	Tanzania
Ethiopia	Mali	Uganda
	Namibia	

Asia-Pacific Region (16)

Australia	Micronesia
Bangladesh	Mongolia
Fiji	Nepal
India	New Zealand
Japan	Palau
South Korea	Philippines
Maldives	Sri Lanka
Marshall Islands	Thailand

Europe-Eurasia Region (40)

Austria	Iceland
Belgium	Ireland
Bulgaria	Israel
Croatia	Italy
Cyprus	Kazakhstan
Czech Republic	Kyrgyz Republic
Denmark	Latvia
Estonia	Liechtenstein
Finland	Lithuania
France	Luxembourg
Germany	Macedonia
Greece	Malta
Hungary	Moldova
	Monaco

For information about all GLOBE Countries go to www.globe.gov/countries.



Latin America-Caribbean Region (18)

Netherlands
Norway
Poland
Portugal
Romania
Russia
Serbia
Spain
Sweden
Switzerland
Turkey
Ukraine
United Kingdom

Argentina
Bahamas
Bolivia
Chile
Colombia
Costa Rica
Dominican Republic
Ecuador
El Salvador

Guatemala
Honduras
Mexico
Panama
Paraguay
Peru
Suriname
Trinidad and Tobago
Uruguay

Near East-North Africa Region (13)

Bahrain
Egypt
Jordan
Kuwait
Lebanon
Mauritania
Morocco

Oman
Pakistan
Qatar
Saudi Arabia
Tunisia
United Arab Emirates

North America Region (2)

Canada
United States of America

GLOBE Regions

Earth: The Operators' Manual

Wednesday, 20 July 2011, 10:00-11:30 and 14:00 – 15:30
Grand Ballroom C & D

Things that are important to us, like cars and computers, come with manuals. So why not a manual for the most complex operating system of all—the Earth. Is the planet due for an oil change? What do we need to do to keep Earth operating at peak performance? These are some of the questions addressed in “Earth: The Operators’ Manual,” a one-hour special on climate change and sustainable energy.

Host Richard Alley takes viewers to locations around our planet to see the evidence for themselves. For proof of climate change, we explore massive glaciers in New Zealand whose advances and retreats during the Ice Ages are tied to changing levels of carbon dioxide.

We go to the National Ice Core Lab in Denver, Colorado, where records of past temperatures and atmospheric composition are unlocked from 400,000 year old ice.

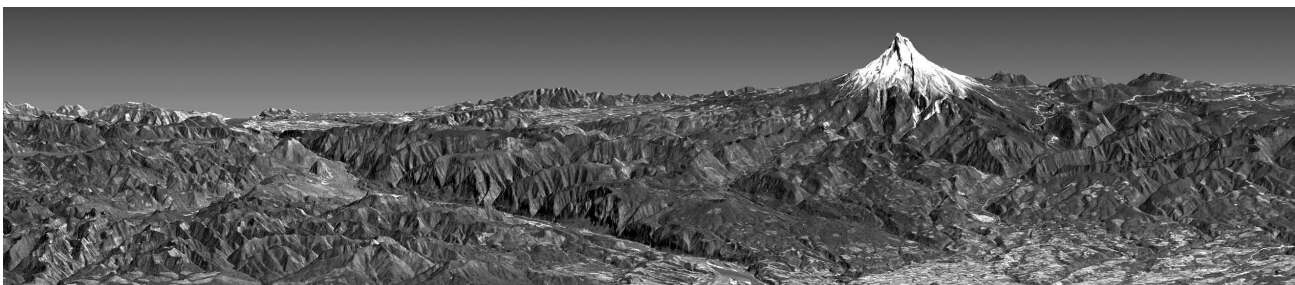
To put numbers on sustainable energy options, locations include the sunniest place in the world, the dunes near Yuma, Arizona, where solar power could offer 80 percent of Earth’s current use, and the hot springs and geysers of New Zealand, sacred to the native Maori but which now power geothermal generating stations.

Host Richard Alley once worked for an oil company, is a contributor to the UN panel on climate change (the IPCC), has testified to Congress about climate change and been a “tour guide” for Senators visiting the glaciers of Greenland.

Alley concludes the program, high on Hawaii’s Mauna Kea, with this win-win-win suggestion: “If we approach Earth as if we have an Operators’ Manual, we can avoid climate catastrophes, improve energy security, and make millions of good jobs.”

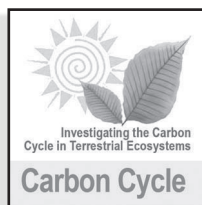
Also appearing in this film are Rear Admiral David Titley, Oceanographer of the Navy, and a contributor to the Pentagon’s Quadrennial Defense Review which in 2010, for the first time, cited climate change as a “threat multiplier”; Annise Parker, Mayor of Houston, Texas, whose city is—perhaps surprisingly—the #1 municipal purchaser of renewable energy in the United States; rancher Steve Oatman, who may be uncertain about climate change but knows America needs clean energy, and Peggy Liu, chairperson of JUCCE, the Joint U.S.-China Collaboration on Clean Energy.

This film will be shown twice on Wednesday, 20 July 2011 at 10:00 and at 14:00. Each showing will be followed by a question and answer period. Both showings will be held in Grand Ballroom C & D.





GLOBE Projects



GLOBE Carbon Cycle

educational materials enable students to investigate and learn about the carbon cycle with existing as well as new protocols, conduct laboratory based plant-a-plant experiments, learn about carbon in the Earth system through a suite of classroom activities, and manipulate and analyze interactive carbon cycle models.

<http://globecarboncycle.unh.edu/>



From Local to Extreme Environments (FLEXE)

includes learning resources designed to help students gain an understanding of extreme environments, the interconnected Earth system, and the process of science. Curriculum materials include an Energy unit that examines energy transfer between components of the Earth system and an Ecology unit that introduces ecological concepts and guides students in developing their own research questions.

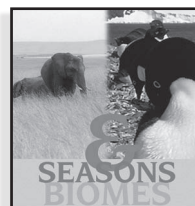
<http://www.flexe.psu.edu/main/home.cfm>



The GLOBE Watershed Dynamics

project includes materials designed to teach students about water availability and the impacts of human activity on watersheds using Fieldscope, a free online GIS (Geographic Information Systems) analysis and visualization tool. The Watershed Dynamics Water Availability module enables students to investigate the water cycle and the Human Impact module investigates the relationship between land cover surface type and stream flow.

<http://wd.northwestern.edu/>



The GLOBE Seasons and Biomes Project

involves students in collecting critically needed science measurements to validate satellite data. Seasons and Biomes includes a suite of new learning activities and new scientific protocols focusing on ice seasonality of lakes and rivers, investigation of ground freezing with frost tubes, and research on mosquito emergence.

<http://globe.gov/science/topics/seasons-biomes#Overview>



The **GLOBE at Night** program is an international citizen-science campaign to raise public awareness of the impact of light pollution. Citizens around the world are encouraged to measure local levels of night sky brightness and contribute observations online to a world map. For campaign dates and more information, please visit www.globeatnight.org.



CloudSat is a satellite that seeks to improve understanding of Earth's climate by providing new insights into the distribution of clouds over the globe. GLOBE schools participating in the CloudSat Education Network (CEN) record cloud observations at the same time that CloudSat is passing overhead. These observations are used by scientists to verify the satellite's observations.

<http://cloudsat.atmos.colostate.edu/education>

GLOBE Regional Projects



AFRICA

Mt. Kilimanjaro Research Expedition occurs each September to study changes occurring on the mountain! The expedition website received over 18,700 Web visits during the 9-day trek in 2010 from 917 cities representing 95 Countries. Over 700 questions were emailed to Base Camp with over 100 answered from the mountain!

ASIA-PACIFIC

Watershed Project is an important environmental initiative in the region since human activities can potentially harm existing watersheds, which in turn affects the availability of water for all. GLOBE students are developing extensive projects to better understand water dynamics and issues related to watershed management working together with scientists across the region.



EUROPE-EURASIA

Interactive Meteosat project is creating a collaborative website with the European Space Agency combining satellite data and GLOBE measurements into one interface in preparation for the European Climate Research Campaign and Youth Summit in June 2012.

Students participate at the GLOBE Games in the Czech Republic.

LATIN AMERICA-CARIBBEAN

Students connect to North America region to study migratory birds as ***Bioindicators of Climate***. Assisted by GLOBE Alumni, research spans from the subarctic polar zone of Alaska to the tropical zones of South America, allowing students to learn how migration patterns correlate to temperature and food availability, and to explore the diversity of cultures between countries in both regions.



NORTH AMERICA

SCUBAnauts International (SNI) organizes local Chapters facilitating students to participate in year-round research projects collecting and analyzing hydrologic and atmospheric data from their local marine environments. Highlights include extensive research expeditions such as Operation Deep Climb in Hawaii, virtual student conferences linking to the Asia-Pacific region, and studying extreme climate-related events and their effects on marine ecosystems such as coral bleaching.



Featured Regional Project

Near-East / North Africa

Live video link to the Ocean for Life Field Study to Channel Islands National Marine Sanctuary. Special thanks to Qatar Foundation International, Cisco Systems and the Marine Exchange of Southern California for making this live presentation possible.

National Marine Sanctuaries
National Oceanic and Atmospheric Administration



EDUCATION AND OUTREACH



Photo: Lindsey McCullough, National Geographic Photo Camp

Ocean for Life students study marine science and learn how the ocean connects us all.



Photo: Nicolas Lemoine, France, Ocean for Life 2009

Students document their experience using still and video cameras to create youth media projects to share with their communities.



Photo: Mel Meyer, National Geographic Photo Camp

Hands-on marine science allows students an opportunity to work together and build lasting friendships.

Ocean for Life: One World, One Ocean



Hands-on Learning

The Ocean for Life Program brings together students of diverse cultures and backgrounds to discover marine science, conservation, and how the ocean connects us all. NOAA's national marine sanctuaries provide the optimal setting for this unique opportunity to enhance cross-cultural relationships, while creating a stewardship ethic for the ocean and the universal human experience.

Ocean for Life provides high-quality, immersive ocean field studies and follow-on education programs to facilitate cross-cultural learning, appreciation and lasting experiences between multi-national students.

The Ocean for Life program is designed around three main themes: a sense of place, interconnectedness, and ocean conservation and stewardship. These themes are highlighted through activities focusing on ocean science and exploration, cultural exchanges, and youth media projects.

