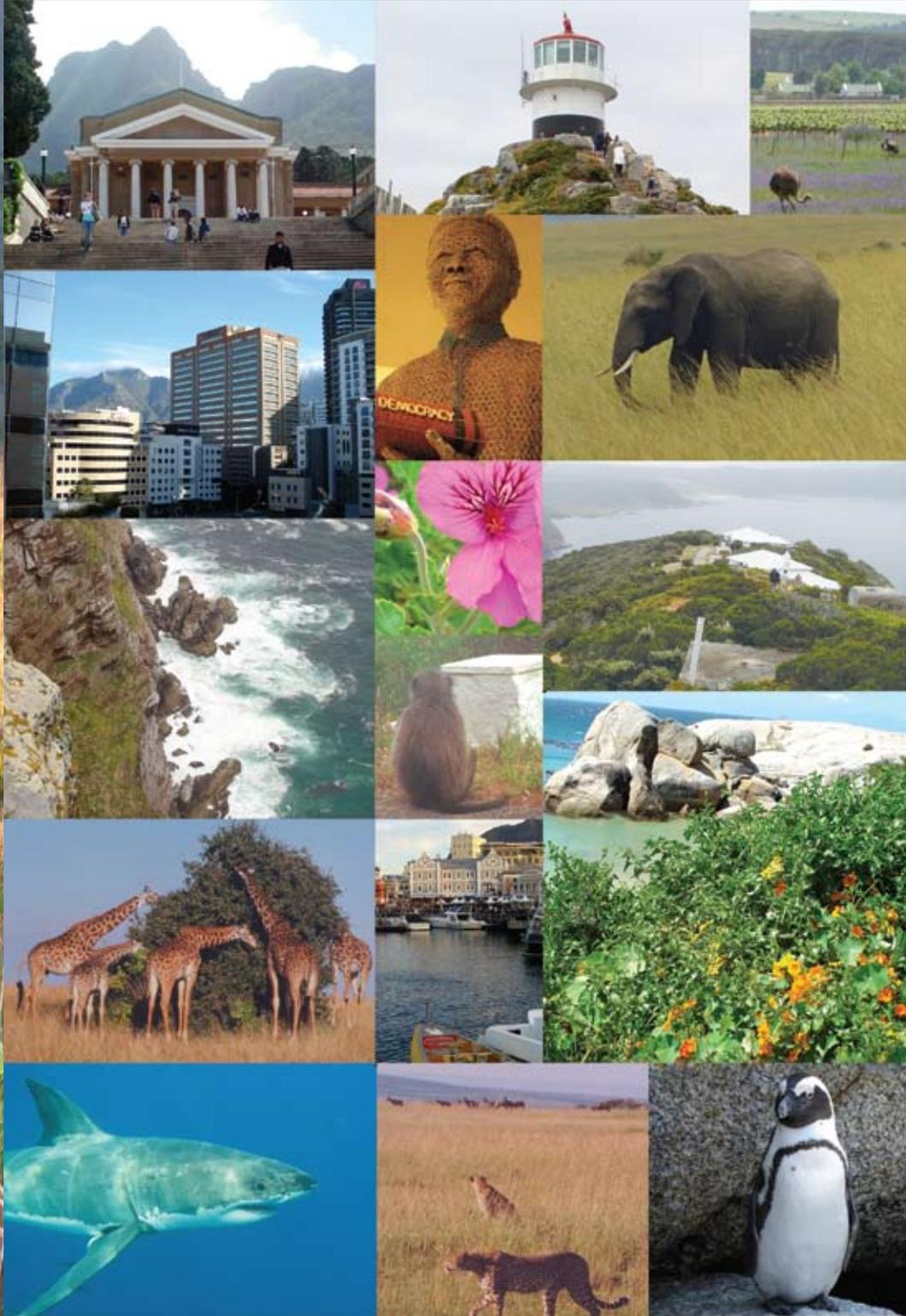




12<sup>TH</sup>  
**GLOBE ANNUAL CONFERENCE**



22 - 27 June 2008

**GLOBE Student Research for Sustainable Communities**  
*Cape Town, South Africa*

**PROGRAM**



# The GLOBE Program

*Global Learning and Observations to Benefit the Environment  
An International Environmental Science and Education Program*

24 June 2008

Dear Friends,

Welcome to the 12<sup>th</sup> Annual GLOBE Conference in Cape Town, South Africa! The GLOBE Program Office is pleased to be co-hosting this event with our Partners from the Africa Regional Consortium led by South Africa and Cameroon.

