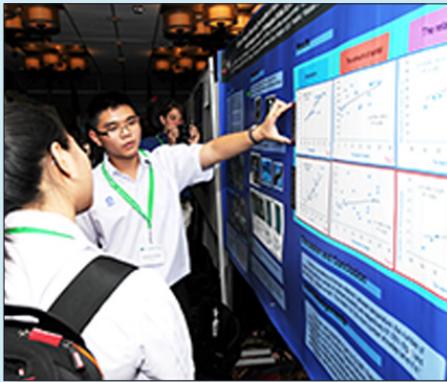




THE GLOBE PROGRAM

# 2013–14 GLOBE Annual Review



Sponsored by:   Supported by:   Implemented by:  UCAR

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## About The GLOBE Program

GLOBE is an international science and education program that connects a network of students, teachers and scientists from around the world to better understand, sustain and improve Earth's environment at local, regional and global scales. By engaging students in hands-on learning of Earth system science, GLOBE is an innovative way for teachers to get students of all ages excited about scientific discovery locally and globally.

GLOBE is implemented through its country and U.S. partners. The core supporting infrastructure is sponsored by the National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF), and supported by the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Department of State. The day-to-day operation and worldwide coordination is carried out by the GLOBE Implementation Office at the University Corporation for Atmospheric Research (UCAR).

### CONNECTING A GLOBAL SCIENCE AND EDUCATION COMMUNITY

- 109 participating countries
- Over 80,000 GLOBE trained teachers around the world
- 27,000 schools internationally
- 10 million students worldwide have participated
- Students have contributed to the 120 million measurements in the GLOBE science database

\*Cumulative Metrics through 2013

### CONNECTING STUDENTS TO HIGH CALIBER SCIENTIFIC RESEARCH

GLOBE's scientific protocols are developed by scientists, tested by teachers and executed by students who produce meaningful, standardized "science-grade" data that can be used in support of student scientific research in the five GLOBE investigation areas: Atmosphere, Earth as a System, Hydrology, Land Cover/Biology, and Soil. Students around the world upload their measurements to GLOBE's international database and conduct inquiry-based science projects.



## CONNECTING TEACHERS WITH INQUIRY-BASED INSTRUCTION

GLOBE partners provide teacher training and professional development both online and in-person. The hands-on projects—based on the five GLOBE investigation areas—can be integrated into curricular areas such as sciences, language arts and geography. In addition, GLOBE activities take students from observations and questions to their own research projects and address the requirements contained in national and international science standards. GLOBE can also be integrated in the lesson plans for many different subjects and grade levels.

## CONNECTING STUDENTS GLOBALLY THROUGH SCIENCE

Through GLOBE, students learn Earth science from doing hands-on activities in their local community and they collaborate with students elsewhere around the world, contributing to global study around our common bond: Earth. GLOBE gets students involved in scientific discovery at an early age and allows them to experience the scientific method and contribute to environmental research. GLOBE also provides opportunities for student-teacher-scientist collaboration through the GLOBE International Scientist Network (GISN).





## A Message from Dr. Tony Murphy

### Director, GLOBE Implementation Office

The Earth system is dynamic, ever changing; its components interact with each other at various temporal and spatial scales to create a whole that is greater than the parts. The GLOBE Program and its worldwide community reflect attributes similar to those of the Earth system. GLOBE students, teachers, scientists, and partners have their vital roles in the teaching and learning about the environment in their respective countries or locale; we also come together and collaborate to inspire environmental stewardship worldwide. As the GLOBE students become scientists, engineers, teachers, other professionals, the Program also continues to evolve and strengthen.

With the completion of the student data entry interface in 2013, the operation of the new GLOBE data and information system has been transferred to the NASA Goddard Space Flight Center. In addition to the Education, Evaluation, Science, and Technology Working Groups and the U.S. Partner Forum, served by members of the GLOBE community on a rotating basis, NASA has also selected UCAR to host the GLOBE Implementation Office (GIO) through a competitive process. As a previous GLOBE U.S. partner, I am honored to serve as the Director of the GIO and the associated Region Offices.



The GLOBE Working Groups and the U.S. Partner Forum offer the community the opportunity for greater involvement in programmatic development advocated by many members in recent years. Now is the time for this advocacy to be turned into action. You should communicate with the Working Groups and put your ideas and suggestions forward for discussion; you should inform the Region Offices of the great work you do with GLOBE; and, you should harness the power of this unique international science and education program to enhance the participation in your GLOBE partnership. Populate your pages on the website and encourage more data entry and use of the data visualization system. These are all steps you can take to increase your involvement in and help shape the future direction of the Program.

From the GLOBE Implementation Office, a number of initiatives will be launched to strengthen the core support for your work with GLOBE. I pledge to work closely with you, as well as NASA and other sponsors. In the report below, I will outline the initiatives to come from the GIO and highlight the work accomplished by many of you in 2013.

For 20 years, The GLOBE Program has been an enduring example of quality science education and international cooperation because of the support of the GLOBE partners and its community. Just like the Earth system, GLOBE has evolved over that time and will likely continue to change over the next 20 years. The challenge for all of us is to harness the opportunities at hand to strengthen the Program and to increase its presence globally.



## Focus of the GLOBE Implementation Office

The GLOBE Implementation Office's (GIO) focus is on supporting the community and helping the Program gain strength in existing partner countries and encouraging new countries to join. Below is a list of a number of initiatives, as well as operational functions of the GIO, that will help this process.