Ocean for Life 2011

The two-week immersive field study will be held in Santa Barbara, California and on Santa Cruz Island hosted by Channel Islands National Marine Sanctuary from July 14-26, 2011. Ocean science activities will focus on kelp forest ecosystems, marine life of the Santa Barbara Channel, rocky intertidal monitoring, watersheds, water quality monitoring, climate change, ocean acidification and much more.

Students will split into two groups during the field study to document their experiences – through video or still photography – mentored by staff from the National Geographic Media Camp and graduate students from American University's Center for Environmental Filmmaking in Washington, DC.

To Learn More

For more information and to learn how you can support Ocean for Life, contact Claire Fackler at claire.fackler@noaa.gov, (805) 963-3238 ext. 18.

<http://sanctuaries.noaa.gov/education/ofl>

Connect with GLOBE!



The screenshot shows the GLOBE Program website interface. At the top, there's a navigation bar with links: Home, About GLOBE, Explore Science, What's New?, and Classic GLOBE. The main content area features a world map titled 'THE GLOBE SCIENCE NETWORK' with regions labeled: North America, Latin America/Caribbean, Europe/Eurasia, Near East/North Africa, Africa, and Asia/Pacific. To the right, there are sections for 'Annual Partner Meeting' (17 July - 22 July 2011), 'GLOBE STARS' (showing a photo of students), and 'RECENT TWEETS' (a tweet about a Spotlight Day event). The footer includes logos for UCAR, COMMUNITY PROGRAMS, TYLER, NASA, and NSE, along with social media icons for RSS, Facebook, Twitter, YouTube, and a link to the Privacy Policy.

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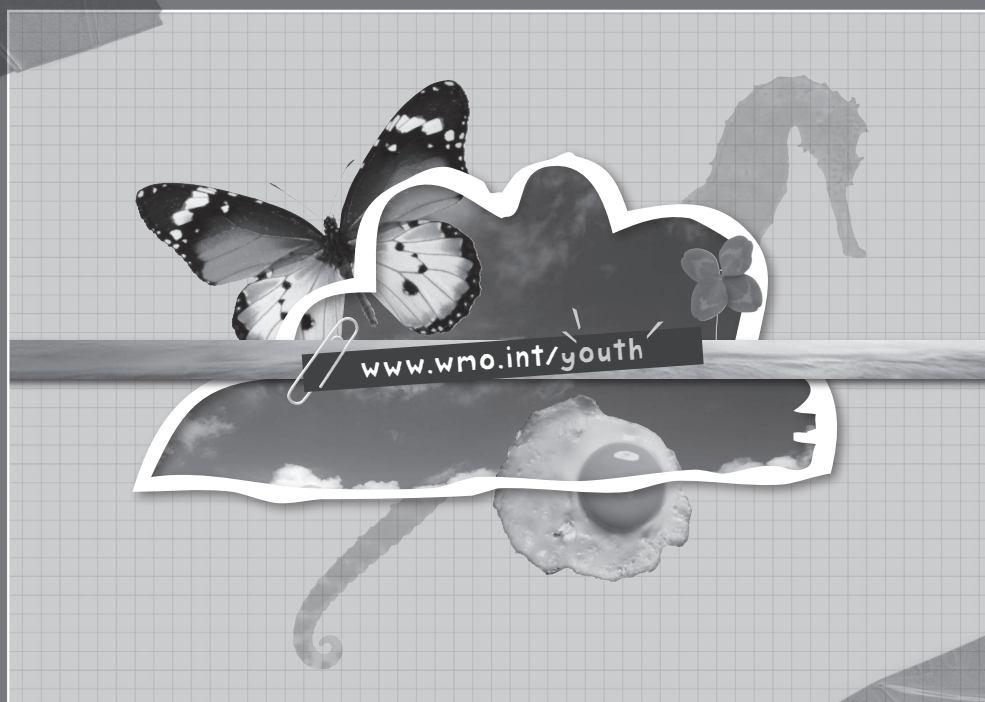
Twitter



YouTube

4th and 5th grade students from Superior Elementary, Superior, Colorado, USA, use their cloud charts to identify cloud types.





New Youth Corner online

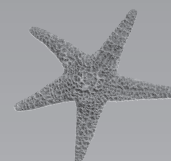
stories • videos • games • experiments



**We encourage readers to use the
new Youth Corner online,
especially when preparing for
World Meteorological Day – Climate for You
23 March 2011**

**We welcome your comments, suggestions and
materials for the site.**

Contact cpa@wmo.int



Poster Sessions

Session 1: Monday, 18 July 2011, 18:30 – 20:30

Location: Grand Ballroom A & B

1.1 The GLOBE Program in Saudi Arabia

Dr. Hadi Ali Bahari, GLOBE Country Coordinator, Ministry of Education, Riyadh, Kingdom of Saudi Arabia, hb445566@gmail.com

The Kingdom of Saudi Arabia became the 99th GLOBE Country on 30 September 2002. Over the past nine years, schools in Saudi Arabia have made impressive accomplishments through their GLOBE research, and Minister of Education His Highness Prince Faisal bin Abdullah bin Mohammed Al Saud and Their Excellencies the Vice-Minister Mr. Faisal bin Abdulrahman bin Muammar, Mrs. Norah Al-Fayez, and Dr. Khalid Al-Sabti, are working together to support teachers by providing high quality professional development activities ensuring GLOBE implementation continues in both the boys' and girls' sections of the Kingdom's educational system. Six schools initiated the program, however that number has grown to 115 participating schools today. The Hamzah Bin Abdulmtalib school in Jeddah, Saudi Arabia, is among three schools around the world that have submitted between 50,000 to 55,000 measurements to the GLOBE database. 625 Honor Roll certificates have been awarded to GLOBE schools in Saudi Arabia. GLOBE Saudi Arabia has two international master trainers (Mr. Rafat Jambi and Mr. Hani Felemban), three trainers (Mrs. Norah Al Nasser, Mrs. Amal Alhargan and Mrs. Basma Alrashed) and one assistant master trainer (Mohammed Alghanum). The main goals of GLOBE Saudi Arabia are implementing the program in more schools, increasing environmental awareness and supporting student environmental research.

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1.2 Trinidad and Tobago Experiences a Second Life

Mr. Hollis Carlyle Sankar, Ministry of Education, Mc Bean, Couva, Trinidad and Tobago, hcsankar@gmail.com

Ms. Farishazad Nagi, Ministry of Education, Mc Bean, Couva, Trinidad and Tobago

In February 2011, the Ministry of Education appointed two new coordinators to administer the GLOBE Program following the retirement of former Country Coordinator Mr. Henry Saunders. This presentation will provide the country's new strategy for GLOBE and the successes achieved in 2011.

GLOBE en Trinidad y Tobago

En febrero de 2011, el Ministerio de Educación nombró a dos nuevos coordinadores para administrar el Programa GLOBE, después de la jubilación del Sr. Henry Saunders, el coordinador anterior del país. Esta presentación proporcionará la nueva estrategia del país para GLOBE y los logros alcanzados en 2011.

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1.3 Defining the Characteristics of Authentic Student/Teacher/Scientist Climate-Related Research

Dr. David R. Brooks, Institute for Earth Science Research and Education, Eagleville, Pennsylvania, U.S., brooksdrr@InstESRE.org

In November 2010, a workshop sponsored by NSF and NOAA was convened to define what it means for students and their teachers to engage in authentic climate science research in collaboration with scientists. A goal of the workshop was to distinguish between "research" and other kinds of learning activities. A "scientific interest" test was proposed: "If students and their teachers conduct an activity in an appropriate way, when they get done will any scientist care whether they did the activity or not?" Many student inquiry-based "learning about" activities are educationally beneficial



but do not satisfy this test. Several specific research projects suitable for student/teacher/scientist collaboration were proposed at the workshop. A template for defining such projects was developed and implementation guidelines for both scientists and educators were provided. Educators and their institutions need to re-think their commitments to authentic student science, and scientists must re-think their approach to “educational outreach” programs in order to develop an infrastructure that will support student participation in one of the major science challenges of the 21st century.

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1.4 Watershed Dynamics: Using GIS to Access Scientific Data and Study the Water Cycle

Ms. Colleen Buzby, Northwestern University, Evanston, Illinois, U.S., c-buzby@northwestern.edu

Mr. Colin Sheaff, Northwestern University, colin-sheaff@northwestern.edu

Dr. Kemi Jona, Northwestern University, kjona@northwestern.edu

The Watershed Dynamics project has developed GIS (Geographic Information System) tools and curriculum to provide middle and high school students with data and analysis tools to perform investigations on their watershed. Using National Geographic’s FieldScope GIS, students investigate precipitation, stream flow, and land cover data to answer real-world questions. Curriculum developers at Northwestern University and the GLOBE Program have created two complete units that scaffold students on their way to independent research using GIS. In Water Availability, students study precipitation, evaporation, and surface runoff to investigate the water cycle and how it varies around the world and over time. In Human Impacts, students analyze land cover change and stream flow to analyze how humans are impacting their watershed. While these units can be used together or individually, both progressively provide more research independence, leading them to ask their own questions about the watershed using GIS data. Students learn transferable geospatial analysis skills using FieldScope, which provides the functionality of desktop software but is simpler to access. Stop by to look at available curriculum materials and hear about how you can use these resources in your trainings.

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1.5 Relationship Between Climate and Phenology of Native Trees in the National Agrarian University La Molina, Lima, Peru

Ms. Claudia Cecilia Caro, Universidad Nacional Agraria La Molina, Lima, Peru, ccaro@lamolina.edu.pe

Mr. Aldo Alessi, Mr. Gustavo de la Cruz, Mr. Jonathan Paredes, and Mr. Fidel Castillo, Universidad Nacional Agraria La Molina, Lima, Peru

Considering the importance of the knowledge about the phenology process in the conservation of native Peruvian trees, it is important to establish connections between this process and the meteorological elements that could influence the pattern of change in these trees. To establish this connection, meteorology students following GLOBE instructions, built a weather shelter with inexpensive materials in order to take measurements of meteorological variables like temperature, precipitation, relative humidity, pressure, and wind speed. These measurements are used to establish a correlation between meteorological variables and the phenological process in three species of native Peruvian trees.