The Annual Conference brings together GLOBE Country Coordinators and U.S. Partnership Coordinators, Science and Education Principal Investigators, as well as Partnering Organizations from around the world to address key science and education elements of GLOBE. The Annual Conference promotes the continued recognition and growth of GLOBE as the world's preeminent, hands-on minds-on primary, secondary, and higher education environmental science program. We have distinguished representatives from 18 countries and 9 U.S. states who will be sharing their insights into successful implementation models as well as their research efforts related to GLOBE. We are hopeful that their presentations will stimulate further discussions and actions that can strengthen and sustain the GLOBE Program, and facilitate building strong learning communities that bring together top scientists, educators and students from around the world.

This year, we are fortunate to participate in activities associated with the 2008 GLOBE Learning Expedition. The combined event provides us with the opportunity to see tangible results of our collective work to implement GLOBE around the world and support student research.

This is a time to study, to learn, to form friendships and support networks, and to reignite our enthusiasm for the vital work we do. Your active participation in the 12<sup>th</sup> Annual Conference and 2008 GLE is essential to nurturing and sustaining the vision of the GLOBE Program. Thank you for joining us.

Sincerely,

Edward E. Geary, Ph.D.  
Director

Teresa J. Kennedy, Ph.D.  
Deputy Director  
International Programs / Partnerships  
AC Conference Co-Chair

Emmett L. Wright, Ph.D.  
Deputy Director  
Science / Education  
GLE Conference Co-Chair

Mrs. Margaret Besong  
GLE/AC Conference Co-Chair  
GLOBE Africa GIAC Representative  
GLOBE Cameroon Country Coordinator  
Yaoundé, Cameroon

Mr. Mark Brettenny  
GLE/AC Conference Co-Chair  
GLOBE in Africa NGO  
Mossel Bay, South Africa



## 2008 Annual Conference Organizing Committee



Dr. Teresa Kennedy — GLOBE Program Office, Co-Chair  
 Mrs. Margaret Besong — GLOBE Cameroon, Co-Chair  
 Mr. Mark Brettenny — GLOBE in Africa NGO, Co-Chair  
 Dr. Russanne Low — GLOBE Program Office, AC Coordinator

### International Committee Members

Mrs. Rogeline Brettenny — GLOBE in Africa NGO, Mossel Bay, South Africa  
 Ms. Alidjennatou Aliou Emmanuel — GLOBE Benin Country Coordinator, Porto-Novo, Benin  
 Dr. Michael Odell — GLOBE University of Texas at Tyler, Tyler, Texas, U.S.A

### GLOBE Program Office Committee Members

Dr. Emmett Wright — GLE Co-Chair  
 Dr. Sheila Yule — GLE Coordinator

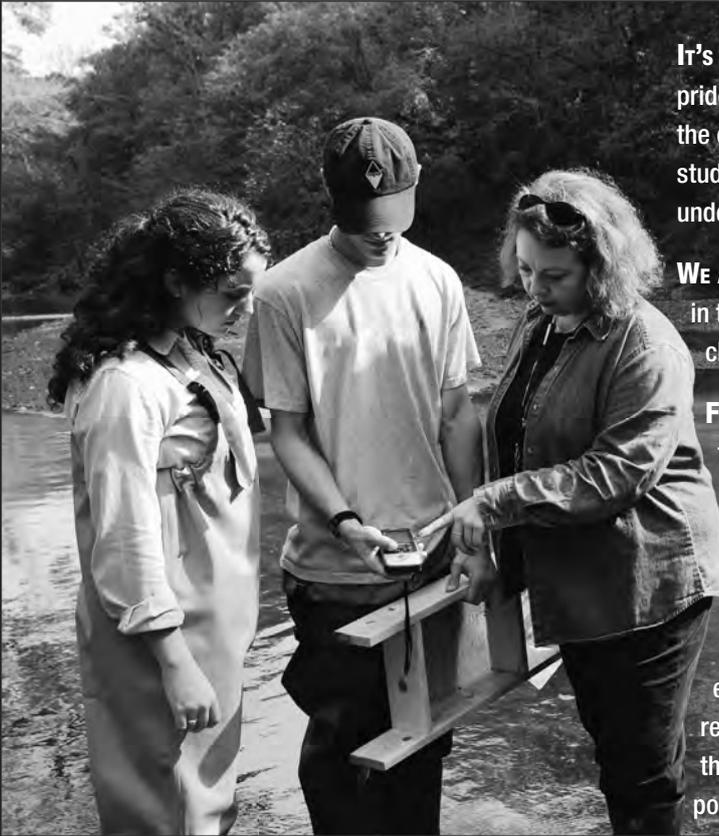
Ms. Silvia Agnona	Dr. Peggy LeMone	Ms. Loretta Quinn
Ms. Jan Heiderer	Mr. Mike Leon	Mr. Gary Randolph
Mr. Martos Hoffman	Ms. Nandini McClurg	Ms. Paula Robinson
Ms. Katy Lackey	Ms. Karen Milberger	Mr. David Smith
Mr. Jaime Larsen	Ms. Maureen Murray	Mr. Eric Stonebraker