- Coordinating regularly with the NASA Goddard Space Flight Center Data and Information Systems (DIS) Team.
- Continuing to offer assistance from the Community Support Team on technical and programmatic questions.
- Continuing to communicate with the community on a regular basis through newsletters, director letters, social media, etc.
- Creating a GLOBE Distinguished Educator Fellowship: Teachers will be paired with a scientist from the GLOBE International Scientist Network to develop learning activities that highlight the use of the student data and the visualization system. Teachers and scientists will work on this project virtually.
- Increasing use of data through the development of quality assured datasets. The datasets will be placed on the website in an easily downloadable format so that teachers can download them and use them with their students and trainers can use them in their workshops.
- Streamlining the GLOBE Training Process and reviewing the training resources so that they are current and integrate the new visualization system.
- Collaborating with the Working Groups on specific topics, including the Evaluation Working Group on strengthening evaluation within the Program.
- Developing a series of communication templates that the community can use with a variety of audiences.
- Supporting community-driven student research campaigns and introduction of new science protocols using existing guidelines and processes.



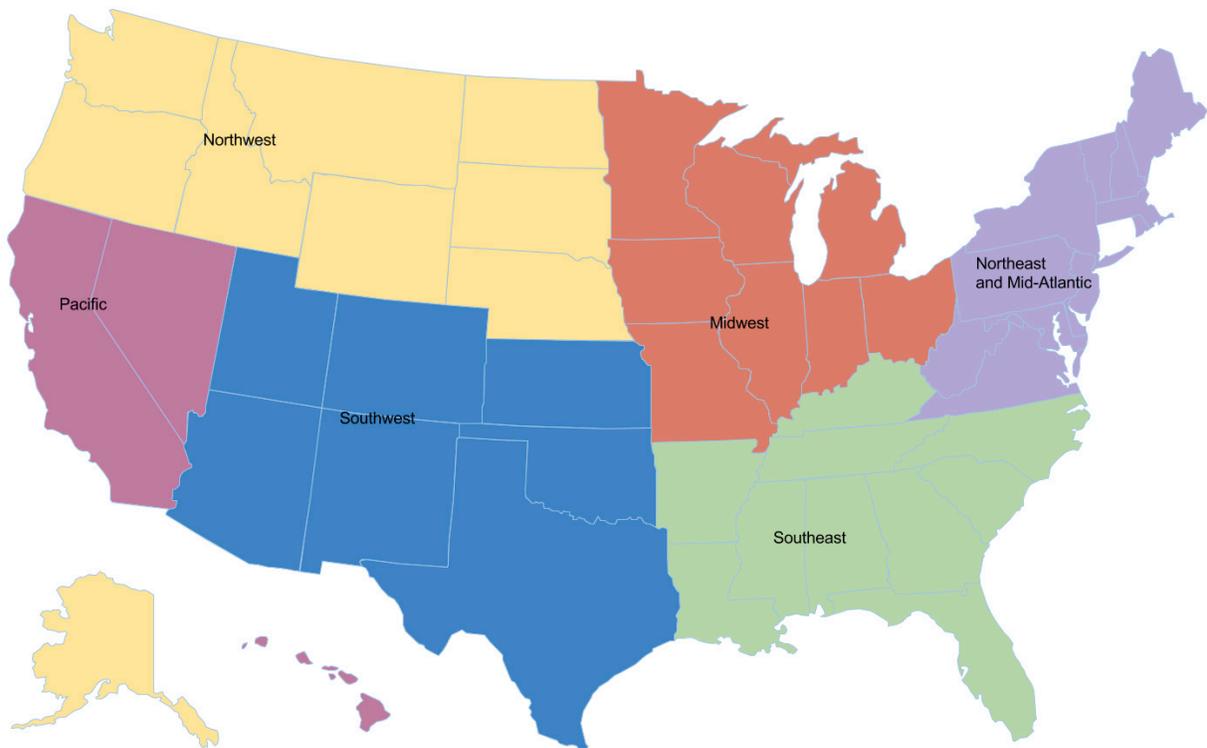


## Four GLOBE Working Groups and the U.S. Partner Forum Formed in June 2014

Four new GLOBE Working Groups have been formed—Education, Evaluation, Science and Technology. Each group can be composed of up to eight members, with the appropriate expertise and background, and to the extent possible, have representation from the six regions of the Program (Africa; Asia and Pacific; Europe and Eurasia; Latin America and Caribbean; Near East and North Africa; and North America). GIO staff support the functioning of the groups and facilitate their regular meetings. The Working Groups convened their initial meeting at the GLOBE Learning Expedition in August 2014.

The U.S. Partner Forum has also been established. To encourage collaboration and mutual support, the U.S. has been divided into six geographic areas; the Forum consists of at least one GLOBE partner from each area. People with specific skills or expertise can be added to the Forum. GIO staff support the functioning of the Forum and facilitate its regular meetings. The first meeting of the Forum is to be convened in Washington D.C. during the fall of 2014.