An important secondary objective of this project is to test a tool that is inexpensive but meets all GLOBE requirements, and can be used to monitor the climate in regions of our country where the people cannot afford an expensive weather shelter to monitor the climate. This simple innovation could help in the future to improve the application of the GLOBE Program in Peru, especially in places where the economy is a main obstacle against certain research.

Relación entre el clima y el proceso de la fenología de árboles nativos en el Agrario Nacional Molina en Perú

Teniendo en cuenta la importancia del conocimiento con respecto al proceso de la fenología en la conservación de los árboles nativos del Perú, es importante para establecer las conexiones entre este proceso y los elementos meteorológicos que pudieran influir en el patrón de cambio en estos árboles. Para establecer esta conexión, estudiantes de meteorología siguiendo las instrucciones de GLOBE, construyeron una caseta meteorológica con materiales de bajo costo con el fin

de realizar mediciones de variables meteorológicas tales como temperatura, precipitación, humedad relativa, presión y velocidad del viento. Estas mediciones se utilizan para establecer una correlación entre las variables meteorológicas y el proceso fenológico en tres especies de árboles nativos del Perú.

Un objetivo secundario importante de este proyecto es poner a prueba una herramienta que es barata, antes bien cumple todos los requisitos de GLOBE, y puede ser usada para monitorear el clima en las regiones de nuestro país donde la gente no puede permitirse una caseta meteorológica costosa para controlar el clima. Esta simple innovación podría ayudar, en el futuro, a mejorar la aplicación del Programa GLOBE en el Perú, especialmente en lugares donde la economía es el principal obstáculo contra ciertas investigaciones.

1.6 GLOBE Argentina

Mrs. Maria Marta G. de Daneri, Universidad de Ciencias Empresariales y Sociales, Buenos Aires, Argentina,
gmartinez@uces.edu.ar

This poster reflects activities that have been undertaken to further establish implementation of the GLOBE program within the Argentina. An important accomplishment is Teacher Training Workshops that were held covering protocols in support of the GLOBE Student Climate Change Campaign.. Also highlighted are the responses by GLOBE students to share the results of their investigation of events such as the Water Marathon and the International Book Fair. GLOBE Argentina worked to disseminate student activities through Public Television Educational Programs devoted to environmental activities and to promote participation in competitions such as a photo contest on the Protection of Nature Day and a literary contest on Earth Day. Focus was also placed on strongly encouraging the participation of schools throughout the country in GLOBE at Night observations. Finally, a GLOBE Argentina website was created to forge an additional link to the GLOBE community (<http://www.globeargentina.com.ar>).

El póster refleja las actividades realizadas. Talleres de Formación Docente sobre los protocolos para incentivar la Campaña de Cambio Climático del Programa GLOBE.. Se resalta la respuesta de los alumnos GLOBE a las distintas convocatorias con la finalidad de compartir los resultados de sus investigaciones en eventos como la Maratón del Agua y la Feria Internacional del Libro. Se difundieron las actividades a través de programas educativos dedicados a la temática ambiental de la televisión pública. Se promovió la participación en concursos, uno fotográfico para el día de Protección de la Naturaleza y otro literario para el Día de la Tierra. Destacamos la participación de colegios de todo el país en las observaciones de GLOBE at Night. Como nexo entre la comunidad GLOBE se creó el sitio web GLOBE Argentina (<http://www.globeargentina.com.ar>).

1.7 GLOBE Alumni International Organization: Bridging the Gap between Science Education and Real World Applications

Mr. Matt S. Fenzel, GLOBE Alumni North America, Louisville, Kentucky, U.S., mattfenzel@gmail.com

Contributions to this presentation were made by representatives of the International GLOBE Alumni Organization: Tomáš Tunkl, Czech GLOBE Alumni, tunklt@gmail.com; Juan Diego Calvo-Perez Rodo, GLOBE Latin America and Caribbean Alumni, juandiego_cpr92@hotmail.com; Marcelin Fogue Tamsu, Cameroon GLOBE Alumni, tamsufogue@yahoo.fr; Madhuranga Rathnayake, Sri Lanka GLOBE Alumni, mail.pvgm@gmail.com; Ylliass Lawani, Benin GLOBE Alumni, ylliass@gmail.com; Mohamad Elwan, Egypt GLOBE Alumni, 3olwan@gmail.com; Wajeeha Hussain, Bahrain GLOBE Alumni, wajahahussain@gmail.com; Laura Altin, GLOBE Europe Alumni Europe, laura662@gmail.com; and Watcharee Ruairuen, GLOBE Asia-Pacific Alumni, ruairuen@gmail.com

As the GLOBE Community continues to grow through the use of relevant inquiry-based science education projects at local, regional, and increasingly international levels, the GLOBE Alumni International Organization serves as an integral bridge between GLOBE students and the community. Alumni have developed many international collaborative projects that incorporate key components of the GLOBE Program's current climate research initiatives, while also applying real world science learning.

With support from the Seasons & Biomes ESSP, GLOBE Alumni developed a web-based GLOBE School (GS) Pals Project, through which they implemented modern technologies on a simple web platform to bring students, scientists, and alumni together on activities, events, and research projects. One collaborative highlight is the Migratory Bird Study between the San Ignacio de Ricaldo School in Lima, Peru, and the Innoko River School in Shageluk, Alaska, U.S. Alumni have also provided support for international GLOBE events such as GLOBE at Night, the Land Cover Campaign, and World Water Day. Local Alumni have supported the GLOBE Games in the Czech Republic and will support the upcoming GLOBE Games in Estonia. Additionally, the GLOBE Alumni coordinate and communicate internationally to support student projects and school-to-school collaborations.

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1.8 Publication Plan: Practices and Outcomes of GLOBE Japan--Educational Challenges for Environmental Era of 21st Century

Dr. Shuji Yamashita, Tokyo Gakugei University, Tokyo, Japan, yamkkfrog88@yahoo.co.jp

Dr. Tomoyasu Yoshitomi, Tokyo Gakugei University, Tokyo, Japan, t-ystm@u-gakugei.ac.jp

GLOBE Japan is planning to publish “Practices and Outcomes of GLOBE activities in Japan” in Japanese. The proposed content includes a history of the GLOBE Program in Japan, a brief explanation of applied theories and scientific methods, and reports of practical activities performed by students. The publication will provide descriptions of GLOBE school activities and their effect on future curriculum. In addition, it will address challenges of program implementation and how they are addressed through annual meetings and student conferences. GLOBE activities in Japan have shown increases in awareness of the relationship between students and their environment. Approximately 200 schools in Japan have been taking part in GLOBE as a model school which has been supported financially for two years by the Japanese Government, the Japanese Ministry of Education, Culture, Sport, Science and Technology (MEXT).

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1.9 GLOBE in an Urban School

Mr. Steven L. Frantz, Roswell Kent Middle School, Akron, Ohio, U.S., sfrantz@akron.k12.oh.us

This poster highlights the 5th year of the GLOBE Program in Akron, Ohio. After initial funding setbacks this year, a collaborative effort by energized parents, students, and teachers has resulted in a new hope and a renewed implementation of the GLOBE Program within the school. With much excitement, GLOBE Program students soared to new heights never before seen at our school. This session represents a journey through our 2010-2011 school year, witnessing student activities, ideas for sustainability, and the celebrations of student success.

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1.10 Measuring What Matters: Assessing GLOBE Students’ Knowledge, Skills, and Abilities in a 400 Level Undergraduate Environmental Studies Course at Bowling Green State University

Dr. Jodi J. Haney, Bowling Green State University, Bowling Green, Ohio, U.S., jhaney@bgsu.edu

Students know teachers measure what matters. At Bowling Green State University, in ENVS 4150: Investigating Earth Systems via GLOBE, students are assessed authentically using Type I, II, and III assessment strategies. Type I assessments require students to demonstrate knowledge orally or through writing. As such, our students construct concept maps and take on-line quizzes to evaluate their understanding of course readings and discussions. Type II assessments require students to demonstrate skills and abilities through performances. Our students provide evidence of both their scientific skills and pedagogical skills through GLOBE skills practical exams and co-teaching sessions of GLOBE measurements and learning activities. Type III assessments require students to create or produce. Our students develop and present a GLOBE Action Plan, highlighting how they will gain administrative and community support, develop a program budget, and implement GLOBE in their future classroom or informal learning environment. Our students also complete an Earth

as a System Investigation with both descriptive and statistical data analysis evaluating their ability to conduct scientific research using GLOBE data. During this poster presentation, we will present and discuss Type I, II, and III authentic assessment strategies, showcase student work samples, and share scoring rubrics for all types of assessment.

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1.11 Relaunching GLOBE in Suriname through the Student Climate Research Campaign

Ms. Charissa Jones, GLOBE Suriname Assistant Country Coordinator and Antioch University New England, Paramaribo, Suriname, cjones7@antioch.edu

Ms. Monique Susan Pool, GLOBE Suriname Country Coordinator and Managing Director of the Green Heritage Fund Suriname, info@greenfund.sr.org

Mr. Gregoir Berenos, GLOBE Government Point of Contact, Paramaribo, Suriname, grecoberenos@yahoo.com

The GLOBE Program in Suriname is going through a period of revitalization. While Suriname has been a member country since 1997, its new coordinating organization, Green Heritage Fund Suriname (GHFS), is looking to expand the GLOBE Program from the success of its non-formal Citizen Science Dolphin Programme in 2010 into seven schools around Suriname through the upcoming Student Climate Research Campaign (SCRC) launching in September 2011. Through the SCRC, GLOBE Suriname will address the climate change issues that communities presently face and will face in the future by implementing the GLOBE protocols in a manner that will meet the individual needs of the schools and their surrounding communities. GHFS is also looking at implementing and including the location of its Xenarthra Rehabilitation Centre on the Suriname River near a well-known eco & cultural resort into the SCRC. At this location, GHFS will manage a research project which was established to measure the storage of carbon in the soil and trees as an educational and tourist attraction. This will enable GLOBE Suriname participants another way to learn and understand the importance of their forests.

Relanzamiento del Programa GLOBE en Suriname con La Campaña de Investigación Estudiantil sobre el Clima (SCRC)

El Programa GLOBE en Surinam está pasando por un período de revitalización. En tanto que Surinam es un país miembro desde 1997, su nueva organización de coordinación, Green Heritage Fund Suriname (GHFS), está tratando de ampliar el Programa GLOBE luego del éxito de su programa informal en el año 2010 de Delfines Ciudadanos de Ciencia en siete escuelas de todo Surinam a través de la próxima Campaña de Investigación Estudiantil sobre el Clima (SCRC) cuyo lanzamiento será en septiembre del 2011. A través de la SCRC, en GLOBE Surinam se abordarán los temas del cambio climático que actualmente presentan las comunidades y se enfrentarán en el futuro mediante la implementación de los protocolos GLOBE de tal manera que satisfaga las necesidades individuales de las escuelas y de sus comunidades vecinas. GHFS también está considerando implementar e incluir la ubicación de su Centro de Rehabilitación Xenarthra en el río Surinam, cercano a un famoso centro turístico ecológico y cultural dentro de la SCRC (Campaña de Investigación Estudiantil sobre el Clima). En este lugar, la GHFS gestionará un proyecto de investigación que se estableció para medir el almacenamiento de carbono en el suelo y árboles como un atractivo educativo y turístico. Esto facilitará a los participantes de GLOBE Surinam aprender y comprender la importancia de sus bosques de otra manera.

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1.12 Developing Hand-held Applications to Support GLOBE Research

Dr. Mitchell Klett, Northern Michigan University, Marquette, Michigan, U.S., mklett@nmu.edu

Dr. Michael Odell, University of Texas at Tyler, Tyler, Texas, U.S., [modell@uttyler.edu](mailto:model@uttyler.edu)

This presentation addresses Web 2.0 hand-held and smart touch technologies that enhance learning and allow students to collect, enter and visualize their data in the field. Innovations in data collection and Web 2.0 applications that have shown promise will be discussed. This poster session seeks input from the GLOBE community on prioritizing development of hand-held and Web 2.0 applications that could be developed in the next year.

1.13 The GLOBE Program in Cameroon

Mr. Lawrence Kambiwoa, Country Coordinator, GLOBE Cameroon, Yaoundé, Cameroon, lawrencekambiwoa@hotmail.com

Former secondary school students attending universities in Cameroon have created GLOBE Alumni Clubs in their various institutions. GLOBE Trainers prepared teachers on themes related to weather, climate, seasons, and our interactions in the community, highlighted protocols related to soil characterization in preparation for Geography examinations, as well as worked with teachers to conduct field assessments and display artwork promoting the protection of the environment. In addition, Cameroon was highlighted in GLOBE Stars, participated with the CloudSat Education Network, and reviewed Foundational Learning Activities for the Student Climate Research Campaign.

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1.14 SCUBAonauts International: Connecting GLOBE Students with the Oceans

Dr. Elizabeth Moses, SCUBAonauts International, Silver Spring, Maryland, U.S., emoses@scubanautsintl.org

SCUBAonauts International (SNI) organizes year-round student research projects collecting hydrologic and atmospheric data from their local freshwater and marine environments and extensive research expeditions including Caribbean reef studies and Operation Deep Climb in Hawaii. Through virtual conferences and in partnership with GLOBE and NOAA on the Ocean for Life program, SNI is fostering environmental and cultural connections between students from the North America, Asia-Pacific, and Near East regions. SNI plans to participate in the GLOBE Student Climate Research Campaign focusing on extreme climate-related events and their effects on marine ecosystems such as coral bleaching.

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1.15 CloudSat Education Network

Mr. Peter C. Falcon, Jet Propulsion Laboratory, Pasadena, California, U.S., pcfalcon@jpl.nasa.gov

Ms. Deanna TeBockhorst, Colorado State University, Fort Collins, Colorado, U.S., deanna@atmos.colostate.edu

Dr. Todd Ellis, SUNY College at Oneonta, Oneonta, New York, U.S., ellistd@oneonta.edu

Dr. Matt Rogers, Colorado State University, Fort Collins, Colorado, U.S., rogers@cira.colostate.edu

CloudSat is an experimental NASA satellite that uses a unique radar to study clouds and precipitation from space. As part of our EP/O efforts we have established the CloudSat Education Network (CEN), which consist of approximately 100 schools and other educational organizations from 12 countries (Canada, Thailand, India, New Zealand, Germany, Australia, Estonia, Croatia, United States, Switzerland, Cameroon, Dominican Republic). Students communicate with scientists, conduct research with satellite data, learn about other cultures and make genuine scientific contributions to the mission.

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1.16 Near East-North Africa (NENA) Collaborations including the OCEAN FOR LIFE Regional Project

Mrs. Zakeya Ahmed Ali Zada, NENA GIAC Representative, Manama, Bahrain, zakeya@moc.gov.bh, zakeya20@gmail.com

Mrs. Sawsan Abu Fakhreddine, GLOBE Lebanon Country Coordinator and Regional Office Director, Jdeideh, Lebanon, sawsan@afdc.org.lb

Ms. Siham Salman, GLOBE Near East-North Africa Regional Office, Jdeideh, Lebanon, siham@afdc.org.lb

GLOBE activities in the NENA region expand throughout 13 countries. This presentation will highlight student accomplishments, including Ocean for Life (OFL) project activities. The 2009 OFL event teamed a total of sixty (60) students representing the United States, Canada and the Near East-North Africa Region (thirty of these students represented the countries of Armenia, Bahrain, Egypt, Jordan, Lebanon, Morocco, Pakistan, and Saudi Arabia), to engage in a unique educational and cultural experience focusing on marine biology, oceanography, and the foundations of GLOBE student research. Students were divided between two marine sanctuaries located in Florida and California, and also spent time together in

Washington D.C. The 2011 OFL activities bring together thirty (30) students, including twelve students from the United States representing American Samoa and the states of Arizona, California, Florida, Hawaii, Illinois, Michigan, Rhode Island and Washington, with eighteen students from the Greater Middle East representing Bahrain, Egypt, Kuwait, Lebanon, Morocco, Pakistan, Qatar and Saudi Arabia. Highlights of Ocean for Life will be shared during this presentation.

Students from Nibung Practising School in Bamenda, Cameroon, display their artwork.



Students at the Royal College in Colombo, Sri Lanka collecting data on soil characteristics.





Session 2: Tuesday, 19 July 2011, 18:30 – 20:30

Location: Grand Ballroom A & B

2.1 GLOBE ITEST: From Learning to Research

Dr. Michael R Odell, University of Texas at Tyler, Tyler, Texas, U.S., model@uttyler.edu

Dr. Teresa Kennedy, GLOBE Program Office, International Division, UCAR-GLOBE Satellite Office, Tyler, Texas, U.S., tkennedy@globe.gov

Dr. Donna Charlevoix, GLOBE Program Office, Science and Education Division, UCAR, Boulder, Colorado, U.S., charlevo@globe.gov

The GLOBE Program Office at the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado, in collaboration with the University of Colorado, New York University, the University of Texas at Tyler and the Texas Regional Collaboratives are implementing an innovative NSF-funded ITEST Strategies project to design and evaluate an Earth System Science (ESS) learning experience for teachers and students. The primary goals of the project are (1) to provide teachers with the knowledge, skills, strategies, and confidence to engage secondary students in authentic ESS research on local, regional, and global scales, (2) to expose teachers and students to careers in the Earth sciences, and (3) to allow students to experience ESS research by interacting with scientists from around the world. Hybrid (onsite and virtual) professional development activities combined with online collaboration tools will support teacher and student learning about climate science as well as climate research investigations by diverse learners. In addition to core climate and environmental science knowledge, students and teachers will develop systems thinking, problem-solving, data analysis and cross-cultural communication and collaboration skills.

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2.2 Impact Study of the 2011 Tōhoku Earthquake and Tsunami on the Coastline of Panama

Ms. Adilia Edith Olmedo de Pérez, Ministry of Education, Panama City, Panama, adilia.deperez@meduca.gob.pa

The purpose of this investigation was analyzing and verifying whether the 2011 tsunami affected the coastline of Panama. The most destructive tsunamis are generated by earthquakes whose epicenter or fault lines are located in the sea floor, or very close to it. This phenomenon occurs in areas of the Earth where continental tectonic plaques forming the Earth's crust subduct. The methodology used in this study was based on information about the 2011 tsunami event, and the causes and possible impact on Panama, specifically on the areas located in the La Chorrera province. This project analyzed the events that occurred on 11 March 2011. Results from the investigation showed that the high tide weakened the waves, due to the amount of water present, at the narrow entrance into the Panama Bay, and the S-shape of the Panama isthmus that prevents waves less than 20 feet of height from entering. The shape of the sea bed along the Panamanian Pacific coastline served as a breakwater, reducing wave action. In addition, the distance between Japan and Panama reduced the volume of water and the strength of the waves, and was the main factor explaining why the 2011 tsunami did not impact Panama.

Investigación sobre el Impacto del Terremoto y Tsunami de Tohoku de 2011 sobre la costa de Panamá

El propósito de esta investigación era analizar y comprobar si el tsunami de 2011 afectó a Panamá. Los tsunamis más destructivos son los generados por terremotos cuyo epicentro o línea de falla está en el fondo marino o cerca de él. Esto se produce en las regiones de la tierra en la que se da una subducción de la placas tectónicas continentales que conforman la corteza terrestre. La metodología realizada se basó en recolección de la información de los sucesos en Japón, causas y las posibilidades de afectación a Panamá específicamente las áreas ubicadas en la provincia de La Chorrera. Es un trabajo analítico de los hechos ocurridos el 11 de marzo de 2011. Los resultados de la investigación demostraron que la pleamar debilitó las ondas por cantidad de agua presente en su recorrido y la entrada en la bahía de Panamá. La forma que tiene nuestro istmo de una "S" acostada hace difícil la entrada de fuertes olas por la cual tiene que alcanzar 20 pies. La conformación del lecho marino del pacifico panameño funcionaron como rompeolas, la distancia de Japón a Panamá fue el factor principal que el tsunami no llegó, la cual disminuyó el volumen del agua y la fuerza de las olas perdieran su fuerza, entre aspectos.