### US GLOBE Geographic Areas





## GLOBE at a Glance

The table below contains a summary of growth in both schools joining the Program and measurements entered into the database in all six GLOBE regions during 2013. Additional data may be found on the GLOBE website: <http://www.globe.gov/about-globe/metrics/impact>

Region	Countries	Total Schools	Schools Joined in 2013	Total Cumulative Measurements	Measurements Entered in 2013
Africa	22	691	46	941,491	121,613
Asia and Pacific	16*	2,682	100	943,675	80,931
Europe and Eurasia	39	3,949	225	37,774,864	10,040,808
Latin America and Caribbean	18	776	124	917,345	166,297
Near East and North Africa	13	460	159	564,601	99,707
North America	1	18,706	1,208	78,163,214	13,324,102
<b>Total</b>	<b>109</b>	<b>27,264</b>	<b>1,862</b>	<b>119,305,190</b>	<b>23,833,458</b>

\* including Taiwan as a partner

## Program Highlights in 2013

### Student Climate Research Campaign Concluded in 2013

Student research campaigns play a major role in involving students, teachers and scientists in important scientific work. They highlight a particular set of questions in Earth system science, using one or more GLOBE protocols. Campaigns also offers students and teachers a scientific focus for a particular period of time. The GLOBE Program initiated its first global campaign, the Student Climate Research Campaign (SCRC), to engage students in measuring, investigating, and understanding climate systems in their local and global communities. Drawing on GLOBE protocols and data, students took climate-related measurements and investigated questions about climate. The campaign ran from 2011 – 2013 and was implemented in two phases: September 2011 to August 2012 and September 2012 to August 2013.

Over the course of the SCRC,

- Students in 952 schools entered 2.2 million data points into the GLOBE science database and shared 95 climate-related research projects.
- The GLOBE community hosted 345 Training Workshops for 8,250 teachers.
- Twenty-one webinars were attended by 217 scientists, teachers, community members and the public. The webinars have been viewed 955 times.



- Four Intensive Observing Periods (IOPs) were held during the campaign. During these focused periods of time, participants were encouraged to collect large amounts of data and enter them into the GLOBE database.

As part of the SCRC in 2013, the Surface Temperature Field Campaign (STFC) was opened to the entire GLOBE community to collect international data. This was especially important because the new Landsat 8 satellite launched by NASA in 2013 was the first satellite in Landsat's 41-year history that had two thermal bands. This means that the satellite is able to observe Earth's temperature better than the previous Landsat satellites. GLOBE student data helped to validate the Landsat 8 surface temperature algorithms.

The next major component of the SCRC was the Student Research Investigations. To explore the question, "What is my climate and how has it changed over time?" students were encouraged to develop collaborations with scientists to investigate a climate issue of local relevance and to also identify and use any regional or national climate datasets. Additionally, the students were encouraged to connect with other GLOBE schools to work on research investigations. Finally, the students were encouraged to share their results with the wider community.



Ninety-five research projects were submitted as a part of the SCRC. These are posted in the GLOBE website student zone. Below is a list of projects that represent both the diversity of Earth science topics and quality work from GLOBE students:

- *The impact of temperature change on larval mosquito outbreaks*, Lycee Rabemananjara, Madagascar
- *Study of biodiversity and indicators of air quality in the surrounding forest lichens*, Donchanwittayakom School, Thailand
- *Air pollution using the moss bags method*, Srednja skola Mate Blazine and Srednja skola Mate Blazine Labin, Croatia
- *Are the floods in La Plata related to climate change?*, Colegio French, Argentina
- *Does increased precipitation affect the water quality of Norwalk Creek?*, Main Street Intermediate School, USA

While this particular campaign has concluded, organizing a major campaign such as the SCRC has produced a number of important lessons, which will guide future campaigns. These include:

- Creating student research campaigns of a limited duration to focus students on specific Earth science concepts can have a positive impact on community involvement.
- Offering various levels of involvement (as little as attending a webinar to participating in all the IOPs and submitting a student presentation) allows for a variety of participation and personalization by teachers.
- Allowing different types of involvement for students with diverse strengths to participate in the campaign – artistically motivated students could enter the art competition whereas students more interested in data analysis could submit a research project to a science fair or to the virtual student conference.
- Resolving technical issues associated with the campaign's web presence before its launch.



Funding for the three-year project, From Learning to Research (L2R), was received through a grant from the National Science Foundation (NSF) to supplement SCRC. The overall goals of L2R were to:

- Provide teachers with the knowledge, skills, strategies, and confidence to engage middle and secondary students in authentic Earth System Science research on local, regional, and global scales;
- Expose teachers and students to careers in Earth Science; and
- Allow students to experience Earth Science research by interacting with scientists from around the world.

Two cohorts of GLOBE teachers were selected for this exciting project, which used a hybrid meeting methodology to create scientist-student-teacher collaborations. Teachers met for a 1-week summer institute and then maintained contact through bi-weekly webinars throughout the school year. As part of the completion of the project, teachers from both cohorts met to discuss needed resources for the classroom to aid with the development of locally relevant climate research projects. As a result, several products, such as graphic organizers and informational brochures for Project Based Learning, were developed, which were reviewed by teachers, students, and partners at the 2013 GLOBE Annual Partner Meeting.



## GLOBE Student Research Exhibitions to Continue Annually

Student based GLOBE research is a key component of The GLOBE Program. Interacting with students in discussions of their research reinforces the value of doing GLOBE. While the GLOBE Learning Expedition's explicit function is for students to communicate their GLOBE research, the event occurs periodically. To allow more opportunities for students to communicate their GLOBE research, a proposal from the community to host student research exhibitions with the annual partner meeting was made and the first such event was held at the 16<sup>th</sup> Annual Partner Meeting in St. Paul, Minnesota. In 2013, the 2nd GLOBE Student Research Exhibition was held in conjunction with the 17<sup>th</sup> Annual GLOBE Partner Meeting in Maryland.





Thirty-five projects were presented, eight virtually, at the exhibition. Virtual presentation allows inclusion of reports for students who cannot attend the meeting. All six regions were represented, including a joint project between three collaborating countries from the Latin America and Caribbean region. GLOBE countries represented at the exhibition included Argentina, Croatia, Madagascar, Nigeria, Norway, Peru, Saudi Arabia, Thailand, United States, and Uruguay. As in the first Student Research Exhibition, GLOBE scientists scored the projects based upon a modified Intel Science Fair score sheet and awarded 1st–3rd places, listed below.