2.3 GLOBE in Costa Rica: 2011

Mr. Roberto Quirós, Omar Dengo Foundation, San José, Costa Rica, roberto.quirós@fod.ac.cr

GLOBE Costa Rica began in 1998 as a program directed by the Ministry of Public Education (MEP). In 2002, the Omar Dengo Foundation (ODF) became the international partner charged with coordinating the GLOBE Program in Costa Rica. Since then, GLOBE has been implemented in several public high schools in the form of science clubs, which are integrated within the National Program of Educational Informatics (MEP-ODF). In 2010, a professional development workshop for GLOBE teachers was held, and at the end of the year, results of the student field research projects were shared at a symposium-like event held at the ODF installations. GLOBE teacher training was held at the beginning of 2011. Today, GLOBE Costa Rica is reaching students between the ages of 12 and 17 who join these science clubs. The objective is to give public high school students the opportunity to develop their scientific thinking through research projects that relate scientific inquiry with problems in their communities, giving special emphasis to water use. Emphasis is given to the scientific design, execution, and interpretation of field research projects. In Costa Rica, the main goal for the near future is to strengthen students' ability to conduct research.

GLOBE en Costa Rica

GLOBE en Costa Rica se inició en 1998 como un programa dirigido por el Ministerio de Educación Pública (MEP). En 2002, la Fundación Omar Dengo (FOD) se convirtió en el socio internacional encargado de coordinar el Programa GLOBE en Costa Rica. Desde entonces, GLOBE ha sido implementado en varias escuelas secundarias públicas como clubes de ciencia, que se integran dentro del Programa Nacional de Informática Educativa (MEP-FOD). En 2010, se llevó a cabo un taller de desarrollo profesional para maestros GLOBE, y al final del año, los resultados de los proyectos de investigación de los estudiantes de campo fueron compartidos en un evento tipo simposio celebrado en las instalaciones de la FOD. A principios de 2011 se llevó a cabo una capacitación docente de GLOBE. Hoy en día, GLOBE Costa Rica está llegando a estudiantes entre de 12 y 17 años de edad que se unen a estos clubes de ciencia. El objetivo es dar a estudiantes de escuelas públicas la oportunidad de desarrollar su pensamiento científico a través de proyectos de investigación que relacionan la investigación científica con problemas en sus comunidades, con énfasis especial en el uso del agua. Se hace hincapié en el diseño científico, la ejecución y la interpretación de los proyectos de investigación de campo. En Costa Rica, el principal objetivo para el futuro inmediato es fortalecer la capacidad de los estudiantes para llevar a cabo la investigación.

2.4 Sixteen Years of GLOBE in Santo Domingo, Dominican Republic

Maria Lorena Rodriguez de Ruiz-Alma, Notre Dame School, Santo Domingo, Dominican Republic, mruiz@notredame.edu.do

Pictures of the main activities where our GLOBE teachers and students participated will be presented.

Dieciséis años del Programa GLOBE en Santo Domingo, La República Dominicana

Fotos de las actividades principales donde participaron nuestros profesores y estudiantes serán presentados.

2.5 GLOBE Peru

Mr. Carlos Rojas, Ministry of the Environment, San Isidro, Lima, Peru, crojas@minam.gob.pe

Ms. Claudia Cecilia Caro, Universidad Nacional Agraria La Molina, Lima, Peru, ccaro@lamolina.edu.pe

GLOBE Peru has improved its activities in the last year through focused implementation, and the development of climate and biodiversity research of the Eco-efficiency education program, a national program managed by the Ministry of Environment. GLOBE has demonstrated the power to motivate the new generation of scientists by testing the value of their protocols and strategies to improve scientific and environmental education in Peru. Peru's main highlights of the year

include inclusion of the GLOBE Program in the national environmental education guide to promote eco-efficiency in the schools; implementation of a bi-national project between Peru and Alaska to watch migratory birds with the support of GLOBE Alumni; and participation in GLOBE campaigns such as GLOBE at Night and the Land Cover and Climate. All of these GLOBE activities contribute to improving the GLOBE Program in Peru, and we expect to continue with these actions in order to increase the GLOBE community in Peru.

GLOBE en el Perú

GLOBE en el Perú ha mejorado su actividad en el último año a través de la aplicación concreta y el desarrollo de la investigación del clima y la biodiversidad del programa de educación Eco-eficiencia, un programa nacional administrado por el Ministerio de Medio Ambiente. GLOBE ha demostrado el poder de motivar a la nueva generación de científicos al comprobar el valor de sus protocolos y estrategias para mejorar la educación científica y ambiental en el Perú. Los principales puntos sobresalientes del Perú del año abarcan la inclusión del Programa GLOBE en la guía nacional de educación ambiental que promueve la eco-eficiencia en las escuelas, la implementación de un proyecto binacional entre Perú y Alaska para observar las aves migratorias con el apoyo de ex alumnos (GLOBE Alumni) y la participación en campañas de GLOBE como GLOBE de Noche y de Cobertura Terrestre y Clima. Todas estas actividades GLOBE contribuyen a mejorar el Programa GLOBE en el Perú, y esperamos continuar con estas acciones a fin de aumentar la comunidad de GLOBE en el Perú.

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2.6 GLOBE Bahrain Achievements 2010-2011

Mrs. Wafa Mubarrak Bin Daynna, The GLOBE Program, Ministry of Education, Muharaq, Kingdom of Bahrain, wafa.1962@hotmail.com

Seema Hussain Al Ammry, Al Hidd Intermediate Secondary Girls School Coordinator, Bahrain

The GLOBE team in Bahrain, supported by the Ministry of Education, organized many GLOBE activities throughout the year. The ministry works diligently to achieve the desired goals of the program, resulting in a great deal of science education activities occurring outside the classroom. GLOBE intermediate and secondary schools in Bahrain participated in a bird migration study at a natural mangrove habitat. A phenomenal Girls Science Camp was also held at the Ministry of Education Scout Camp at Al Jazer Beach from 3-4 February 2011. This unique location, covered in wild plant species, is a benefit of the camp. The beach is a perfect educational atmosphere for students to take part in the activities and gain valuable experiences. Skilled experts carried out wonderful workshops implementing science and technology. The Annual Scientist Fair included a number of workshops by specialists and engineers in the field to explain the importance of GLOBE students working together in groups. "GLOBE Green School," the 7th Annual Scientist Fair of 2010-2011, took place on 27 June 2011 at Shaikh Khalifa Institute for Technology.

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2.7 Research on Sinkholes in Adams County Ohio Using GLOBE GPS and Modified Site Description Protocols

Ms. Donna Shepherd, Adams County/Ohio Valley School District, West Union, Ohio, U.S., donna.shepherd@ovsd.us

After rescuing a goat from a newly opened sinkhole in a pasture, questions were raised about the abundance and distribution of sinkholes in Adams County, a karst region of Ohio. Three GLOBE teachers, Donna Shepherd, Jessica Wilkinson and Mary Young, along with Ohio Geologic Survey geologist, Douglas Aden, worked with 115 students in the 6th, 11th and 12th grades to research sinkholes in the area. A grant from the Ohio Appalachian Center for Higher Education (OACHE) provided grant funds to enable the students to travel to various locations within the county to conduct their research. The GLOBE GPS protocol was used to locate the sinkholes and a modified GLOBE site description was made for each location. The high school students also learned to use the Environmental Systems Research Institutes (ESRI) ArcGIS program to make maps of the sinkhole locations. The data will be submitted to the Ohio Department of Natural Resources GIMS program to add to the data on sinkhole locations in Adams County.

2.8 GLOBE Carbon Cycle: Using a Systems Approach to Understand Carbon and the Earth's Climate System

Ms. Sarah Silverberg, University of New Hampshire, Durham, New Hampshire, U.S., sarah.silverberg@unh.edu

Science Content Standards identify systems as a unifying concept across the K-12 curriculum. While this standard exists, there is a recognized gap in the ability of students to use a systems thinking approach in their learning. In a similar vein, both popular media as well as some educational curricula move quickly through climate topics to carbon footprint analyses without ever addressing the nature of carbon or the carbon cycle.

By participating in GLOBE Carbon Cycle, a joint project between NASA-funded carbon cycle scientists and GLOBE, students learn to use a systems thinking approach, while gaining a foundation in the carbon cycle and its relation to climate and energy. Come learn about the diverse set of activities geared toward upper middle and high school students. The global carbon cycle adventure story and game shows the carbon cycle as a complete system, and introduces systems concepts including reservoirs, fluxes, and equilibrium. Classroom photosynthesis experiments and field measurements of schoolyard vegetation brings the global view to the local level. And the use of computer models at varying levels of complexity not only reinforces systems concepts and carbon content but also introduces students to an important scientific tool necessary for understanding climate change.

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2.9 Monitoring Seasons through Global Learning Communities (MSTGLC)

Dr. Elena Bautista Sparrow, International Arctic Research Center, University of Alaska Fairbanks, Alaska, U.S., ebsparrow@alaska.edu

Additional presenters:

Ms. Martha Robus Kopplin, Seasons and Biomes Project Coordinator, International Arctic Research Center, University of Alaska Fairbanks, mrkopplin@alaska.edu

Dr. Rebecca Boger, Seasons and Biomes Co-PI, Brooklyn College, beckyboger@gmail.com

Dr. Leslie Gordon, Seasons and Biomes Co-PI, Gordon Consulting Services, leslie@oregoncoast.com

Dr. Elissa Levine, Seasons and Biomes Co-PI, elissa2@comcast.net

Dr. Kim Morris, Seasons and Biomes Co-PI, University of Alaska Fairbanks, kim.morris@gi.alaska.edu

Dr. Dave Verbyla, Seasons and Biomes Co-PI, University of Alaska Fairbanks, dverbyla@alaska.edu

Dr. Sheila Yule, former educational designer, GLOBE Program Office, syule@globe.gov

MSTGLC, also known as Seasons and Biomes, is an inquiry- and project- based initiative that monitors seasons, specifically their variability within the year. Its goals include increasing primary and secondary students' understanding of the Earth system and of climate change, engaging these students in research as a way of learning science, contributing to climate change studies, and participating in the 4th International Polar Year. We have conducted international professional development workshops in the USA, Germany, South Africa, Thailand, Australia, Tanzania, Nigeria, Estonia, and Madagascar. In the USA, we offer workshops as university courses for continuing education or graduate credits. In addition to the current GLOBE protocols, we have developed measurement protocols such as Ice Seasonality (Freeze Up and Break Up), Frost Tube (depth of soil freezing), and three different Mosquito protocols (based on global regions). New learning activities include Seasonal Leaf Change Inquiry, Setting up an Ice Seasonality Observation Site, How to Make a Climograph and Getting to Know Your Terrestrial Biomes. In addition to reaching students through teachers we have trained, we have reached hundreds of students through video conferences, virtual field expeditions such as the 2009 and 2010 Mt. Kilimanjaro scientific and educational expeditions, and collaborations with the GLOBE Alumni.

2.10 GLOBE in Southside Virginia Schools: Hands-On Activities with Geographic Information System (GIS) and Global Positioning System (GPS)

Dr. Shobha Sriharan, Virginia State University, Petersburg, Virginia, U.S., sriharan@vsu.edu

This poster presentation describes extensive GLOBE trainings provided to science teachers from middle and high schools in Southside Virginia (Petersburg and Colonial Heights cities; Dinwiddie, Prince George, and Matoaca counties). These activities, sponsored by a USDA grant, utilized Geographic Information Systems (GIS) to train the teachers in using ArcGIS in combination with Global Positioning System (GPS) and Google Earth. The teachers learned about GIS and also how to use GPS devices, collected weather and land cover data, analyzed their data, incorporated GPS data into ArcGIS, and mapped the study sites located on the Virginia State University (VSU) campus and the Randolph Farm. The teachers also worked with Dr. Lin Chambers, NASA Langley scientist and GLOBE U.S. Partner in Virginia, a GIS Data Analyst at Virginia Department of Transportation, and faculty members involved in teaching GIS at VSU.

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2.11 Woods Hole Oceanographic Institution GLOBE Partnership: Students, Teachers and Scientists Investigating Coastal Waters in the Northeastern U.S.A.

Ms. Kama K. Thiel, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, U.S., kthieler@whoi.edu

Dr. James A. Yoder, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, U.S. jyoder@whoi.edu

The Woods Hole Oceanographic Institution (WHOI) GLOBE Partnership was established in 2009 to engage students and teachers in the Northeastern United States in a study of the ecology and the quality of coastal waters. The Partnership goals include enhancing students' environmental awareness and contributing to the scientific understanding of the coastal environment. Students in grades 5-12 at public, private, and vocational/technical schools in Massachusetts, Rhode Island, and New York participate in field-based, hands-on research using GLOBE protocols to investigate the hydrologic and atmospheric properties of estuaries and embayments in their communities. WHOI scientists present their research at GLOBE Teacher Training workshops and to visiting students on topics including nutrient loading and eutrophication of coastal waters, estuarine physical processes, and ocean acidification. Regional partners include other Woods Hole-based research institutions, water quality monitoring organizations, and field-based education programs.

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2.12 The GLOBE Program in Hungary

Ms. Piroska Tóth, GLOBE Hungary, Budapest, Hungary, toth.piroska23@freemail.hu

Tibor Kalapos, István Kóbor, Tamás Weidinger, Krisztina Andrási, Ágnes Fogl, Ferenc Kecskés, Katalin Kóczyán, Mária Kocsisné Gregus, Anita Kovács, Nóra Nagyné Dóka, Erzsébet Szekeres, Tibor Tóth, Antalné Vargyai

Hungary joined the GLOBE Program in 1999 with 25 schools. Currently, over 30 schools are registered in the program, 23 of which report data regularly. At present, 1.2 million data have been uploaded to the GLOBE database from schools in Hungary. The GLOBE program is supported by the Ministry of National Resources in Hungary. In addition to conducting the standard measurements, annual meetings with short training courses are held on a yearly basis and one day each year is appointed for synchronized measurements on which each school conducts identical observations and measurements. Calls for student reports on GLOBE-related topics are released regularly and each GLOBE school engages in a number of satellite activities such as exploring natural values in their region, identification of environmental problems, tree planting, garbage collection, among others. Scientific experts assist schools in the fields of meteorology, hydrology and land cover/biology. In addition, a one-semester special course on the GLOBE Program is held for potential environmental science teachers at the Lorand Eötvös University in Budapest. Altogether, the GLOBE program has been successfully integrated in environmental education in participating high schools. The Program greatly contributes to the development of an environmentally-conscious way of thinking and living.

2.13 Projects and activities of GLOBE Uruguay

Ms. Andrea Ventoso, MVOTMA, Dirección Nacional de Medio Ambiente, Montevideo, Uruguay, andrea.ventoso@dinama.gub.uy

In May 2010, the National Directorate for the Environment organized a workshop about “Earth System Science and Land Cover” with the participation of teachers from public and private primary schools. For the first time in the country, this GLOBE event also had the participation of biology teachers from secondary schools and the Technical University. The workshop included an introductory presentation about “Our mountains and their biodiversity”, which was very effective for the subsequent training in green up, green down and land cover protocols. This event took place in conjunction with World Environment Day and International Forest Year celebrations on 5 June. Some of the projects developed by GLOBE teachers in connection with these activities include the project by students and alumni of School no. 85 in Montevideo using hydrology protocols in the Miguelete creek, activities by students of School no. 309 in Montevideo using atmosphere protocols, and the creation of a new fauna protocol by a biology teacher from the Liceo Secundario del Norte school.

Proyectos y Actividades Destacadas del Programa GLOBE en Uruguay

La Dirección Nacional de Medio Ambiente organizó en Mayo de 2010 en Montevideo, Uruguay, un taller sobre “Ciencias del Sistema Tierra y Cobertura Terrestre,” donde participaron maestros de enseñanza primaria pública y privada, pero esta vez se incorporaron al Programa por primera vez en nuestro país, docentes de biología de secundaria y de la escuela técnica (UTU). El taller estuvo acompañado por una charla introductoria alusiva a “Nuestros montes y su biodiversidad,” lo que resultó sumamente efectivo dada la pertinencia para la enseñanza posterior de los protocolos de green up, green down, cobertura terrestre, y otros. Este evento tuvo lugar en el marco de las celebraciones del 5 de Junio, Día Mundial del Medio Ambiente y del Año Internacional de los Bosques. Presentamos algunos de los proyectos que vienen desarrollando los maestros GLOBE en el marco de las actividades en la escuela incluyen el Proyecto de alumnos y ex-alumnos de la Escuela No. 85 de Montevideo, sobre los protocolos de Hidrología en el Arroyo Miguelete, actividades de alumnos de la Escuela No. 309 de Montevideo sobre los protocolos de Atmósfera, y la creación de un nuevo protocolo de fauna por parte de docente de biología del Liceo Secundario del Norte.

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2.14 Mt. Kilimanjaro GLOBE & GIS Project with Morehead STEM Academy, Charlotte, NC

Dr. Alisa B. Wickliff, Center for STEM Education, University of North Carolina (UNC), Charlotte, North Carolina, U.S., abwickli@unc.edu

Ms. Sarah Smith, Center for STEM Education, UNC Charlotte, sarsmith@unc.edu

Ms. Kimberly Garrett, Center for STEM Education, UNC Charlotte, liamandzuzu@hotmail.com

Since 2005, the Center for STEM Education at UNC Charlotte partners with a local urban middle school in Charlotte, North Carolina, to develop a research project studying Earth systems and using GIS which is presented at the National GIS Day event, the 3rd Wednesday in November. Morehead STEM Academy 6th grade students worked on understanding climate change through the use of the temperature tower on their school campus and by participating in the GLOBE virtual field work on Mt. Kilimanjaro, September 2010. The students evaluated temperature at different heights above surface level and with different ground covers, including asphalt, grass, trees, bare soil, and concrete. The students studied the various ecological zones for Mt. Kilimanjaro and recorded vegetation, temperature, elevation, and rainfall. The students' controlling inquiry was “How does temperature affect vegetation on Mt. Kilimanjaro?” They hypothesized that as elevation increases and temperature decreases, the range of vegetation decreases as well. Based on the work of GLOBE scientists, the students concluded that the data collected supported their hypothesis. The students are curious to know whether over time there will be permanent changes in the range of each ecological zone and corresponding vegetation due to sustained changes in temperature.

2.15 Partnerships between GLOBE Schools and Regional Scientists in Japan

Dr. Tomoyasu Yoshitomi, Tokyo Gakugei University, Tokyo, Japan, t-ystm@u-gakugei.ac.jp

Dr. Shuji Yamashita, Tokyo Gakugei University, Tokyo, Japan, yamkkfrog88@yahoo.co.jp

This poster presentation describes recent GLOBE school activities and regional scientist support in Japan. We investigated data entry logs and reports by 19 GLOBE schools selected by MEXT (Japanese Ministry of Education, Culture, Sport, Science and Technology) from April 2009 to March 2011. We found that amongst the diverse observation items, hydrology measurements were particularly popular. There were many hydrology items, including water temperature, water transparency, pH, DO, and EC. Because water environments such as rivers and coastal areas are close to many schools, and a popular field of study, they are featured in many subjects. Many teachers are required to create their own GLOBE activities in their environments. In order to support their activities, the regional partnerships for GLOBE activities are important. The results from questionnaires given at the schools indicated that 78 percent of GLOBE teachers received scientific assistance from other teachers at their schools. There was interaction between 68 percent of schools and outside researchers and specialists from various regional institutes, universities, NPOs, and museums. The involvement of outside researchers included not only field observation and measurement support but also lectures and advice regarding environmental issues and environmental learning instruction.

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2.16 GLOBE Africa Mt. Kilimanjaro Regional Project Engages the World!

Mr. Mark Brettenny, GLOBE Africa Regional Office Mossel Bay, South Africa, mark@globe-africa.org

GLOBE regional coordinators, teachers, and affiliated research scientists collaborate to study changes on the mountain through various GLOBE protocols including cloud cover, relative humidity, air, soil and water temperature, and pH. Constant updates about the status of research expeditions engage students from around the world. Results from the 2009 and 2010 expeditions will be presented.

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2.17 Calisph'Air, an Educational Project to Study the Role of Aerosols in Air Quality and Climate

Mrs. Danielle de Staerke, CNES, Toulouse, France, danielle.destaerke@cnes.fr

Ms. Annie Carrasset, GLOBE teacher, Lycée de la Mer, Gujan Mestras, France, carrasset@9online.fr

GLOBE France was started as a pilot project about seven years ago, when CNES signed a memorandum of understanding with NASA. Within this framework we are developing Calisph'air, an educational project investigating the atmosphere (air quality and climate) in conjunction with the PARASOL, CALIPSO satellite missions. The main objective is helping students explore and understand their local, regional and global environment through scientific investigation as well as increasing their understanding of aerosols and clouds, which are the principal factors of uncertainty in our understanding of the global warming process. For the Calisph'Air project a teacher conference is organized every year at the beginning of the school year to assess the work that has been completed, plan the coming year and welcome new teachers. We conduct at least one measurement campaign per year, during which students use sun photometers to measure aerosol optical thickness and compare their results with others. A student conference is organized at the end of the school year where students present their GLOBE research to other schools and to scientists.