**First prize:** students from Michigan, USA, for their project *“Correlations between vernal pool phenology and a breeding population of Bufo americanus in Dearborn Heights, Michigan.”*

**Second prize:** students from Thailand for their project *“Measured concentration of nitrate in water from the bulb of Wetland plant Nepenthes in Bung Khong Long, Thailand.”*

**Third prize:** students from Croatia for their project *“Water quality and the revitalization potential of Mrtvi Kanal Channel.”*

For information about the student projects visit the 2nd Annual Student Research Exhibition page on the GLOBE website.

## Connect the GLOBE Community with Multimedia Resources

Online technologies (webinars, virtual conferences, social media, etc.) are a valuable resource for use within the Program and will be leveraged more to engage and expand collaboration across the community as well as increase communication between GIO and the community.

Webinars played an important role in the Student Climate Research Campaign and have also been hosted by the GLOBE International Scientist Network (GISN) to encourage scientists to join the Program and to engage with GLOBE students.





For the first time, a Virtual Student Conference was held to engage GLOBE students and scientists in an online discussion of GLOBE research. This was a unique opportunity for GLOBE students to showcase over 50 research investigations and to have their projects reviewed by scientists of the GLOBE International Scientist Network and fellow students.

Competitions are excellent ways to engage the community and have members express their enthusiasm for the Program. Two competitions were held in 2013; an Earth Day video competition and an art competition to illustrate the 2014 GLOBE calendar. For the first competition, GLOBE students were invited to produce a short video demonstrating how participating in GLOBE has enabled or inspired them to improve the environment of their home, school, or community. Eighty-two videos were submitted and judged by GIO staff and by members of the GISN.

The second competition focused on student art to illustrate the pages of the 2014 GLOBE Calendar. Students were asked to express in a variety of media what makes their environment unique and to include a brief statement about how participating in GLOBE has helped them appreciate their local environment. More than 260 entries were received, from which the calendar was created.





Social networking is an important communication tool, especially for programs that engage a younger audience. GLOBE continues to build a robust social network to engage with the existing community, as well as encourage new members, and redirect people to the GLOBE website. Many GLOBE countries also use social media to create awareness of the Program and to communicate events in their countries to their communities. In addition to GLOBE's existing active social media channels (Facebook, Twitter, Instagram, Google+) the GIO began using Pinterest in 2013. Pinterest is a social network that allows users to save, or pin, ideas for teaching, projects, or other interests into thematic groupings, called boards. GLOBE's board has quickly gained popularity amongst teachers, science and education programs, and other Pinterest users. All of these media will be useful tools in future campaigns and competitions.



## 2013 Annual Meeting Attracted GLOBE Partners from Around the World

The 17th GLOBE Annual Partner Meeting was held from 12–16 August 2013 in conjunction with NASA's Goddard Space Flight Center Partnership in Greenbelt, Maryland, near Washington, D.C. The meeting provided teachers, students, scientists and partners from 26 countries and 27 U.S. states the opportunity to exchange ideas during more than 80 sessions.

Country Coordinators and Partners convened in small groups to discuss developments over the past year and brainstorm about ways to keep The GLOBE Program vibrant and to use students' natural expertise in new technology to develop more inter-country projects.





Participants engaged in protocol training during Field Training Sessions. Below, students from Thailand, along with other participants, spent a morning at a local pond learning the protocols for studying macro-invertebrates. In addition, they had an opportunity to visit the NASA Goddard Space Flight Center and learn about satellite missions.



## Training of New DIS Features Continues Online and Face-to-Face

The new GLOBE website ([www.globe.gov](http://www.globe.gov)) passed the one-million page views mark in 2013, a noteworthy milestone achieved less than one year after its launch.

Developments and enhancements continue to create a more robust and user-friendly website. Many of these changes were based on valuable feedback from the community. These included:

- Creating and launching a new Data Entry System that simplifies and clarifies the data entry process;
- Improving the workshop tool for partners to set up and administer training workshops;
- Providing training at the region meetings and the annual partner meeting;
- Developing online resources for website account personalization, and using the workshop management tool; and
- Restoring and enhancing the ability for users to comment on Student Project Spotlights, News, Events, Profiles and Star stories.





## The GLOBE Annual Survey Provides Important Programmatic Information

GLOBE Partners and Country Coordinators implement the Program in various ways depending on a number of factors, including their location, funding, and educational system. The GLOBE Program Partner/Country Coordinator survey helps capture that information. The 2012 survey was distributed to all GLOBE Partners and Country Coordinators in the Spring of 2013. Unlike previous versions, the 2012 survey was aligned directly with performance measures in the GLOBE Program Strategic Plan and included questions that would allow the GIO to monitor meaningful advancement toward achieving the performance goals outlined in the community approved plan.

The following are a few highlights from the survey.