Community Presentation Sessions

Monday, 18 July 2011, 16:00 – 17:00

Strand I – Science

GLOBE for the Promotion of Student Science Research in Schools

Dr. Desh Bandhu, GLOBE Asia / Pacific Regional Office, New Delhi, India, iesindia@gmail.com

The GLOBE Program is implemented in 16 Countries of the Asian Pacific Region and is coordinated by the Country Coordinator in each country. The GLOBE protocols on Atmosphere, Land Cover, Soil, Phenology, and Hydrology has helped students to develop research projects. The presentations include the activities undertaken by the different country exchange programs of the region and the research projects developed by the students. Some of the presentations on different environmental issues are climate change, biodiversity conservation, solid water management, water harvesting, setting of Eco clubs, and wetland clubs in schools and to encourage community awareness and action. The Biodiversity and Ecology learning expeditions have generated interest among the students, and have helped to develop strong inquiry based research programs in Asian schools. The region is planning to implement a GLOBE youth award based on the contribution of students on Hydrology protocols.

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To Observe the Earth and Visualize the Future

Mr. John D. Moore, Albert Einstein Distinguished Educator Fellow at NSF, Arlington, Virginia, U.S., mr.moore.john@gmail.com

As we face future natural and human-generated hazards and disasters, the Geosciences have a critical role in the public awareness, safety, and national security of our nation. In the past months, we have experienced volcanoes, earthquakes, tsunamis, hurricanes, tornadoes, and severe flooding; yet it is becoming increasingly more difficult to find opportunities in K-12 education for students to engage in relevant related studies. What implications will this have on the 21st Century workforce? Teachers are using satellite and remote sensing technologies to incorporate imagery, data and real time observations in the classroom. Geographic Information Systems (GIS) content is being taught as a technical skill, and is used to develop “geospatial thinking” in problem solving. Today, pre-college students and teachers are collaborating with the commercial aerospace industry and NASA to build “CubeSats,” ready for spaceflight to better promote STEM and Career and Technical Education. The “BLUECUBE Project” introduces students to authentic science experiences where they Build, Launch, Utilize and Educate using BalloonSats and CubeSats. Using the “Space to Earth: Earth to Space” model, students are engaged in observing the Earth and visualizing their future through the study of Earth as a System.

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My Journey in Science as a GLOBE Alumnus

Ms. Watcharee Ruairuen, University of Alaska Fairbanks, Fairbanks, Alaska, U.S., ruairuen@gmail.com

My involvement in the GLOBE program started in 2003. From 2006 to 2010 I became a member of the International GLOBE Alumni Organization, and represented the Asia and Pacific Region. I have assisted in GLOBE teacher training, protocol development in mosquito and coral reef research investigations, and mentored teachers in engaging their students in science investigations. With my GLOBE experience and Seasons and Biomes training background, I have worked with high school teachers and students as well as university students in conducting environmental research relevant to their locale. I taught university students GLOBE measurement protocols for soil, atmosphere and land cover investigations. University student projects included “Diversity of Mosquito Larvae in Residence Zones” at Suratthani Rajabhat University, and “Growth of Boletus griseipurpureus,” a mushroom delicacy in Thailand. Learning the scientific method from GLOBE explorations, asking questions, standardized methods, interpretation of data, and communication of



findings, has opened my eyes to the world of science. GLOBE has helped me relate science as a relevant aspect of my daily life, and I have attempted to instill this appreciation for science in the students that I have taught at the secondary and university levels.

Strand II – Education

Engaging Within Time Limits: An Integrated Approach for Elementary Science

Mr. Vance David High, West Virginia University, Morgantown, West Virginia, U.S., vancehigh@gmail.com

Dr. Jim Rye, West Virginia University, Morgantown, West Virginia, U.S., jim.rye@mail.wvu.edu

Mr. Todd Ensign, NASA IV&V Facility Educator Resource Center, Fairmont, West Virginia, U.S., todd.ensign@ivv.nasa.gov

Recent emphasis on reading and mathematics in the elementary curriculum has reduced the time available for children to learn and engage in inquiry-based science. The purpose of this study was to investigate pre-service teachers' perceptions about an elementary inquiry-based science curriculum and ascertain salient features that would persuade them to increase science instruction in their future teaching. Sixty pre-service teachers enrolled in an elementary science methods course and engaged in activities from the children's science curriculum. Subsequently, pre-service teachers completed a reflective assignment on this curriculum and a subset was interviewed. Results from the study indicated that 78 percent of pre-service teachers identified "fun" as a salient feature; other key reasons for using the curriculum included adaptability (65%), reading (57%), and integration (55%). However, only a small percentage (8%) mentioned inquiry as a critical component. Three themes emerged from triangulation: 'fun' as a motivator for teaching elementary science; integration of reading stories with science curriculum; and pre-service teacher expression of a previous dislike for science. The study results offer compelling evidence for exposing pre-service teachers to an interdisciplinary science curriculum as an initial part of their science methods course work.

Environmental Awareness and Community Participation for the Conservation of Environment

Ms. Sonal Gupta, Indian Environmental Society, New Delhi, India, sonalgupta.ies@gmail.com

Awareness is the key to spreading any kind of knowledge among groups of people. To drive a country like India, it is difficult to disseminate awareness related to environment. A clean and healthy environment is a fundamental necessity of any human being. Therefore, the Government of India implemented a campaign through the Ministry of Environment and Forests, called the "National Environment Awareness Campaign" to spread knowledge related to the preservation of a healthy environment for future generations. The campaign was launched in 1986 and is based on the ideology of environmental education, and how it can sensitize the public toward the utmost necessity for a clean and healthy environment. This program involves the active participation of the Non-Governmental Organization, key stakeholders in the campaign that spread environmental awareness to both rural and urban target areas. Each year the Ministry of Environment and Forests chooses a theme related to persisting environmental issues and request stake holders for a proposal. The National Environment Awareness Campaign is a centrally funded scheme of the Indian Government and it covers almost each and every state of the country. The awareness campaign program inculcates the fundamental aspects of the environment through knowledge and sensitization of the public with the help of various activities included in the campaign.

Using an Open Source Concept Mapping Program (IHMC Cmap Tools) to Assess GLOBE Student Knowledge and Integrative Thinking

Dr. Jodi J. Haney, Bowling Green State University, Bowling Green, Ohio, U.S., jhaney@bgsu.edu

IHMC Cmap Tools is an open source, web-based, concept mapping software program developed by the Florida Institute of Human and Machine Cognition. Pre-service secondary science teachers and environmental education students at Bowling Green State University (BGSU) are required to take the ENVS 4150: Investigating Earth Systems via GLOBE course. The course aims to prepare BGSU students for GLOBE pre-service teacher certification, but also sets out to deepen student environmental literacy, data collection and data analysis skills. Assessing students' understanding of GLOBE concepts and protocols for atmosphere, land cover biology, hydrology, soil, and assessing student ability to understand the inter-relatedness of these GLOBE topics (i.e. Earth as a system) in an authentic and integrative manner is accomplished through concept mapping using the IHMC Cmap Tools Software. This poster presentation will include information on the nature of concept mapping, the rationale for using concept mapping, and the process of making a concept map via Cmap Tools. Sample student concept map examples and a concept mapping scoring rubric will also be presented. IHMC Cmap Tools is free, available for both Mac and PC computer platforms, and appropriate for early childhood through adult learners.

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Strand III – Partnerships

School to School Collaboration Between Norway, the Czech Republic and Croatia 2011-2013

Mr. Karl Torstein Hetland, Norwegian Centre for Science Education, Dalen, Norway, karlth@online.no

GLOBE Europe has a strong network of countries working together to promote GLOBE student research. One example is the long-time collaboration between Norway, the Czech Republic and Croatia. We invite all countries to participate with us in the GLOBE Student Climate Research Campaign in 2011-13! Would you like to participate in an inspiring network with a focus on climate? Would you like to collaborate in a network of schools from Norway, The Czech Republic and Croatia? Do you want to engage your students through an inspiring project that may also be useful locally? Do you have students at the age of 14 or 17 (level 9 or 11)? If you answer yes to these questions, you are an obvious candidate to participate with your class in the GLOBE Program Student Climate Research Campaign.

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Achievement of Scientific Research Learning through Student-Teacher-Scientist Partnerships

Dr. Rungrote Nilthong, School of Science, Mae Fah Luang University, and GLOBE Thailand, The Institute for the Promotion of Teaching Science and Technology, Ministry of Education, Bangkok, Thailand, rungrote@mfu.ac.th

The Institute for Promotion of Teaching Science and Technology (IPST) began the GLOBE Learning Expedition (GLE) project in 2005 through research-based approach and inquiry-based learning. Along with teachers' guidance and scientists as consultants, students learn and understand Earth systems science by performing hands-on research. Research questions from students produce more guidance from teachers and more consultations with the scientists. Scientific research learning partnerships should involve scientific logic and accuracy at all levels. The effective way would be students assuming a junior scientist role and the teacher a senior scientist role. Teachers would need further background information and training in the scientific method. The university scientist should assume all three roles if needed, as this would stimulate the scientific learning method as a whole.



Exploring New York City Parks with EPA and GLOBE

Mr. Peter Schmidt, Queens College, GLOBE New York Metro, Flushing, New York, U.S., peter.schmidt@qc.cuny.edu

With the help of an EPA Regional Grant, GLOBE NY Metro, the southern New York State GLOBE partner, trained teachers in 30 City schools to use the GLOBE inquiry model and select protocols to make local parks an extension of their classroom. The grant allowed us to supply each participating teacher with a classroom set of equipment for the protocol of their choice, and most importantly resources to send GLOBE trained specialists to work alongside the teachers on their initial field experiences with their classes, culminating in a GLOBE Science Symposium hosted at Queens College. The lessons we learned working so closely with the teachers were key to winning a NOAA Environmental Literacy Grant that will allow us to expand the program and hopefully institutionalize some of its key components. This presentation will identify some of the persistent obstacles GLOBE faces in the schools, show strategies that worked, review important insights gained, and celebrate the success of the participating teachers and students.