- Many trends are consistent with the 2011 survey regarding demographics of the respondents.
- With regard to the strategic plan performance measures, the results from this year's survey largely represent the baseline from which to measure continued progress in upcoming years.
- Slightly over 50% of Country Coordinator survey respondents described their primary source of funding for GLOBE operations and management as direct government funding (i.e. Ministry or Department).
- Most U.S. partner survey respondents responded that they received little or no funding for GLOBE operations and management and conducted many GLOBE activities with no support (for free) or relied on internal sources of funding (i.e. university salary or travel funds), which were indirectly used to support GLOBE operations and management.
- The total amount of funding received by Country Coordinators was over \$3.4 million for 2012. This is consistent with the funding amount from 2011, which was reported as \$2.7 million.
- Over half of the survey respondents reported that the organization that manages the GLOBE Partnership also provides equipment, materials or monetary support to GLOBE schools.
- The majority of the respondents are fulfilling the primary partnership activities, but are challenged to engage in other expected activities such as collaboration and communication with other GLOBE partners. It is expected that recent technological improvements will support efforts toward greater community building.

Future survey results will be posted on the GLOBE website for the community to view and use.

### Community Support Team Continues Its Outstanding Service

The Community Support Team (CST) continues to respond to the needs of the community by resolving technical and programmatic issues. Once tickets are received, they are classed according to the categories (shown in the table) for processing. In 2013, there were a total of 5,145 tickets. The CST works with the other GIO staff to answer programmatic questions and to resolve technical issues with the DIS team, including Raytheon Web Solutions staff. Depending on the level of complexity, questions are answered within a few hours to a few days.



Monthly Metrics Based On Ticket Categories 2013									
Month	Data Entry	Data Access	Workshop	Log In	Programmatic	Misc. Technical	Translation	New Accounts	Totals
January	24	2	5	20	104	133	0	269	557
February	87	3	3	6	57	1	0	231	388
March	24	13	58	8	21	4	0	216	344
April	20	18	74	17	38	20	1	149	337
May	10	4	33	17	49	25	5	201	344
June	24	5	38	7	37	12	0	278	401
July	42	3	34	10	34	19	3	815	960
August	13	2	10	27	44	21	0	220	337
September	11	2	22	33	16	39	9	421	553
October	7	3	6	25	47	20	1	334	443
November	10	0	2	14	29	10	0	260	325
December	8	2	0	8	24	4	2	108	156
<b>Total</b>	<b>280</b>	<b>57</b>	<b>285</b>	<b>192</b>	<b>500</b>	<b>308</b>	<b>21</b>	<b>3502</b>	<b>5145</b>

## GLOBE Program and GLOBE Collaborator Win Recognition

The GLOBE Program won the Liferay Pulse Award for Website of the Year at the Liferay Symposium North America in San Francisco, California, in October 2013. Liferay Pulse Awards recognize the people and companies behind innovative and creative websites built using Liferay Portal.

Funded by NASA, the new GLOBE website debuted in July 2012 and was the product of the team at Raytheon Web Solutions (RSW) with collaboration by the GLOBE Program Office (GPO) technical team. The Data Information Systems (DIS) Team, GPO staff and the GLOBE community also made significant contributions.

The Ocean for Life team was awarded the inaugural “Sea to Shining Sea: Excellence in Interpretation and Education as a Team Award” by the National Oceanic and Atmospheric Administration (NOAA) Office of National Marine Sanctuaries.

A partnership between GLOBE, NOAA’s Office of National Marine Sanctuaries, Scubabots International, Inc., and National Marine Sanctuary Foundation, the program brings together students of diverse backgrounds from North America and the Middle East to explore marine science and develop a stewardship ethic for the ocean while fostering new cross-cultural relationships. GLOBE has been involved with the Ocean for Life initiative since 2009 and has facilitated student selection from the Program’s Near East and North Africa Region.



# GLOBE Around the World

## Africa

Region: Africa

Location: Mossel Bay, South Africa

Dates of Meeting: 20–23 April 2013

The 8<sup>th</sup> GLOBE Africa Region annual meeting was held in Mossel Bay, South Africa from 20–23 April 2013. Representatives from the following countries attended the meeting: Benin, Cameroon, Ethiopia, Gabon, Kenya, Madagascar, Nigeria, Senegal, South Africa, Tanzania, and Uganda. Discussions during the meeting focused on working towards greater participation, cooperation, collaboration and innovation to strengthen The GLOBE Program in the Africa region.



### Highlights from the Africa Region

Teacher training is one of the core activities of the Program. A training workshop jointly funded by the National Department of Science and Technology and the paper company Mondi was held in Vryheid, Kwa-Zulu, Natal, South Africa. Forty-two new GLOBE teachers were trained in Atmosphere, Land Cover/Phenology protocols as well as project identification and initiation.



Connecting students with scientific research is an important facet of the Program. After two years traversing the Indian Ocean launching drifting monitoring devices to help map the Indian Ocean, the research schooner The RV Lady Amber was brought to Mossel Bay through successful negotiations by GLOBE Africa. GLOBE learners, particularly those from disadvantaged backgrounds around Cape Town, were taken into the bay to learn more about oceanographic research and conservation. The research vessel is deployed for NASA, the World Meteorological Organization and NOAA's Adopt a Drifter and Teacher at Sea initiative, in which GLOBE teachers have participated.



## GLOBE Around the World Africa



Informal learning settings can be a wonderful venue to share information about The GLOBE Program with the general public. One of these venues is Scifest Africa, the largest science festival in sub-Saharan Africa and seen as the leader in the development of cutting-edge science communication and engagement in the region. GLOBE South Africa partnered with the Department of Science and Technology, the South African Agency for Science and Technology Advancement, and the National Research Foundation (NRF) in hosting the event. Over 72,000 local and international visitors were offered a kaleidoscope of movement and adventure, all based on scientific concepts.



# GLOBE Around the World Asia and Pacific

**Region:** Asia and Pacific

**Location:** Kathmandu, Nepal

**Dates of Meeting:** 2–4 May 2013

Representatives from the following countries attended the region annual meeting: Bangladesh, Fiji, India, Maldives, Marshall Islands, Nepal, Palau, Sri Lanka, and Thailand. Participants discussed the challenges and solutions for implementing GLOBE in their countries. They also considered how to help engage countries that had a low activity level in the Program.

## Highlights from the Asia and Pacific Region

Taiwan joined the GLOBE Community as the newest partner in the Asia and Pacific Region. Implementation of The GLOBE Program in Taiwan is administered by the National Central University and led by Project Coordinator, Dr. Pay-Liam Lin, of the Department of Atmospheric Sciences and Graduate Institute of Atmospheric Physics.

The Region Office organized frequent GLOBE training programs for trainers and teachers. Grants from various agencies in India and abroad funded the workshops. During the workshops, the participants were provided with GLOBE-related resource materials and equipment.



A focus of this region has been the development of educational exchange programs, building a strong GLOBE Program through collaboration. For example, GLOBE students from India travel to Thailand every year to share their research projects; while GLOBE students from Northern India visited the unique Water Classroom in Kathmandu, Nepal they learned more about the Himalayan Ecosystem, which impacts India as well as Nepal. As part of the exchange, GLOBE India also hosted Nepali students for GLOBE activities in India. Similar exchange programs were organized between India and Sri Lanka to bring students together at a wetlands conference in Colombo, Sri Lanka.





## GLOBE Around the World Asia and Pacific

The GLOBE Science Olympiad launched in 2013 had more than 12,000 students from 150 schools participate in the event. Students register for the GLOBE Science Olympiad through their schools and the teacher from the school acts as the coordinator who conducts the examination. Winners are announced on the basis of their performance in the examination. In its first year, 49 students were awarded prizes.

This event has been very helpful in promoting GLOBE activities in different schools around India. It can also serve as a prototype for other countries throughout the region.

GLOBE Japan Center at Tokyo Gakugei University involved high school students in GLOBE activities, focusing on hydrological research. Students collected data using a number of hydrology protocols from various types of water bodies. Their research was presented and shared with their peers.



# GLOBE Around the World

## Europe and Eurasia

**Region:** Europe and Eurasia

**Location:** Tallinn, Estonia

**Dates of Meeting:** 9–12 April 2013

Representatives from the following countries attended the region annual meeting: Belgium, Croatia, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Israel, Kyrgyzstan, Latvia, Lithuania, Netherlands, Norway, Poland, Republic of Macedonia, Switzerland, and the Ukraine. The Country Coordinators discussed the integration of GLOBE into other projects, which have been funded in the region, as well as the European Aerosols Campaign.



### Highlights from the Europe and Eurasia Region

The following is a list of national/regional and joint events that occurred in 2013.

- Annual Students and Teachers GLOBE conference *Possibilities of Learning GLOBE*, Lithuania
- Climate Research Campaign, Poland
- Croatian Annual GLOBE Conference, Croatia
- GLOBE Camp, Estonia
- GLOBE Comenius Project Final meeting, Latvia
- GLOBE event at the US Embassy, Helsinki, Finland
- GLOBE events in connection with Earth day and Water Day, Italy
- GLOBE Games, Czech Republic
- GLOBE Games, Latvia
- GLOBE Games, Poland
- Phaenonet Portal, Switzerland – citizen science initiative that involves GLOBE schools
- Student Meeting and Conference, France
- The Annual Meeting of International Projects (student meeting), Israel
- Tree Ring Project Final Meeting, Norway



## GLOBE Around the World Europe and Eurasia

GLOBE Games are held in numerous countries around the world, but one of the longest running is in the Czech Republic which has held this event annually since 1997. This year's games, in Litvinov, involved 130 students and 38 teachers from 27 schools engaging in learning activities and games, presenting projects and hosting a public festival while teachers received additional training in GLOBE protocols. As part of the festival, students rolled a giant inflatable globe through the streets of Litvinov. *(Photo courtesy of TEREZA Association)*



Two major projects were initiated at the regional level this year. First, preparations began in eight GLOBE countries to launch a three-year European Union-funded project designed to disseminate information about best practices in teaching science and engaging young people in science studies. Participating GLOBE countries will share best practices in science teaching, including GLOBE practices, across the European region.

The second is a GLOBE Europe Aerosols Campaign, divided into a pilot phase followed by a large-scale implementation. Scientists from France and the Netherlands are leading this effort, in collaboration with NASA Langley Research Center scientists. During the pilot phase, participants learned about aerosols, how they impact the environment and what students can do to measure aerosols in their environment.



# GLOBE Around the World

## Latin America and Caribbean

**Region:** Latin America and Caribbean

**Location:** Lima, Peru

**Dates of Meeting:** 25–26 May 2013

Representatives from the following countries attended the region annual meeting: Argentina, Bahamas, Chile, Dominican Republic, Ecuador, Guatemala, Panama, Paraguay, Peru, Trinidad and Tobago, and Uruguay. During the meeting, they discussed the challenges facing teachers implementing GLOBE in their countries and aspects of the new website.

### Highlights from the Latin America and Caribbean Region

In an effort to expand the Program in Peru, the Ministry of Environment and the Regional Environmental Office at the U.S. Embassy co-sponsored a GLOBE training session for teachers, environmentalists and non-governmental organization (NGO) representatives. The 2-day event trained participants in the implementation of GLOBE atmosphere and hydrology protocols and was aimed at strengthening the capacity of students and the educational community to aid in the environmental recovery of the Lake Titicaca basin and its tributaries.