Dr. Krisanadej Jareonsutasinee, GLOBE Thailand, leads students in observing clouds and contrails during a Cloudsat workshop.



Community Workshop Sessions

Friday 22 July, 9:00 – 11:30 and 12:30 – 15:00

ESSP – FLEXE Ecology Unit

Ms. Liz Goehring, Pennsylvania State University, University Park, Pennsylvania, U.S., exg15@psu.edu

Mr. Martos Hoffman, former Educational Designer, GLOBE Program Office, mhoffman@globe.gov

The FLEXE (From Local to EXtreme Environments) project focuses on deepening student understanding of Earth system processes through explorations of local and ‘extreme’ environments. Through FLEXE, students engage in activities that involve collecting and analyzing environmental data from various sources, including the multi-year GLOBE database, deep-sea scientific research projects, and direct measurements of the local environment. Learning activities are organized into two units, Energy and Ecology, that allow students to explore how physical and biological processes and systems can differ between environments.

Participants in the FLEXE workshop will explore activities found in the Ecology Unit, including characterizing a local study site using photographs, understanding how scientists use similar methods to explore the deep-sea, comparing photosynthesis and chemosynthesis, exploring symbiotic relationships and food web dynamics, and investigating deep-sea biodiversity. Participants will also explore the archived Student-Scientist FLEXE Forums. The Forums not only expose students to cutting-edge research and data, but also challenge students to think critically and to ask and answer questions using the same process and methods as scientists. Ultimately, the Ecology Unit guides students to develop an ecological research question they can explore in their local environment that reflects the GLOBE Model for Student Scientific Research.

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ESSP – GLOBE Carbon Cycle: Using a Systems Approach to Understand Carbon, Part of the Earth’s Climate System

Ms. Sarah Silverberg, University of New Hampshire, Durham, New Hampshire, U.S., sarah.silverberg@unh.edu

Join the GLOBE Carbon Cycle Project for a unique blended learning opportunity that includes three distinct components. The workshop takes place on Friday morning from 9:00-11:30 and from 12:30 – 15:00. The first session will include a walk to a local park, in order to practice Carbon Storage Field Measurement skills. Part two will include learning about Carbon Storage Field Data Entry and Analysis (bring a laptop). This will provide the opportunity to learn about the Global Carbon Cycle Introductory Activities and how to use a systems thinking approach to understanding the global carbon cycle. Part three of the workshop will be an online follow-up component that deals specifically with computer modeling of carbon at the local and global level. This section will require some independent work with a few webinar discussions on the limitations and assumptions of models, exploring the science behind models. The workshop will conclude with a designated time to ask questions and brainstorm ideas about working with teachers and students on the implementation of computer models in the classroom.



ESSP – Seasons and Biomes Budburst Inquiry Activity

Dr. Elena Bautista Sparrow, International Arctic Research Center, University of Alaska Fairbanks, Fairbanks, Alaska, U.S., ebsparrow@alaska.edu

Ms. Martha Robus Kopplin, Seasons and Biomes Project Coordinator, International Arctic Research Center, University of Alaska Fairbanks, mrkopplin@alaska.edu

Plants connect different components of the Earth system. The purpose of this workshop is to allow participants to develop an understanding of the relationship between budburst and the local environment by giving them an opportunity to develop an outline for an inquiry related to budburst. Budburst is a phenological event signaling the onset of the growing season. Change in the timing of budburst is one of the indicators of how the environment is responding to changes in climate. Participants begin the activity by observing three different dormant twigs. The activity will develop and expand on the understanding of the differences and similarities in classifying twigs, and help identify the trees and shrubs observed in the Budburst protocol. In their journals, participants will write and draw observations of the dormant twigs collected and brought inside to sprout. Several phenological stages will be evident such as dormant bud, swelling bud, budburst, and leaf length. Participant notes will be used to develop questions they would like to investigate. Participants will learn how to use this activity to guide students through an inquiry and investigative approach while making observations and inferences, asking questions, collecting and analyzing data, and reporting findings to others.

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ESSP - Watershed Dynamics: Using GIS to Access Scientific Data and Study the Water Cycle

Ms. Colleen Buzby, Northwestern University, Evanston, Illinois, U.S., c-buzby@northwestern.edu

Mr. Colin Sheaff, Northwestern University, Evanston, Illinois, U.S., colin-sheaff@northwestern.edu

Dr. Kemi Jona, Northwestern University, Evanston, Illinois, U.S., kjona@northwestern.edu

At the Watershed Dynamics workshop you will learn to use the FieldScope GIS, in which you can analyze worldwide precipitation data to investigate Water Availability. Learn what Geographic Information Systems (GIS) is, how to analyze data, and how to incorporate the Watershed Dynamics project into your trainings. By using the Water Availability activities, you will ask questions of large-scale scientific datasets to understand the relationship between water and geography. You will practice querying the data for high and low precipitation values, compare precipitation, surface runoff, evaporation values around the world, and look at seasonal variation. The online GIS tools being trained in this workshop are freely available and can be accessed via the Internet. Come learn Watershed Dynamics and engage in discussions about how to make global data analysis relevant to local investigations. Bring your own laptop to this presentation or identify a partner with a laptop in advance. Participants who have previously used the Water Availability curriculum can explore the Human Impact on Watershed curriculum to study land cover change over time, and its effect on stream discharge (data only available for the contiguous U.S.).

Preview the tool at: <http://wdi.fieldscope.us>

Download the curriculum at: <http://wd.northwestern.edu/curriculum>

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West Virginia University-NASA IV&V Educator Resource Center Partnership to Build Enthusiasm/Confidence in Pre-service and In-service Teachers for Science Instruction

Dr. James Andrew Rye, West Virginia University, Morgantown, West Virginia, U.S., jim.rye@mail.wvu.edu

Mr. Todd Ensign, NASA IV&V Educator Resource Center, Fairmont, West Virginia, U.S., todd.i.ensign@ivv.nasa.gov

West Virginia University (WVU) and the NASA IV&V Educator Resource Center have been incorporating GLOBE certification and Elementary GLOBE into pre-service and in-service teacher education for over six years. Every elementary education student major at WVU receives training on GPS, clouds, phenology, and an interdisciplinary approach in science

instruction. Ongoing workshops are provided to classroom educators employed in “Professional Development Schools” for the WVU Teacher Education Program, which has led to doctoral research on classroom implementation and garden-based learning as an extension of Elementary GLOBE. Through the NSF funded WVU Watersheds Dynamics project, two graduate-level courses were developed and educators statewide were trained on remote sensing, GIS, concept mapping, and data collection with scientific probeware. During this hands-on workshop, participants will engage in selected Elementary GLOBE activities, GPS and Cloud protocol training, and will be introduced to environmental probeware for GLOBE data collection.

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Evaluation and its Role in Shaping the Future of the GLOBE Program

Dr. Valerie L. Williams, GLOBE Program Office, UCAR, Boulder, Colorado, U.S., vwilliam@ucar.edu

This workshop will focus on the current GLOBE program evaluation activities and specifically, the role of GLOBE Partners in strengthening the evaluation capacity of the program. Previous GLOBE evaluations were conducted by external evaluators, primarily for the purposes of accountability. The current evaluation activities are targeted toward program improvement and using evaluation data to address the needs of GLOBE stakeholders. This will require building a data collection infrastructure among the GLOBE community and represents a first step in these efforts. The workshop will be divided in two parts; the first half of the workshop will present current and upcoming evaluation activities of the GLOBE program, emphasizing the use of different evaluation tools and methodologies. The second half of the workshop will provide a forum for structured discussion among participants on the evaluation priorities and how data can be shared and used to strengthen the GLOBE program.

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Global to Local: Food and Its Environment

Ms. Marsha J. Willis, Texas Regional Collaboratives, University of Texas at Austin, Austin, Texas, U.S., marshawillis@mail.utexas.edu

Mrs. Carol Batycky, GLOBE Canada, Calgary, Alberta, Canada, bbatycky@shaw.ca

Global to Local: Food and Its Environment is a curriculum project developed by GLOBE North America partners. The curriculum, designed in the 5E Instructional Model (Engage, Explore, Explain, Elaborate, and Evaluate) for Grades 3-5, will focus on different types of food, climate, soils, watersheds, irrigation, and energy flow. We will also explore “food miles” which refers to the distance a food item travels from the farm to a home. Students will understand that buying locally decreases the distance food must travel. The concept of “local” is also seen in terms of ecology, where food production is considered from the perspective of a basic ecological unit defined by its climate, soil, watershed, species and local agrisystems, also known as a foodshed. Students will be able to identify the major components of their own foodshed and upon completion of the project, be able to design and grow a successful garden.

Come learn about this grassroots project, participate in hands-on activities, and learn how you can contribute to this project. We will explore how the amount and type of food produced in your foodshed varies depending on the season and what supports the type of food grown in your region.



Extending Elementary GLOBE into the K-4 Classroom

Ms. Lynne H. Hehr, University of Arkansas, Fayetteville, Arkansas, U.S., lhehr@uark.edu

Dr. John Hehr, University of Arkansas, Fayetteville, Arkansas, U.S., jghehr@uark.edu

Dr. Anthony Murphy, St. Catherine University, Saint Paul, Minnesota, U.S., apmurphy@stkate.edu

Dr. Peter Schmidt, Queens College, Flushing, New York, U.S., peter.schmidt@qc.cuny.edu

Need inviting and non-threatening ways to help your K-4 teachers explore the Earth? Elementary GLOBE lessons are quick to set up, easy to incorporate into the primary classroom, and full of science content and literacy correlations! Experience the world of Earth and environmental science (soils, Earth systems, water, clouds, & seasons) in this hands-on, inquiry- and content-driven session! Veteran U.S. Partner professional development providers will lead this session that incorporates favorite extensions, more lessons, and useful resources to complement and extend the K-4 Elementary GLOBE into formal and informal education.

Teachers and students work together to learn more about soil and hydrological indicators as part of the National Center for STEM Elementary Education at St. Catherine University.



Students at Notre Dame Private School in Santo Domingo, Dominican Republic, participate in a CloudSat learning activity.



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