Peru is further expanding the Program by working with institutions of education. For example, the Institution of Education (I.E.) Javier Perez de Cuellar Carampoma District, in the Province of Huarochirí in Lima, installed an instrument shelter with equipment for measuring and monitoring atmospheric data. The I.E. Javier Perez de Cuellar, located in Santa Eulalia basin at an elevation of more than 3,400 meters, joined 48 other institutions of education around Peru that have chosen to implement GLOBE as a valuable tool for the development of scientific and environmental culture among its students.

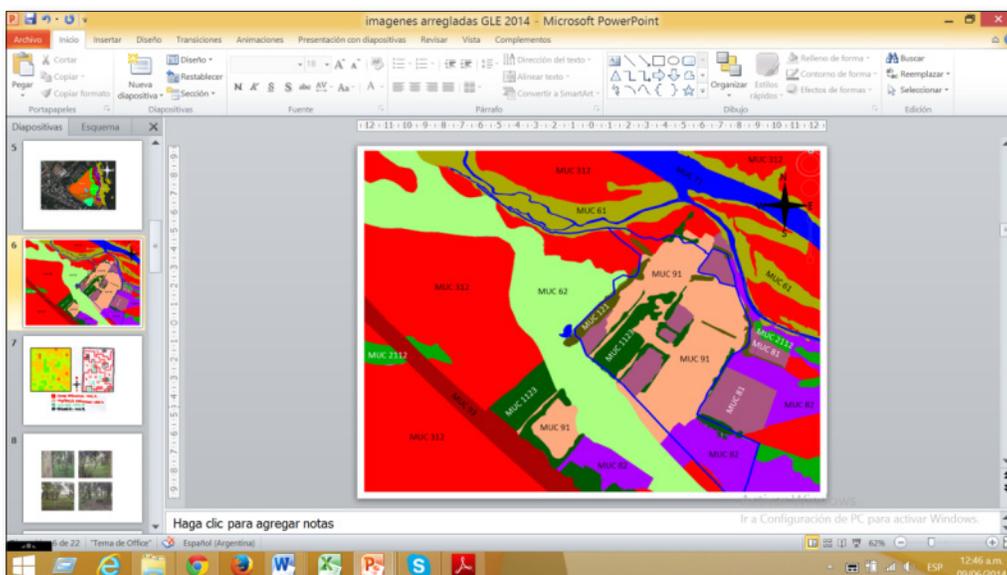


## GLOBE Around the World Latin America and Caribbean

A collaborative research project between three countries, Argentina, Peru and Uruguay, is a testimony to the power of GLOBE bringing students and teachers together from across countries to investigate a natural phenomenon that does not recognize political boundaries. The project considered the impact of the El Niño-Southern Oscillation (ENSO) on the flora present between 10 and 40 degrees latitude in South America.

In each country, GLOBE teachers along with their secondary level students (Argentina), university level students (Peru) and primary level students (Uruguay) selected a study site and described land coverage, following the GLOBE protocols of site selection, GPS, manual mapping of land coverage, digital mapping and biometry. Using satellite images the Normalized Vegetation Difference Index (NDVI) for the sites during La Niña, El Niño and neutral years was determined.

The results illustrated the weather variability that La Niña brings does not impact each country equally and had a negative impact over the study sites in Argentina and Uruguay, and a positive impact for those in Peru.



## GLOBE Around the World Near East and North Africa

**Region:** Near East and North Africa

**Location:** Dead Sea, Jordan

**Dates of Meeting:** 14–16 April 2013

Representatives from the following countries attended the region annual meeting: Bahrain, Jordan, Lebanon, Mauritania, Oman, Saudi Arabia, Tunisia, and United Arab Emirates. During the meeting, participants discussed the role of the region office in the area, strengthening ties across the countries, and supporting countries facing challenges in the region. Participants also received hydrology training at the Dead Sea, a point of geographic interest located at the lowest elevation in the world: 417 meters below sea level, as the water source to be tested.



### Highlights from the Near East and North Africa Region

Teacher training is an important function of country coordinators and critical to implementing GLOBE in any region. In the Near East and North Africa region, different countries across the region hosted a number of trainings to expand the Program.

The Ministry of Education in Saudi Arabia held a meeting for all GLOBE teachers in the Saudi Kingdom. As an important component of the meeting, new teachers were trained on the use of the GLOBE website. GLOBE members from other countries in the region were also offered the opportunity to attend the meeting. Participants from Bahrain, Jordan, Mauritania, Morocco, Oman, Pakistan, Qatar, Tunisia, and United Arab Emirates attended the meeting.

Jordan hosted a GLOBE Training Workshop where teachers learned hydrology and soil protocols, as well as the data entry process. The workshop focused on how GLOBE could be used as a vehicle for teaching about environmental awareness and maintaining a healthy environment. Ten teachers were certified as new GLOBE teachers in Jordan through the workshop.





## GLOBE Around the World Near East and North Africa

GLOBE Oman organized a science exhibition called “GLOBE Scientific Day in the Sultanate of Oman” where students displayed their scientific research. GLOBE Oman organized contests in schools using GLOBE protocols and investigations; their research was presented during the exhibition.

The Kingdom of Bahrain GLOBE Office also organized a scientific contest and a science fair for its GLOBE schools. The purpose of the science fair was to allow students to present their scientific research to their peers. Students are encouraged to be creative in the design of their presentations. GLOBE training workshops were conducted in conjunction with this year’s science fair. The Kingdom of Bahrain GLOBE Office hosts a GLOBE Science Fair and GLOBE Games each year, a direct result of its involvement with the Program.



# GLOBE Around the World

## North America

**Region:** North America

**Location:** San Antonio, Texas

**Date of Meeting:** 10 April 2013

The North America Region Meeting was held in conjunction with the National Science Teachers Association (NSTA) annual conference in San Antonio, Texas. Thirty-two partners from the U.S. and Canada participated in the meeting.

Partners from the following U.S. states were present at the meeting: Arizona, Arkansas, California, Illinois, Iowa, Kansas, Michigan, Mississippi, Ohio, New Hampshire, New Jersey, New York, South Carolina, Texas, Virginia, and West Virginia.



Discussions were initiated about the division of the U.S. into geographic areas to encourage collaboration between partners in these areas and to increase community input into the Program. Existing models of agency regions, such as EPA, NASA center locations, and others were used as a basis for the discussion. A white paper was developed from this and subsequent discussions which was shared with the Program sponsors and the community. Six geographic areas have now been established with representation from each of these areas on the newly formed U.S. Partner Forum.

### Highlights from the North American Region

The Next Generation Science Standards (NGSS) provide a new vision for American science education, creating a context for learning through Performance Expectations, comprehending the core knowledge and ideas, and engaging in scientific and engineering practices. They prepare students for broader understanding and deeper levels of scientific and engineering investigation in high school, university and in life. The standards were developed by a team of experts and stakeholders in science and engineering, K–12 educators and higher education and industry. Many GLOBE partners were involved on their State development teams as part of the writing process for the standards.

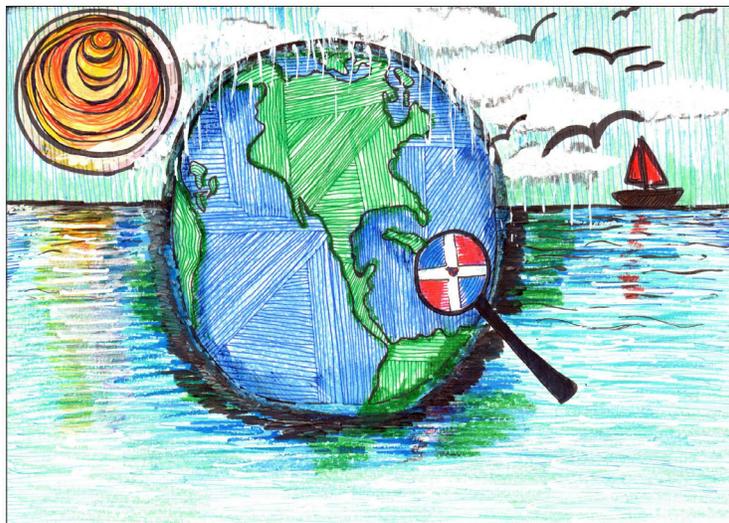
In 2013, two GLOBE partners received funding from the National Science Foundation to plan and implement a NGSS Alignment Workshop. Principal Investigator Marcy Seavey (IA) led the project, with support from GLOBE partner David Bydlowski (MI), GIO, and the GLOBE community. Twenty-two GLOBE members attended a workshop where they aligned each of GLOBE’s learning activities and protocols with the NGSS. Raytheon Web Solutions provided technical support at the workshop and advice on how to disseminate the information to the community through the website.



## GLOBE Around the World North America

One of the main functions of partners is to provide GLOBE-based professional development for teachers. In some cases, the professional development may be very localized, in other cases, it may be more national in scope. For example, science teachers from across the United States sharpened their Earth science skills at Purdue University's College of Science by previewing a soil measurement and analysis experiment that they could use in their own classrooms and labs. GLOBE partner Steven Smith, outreach coordinator for the Department of Earth, Atmospheric and Planetary Sciences at Purdue University, organized the workshop.

Often, there are outreach activities which GIO can support or avail of. One of these was to exhibit the winning artwork from the 2014 GLOBE calendar at the Mesa Lab, located at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. GLOBE student art was visited by the public for a 3-month period.



# GLOBE Around the World

Argentina	Cyprus	Honduras	Luxembourg	New Zealand	Senegal
Austria	Czech Republic	Hungary	Macedonia	Niger	Republic of Serbia
Bahamas	Denmark	Iceland	Madagascar	Nigeria	South Africa
Bahrain	Dominican Republic	India	Maldives	Norway	Spain
Bangladesh	Ecuador	Ireland	Mali	Oman	Sri Lanka
Belgium	Egypt	Israel	Malta	Pakistan	Suriname
Benin	El Salvador	Italy	Marshall Islands	Palau	Switzerland
Bolivia	Estonia	Japan	Mauritania	Panama	Tanzania
Bulgaria	Ethiopia	Jordan	Mexico	Paraguay	Thailand
Burkina Faso	Fiji	Kazakhstan	Micronesia	Peru	Trinidad and Tobago
Cameroon	Finland	Kenya	Moldova	Philippines	Tunisia
Cape Verde	France	South Korea	Monaco	Poland	Turkey
Chad	Gabon	Kuwait	Mongolia	Portugal	Uganda
Chile	Gambia	Kyrgyz Republic	Montenegro	Qatar	Ukraine
Colombia	Ghana	Latvia	Morocco	Romania	United Arab Emirates
The Republic of Congo	Greece	Lebanon	Namibia	Russia	United Kingdom
Costa Rica	Guatemala	Liechtenstein	Nepal	Rwanda	United States of America
Croatia	Guinea	Lithuania	Netherlands	Saudi Arabia	Uruguay

## Partnerships

Taiwan Partnership

## Thank you to our Global Supporters!