*Many photographs included in this program were provided by Friends and Partners of GLOBE.  
 Design services by Smudgeworks, Michael Shibao*

Page	Table of Contents
3	GLOBE Africa
4	University of Cape Town Map
5	Annual Conference Agenda and Featured Speaker
6–13	Presentation Abstracts (listed in order of presentation)
14–15	GLOBE Regional Consortia
16–17	Poster Presentations—GLE and Annual Conference
18	NSTA International Membership and Conferences
19	GLOBE International Advisory Committee (GIAC)
20	GLOBE Student Research Campaign on Climate Change
21	UCAR International Affiliates
22	WMO-GLOBE Collaboration
23	GLOBE-Holbrook Travel International Study Opportunities
24	IGLO—New Collaborating Organization
25	GLOBE Stars and Communication Resources
26	GLOBE Online Annual Partner Survey
27	GLOBE Evaluation



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The GLOBE Program Office thanks Forestry Suppliers for hosting the Annual Conference Day Luncheon.



## GLOBE AFRICA

GLOBE Africa continues to thrive! A Memorandum of Understanding for the GLOBE Africa Consortium was drafted in Yaoundé, Cameroon in 2005. Finalized and signed by 17 countries at the Africa Regional Consortium Meeting in Riversdale, South Africa, 23-27 April 2007, the Agreement paves the way for GLOBE collaborations that span the African continent. Much had happened that led to the formation of the Africa Consortium and even more has occurred since then! A sampling of highlights that promise to benefit the entire consortium is listed below.

- Regional meetings in Cameroon (2005—Sponsored by the GPO), Uganda (2006—Sponsored by the GPO), Nigeria (2006—Sponsored by GLOBE Nigeria) and South Africa (2007 and 2008—Sponsored by the GPO)
- More than 20 regional teacher workshops and training events in 14 African countries since 1995
- Collaborative student research on topics ranging from deforestation, invasive vegetation, climate change, water quality and agriculture
- Collaborative student research with CloudSat mission scientists and regional scientists involved in the Africa Malaria Project
- Alumni activities working to reach across all countries in the region

The GLOBE Africa Consortium leverages infrastructure already in place to support regional teacher workshops and collaborative research. During the regional meeting in Cameroon in 2005, the Consortium drafted the first version of their constitution and stimulated the creation of the Regional Conference Center for professional development in Yaoundé. The regional center serves as the administrative base for the GLOBE Africa Consortium and provides support to all GLOBE partner countries in Sub-Saharan Africa.

Since that time, a number of collaborative projects have evolved, including an international exchange project in 2006 involving GLOBE Alumni of Cameroon, Germany and Estonia. GLOBE Alumni from the Africa region are now in the process of identifying one or more topics that could engage students in research collaborations across Africa.

In October 2007, GLOBE trainers in Niger published the GLOBE Niger Classroom Guide, which is available electronically to all Africa GLOBE Partners, in both French and English, on the GLOBE Web site. The guide includes regional environmental information such as tree species specific to West Africa, and is illustrated with pictures of Nigerien students and teachers conducting GLOBE protocols and analyzing data. The Niger Classroom Guide is intended as a regional supplement to the GLOBE Teacher's Guide and contains step-by-step lesson plans to support GLOBE teachers in their classrooms.

Most recently, Mr. Lawrence Kambiwoa, from Cameroon, received the prestigious Hubert H. Humphrey Fellowship and has spent the 2007-2008 academic year in the United States. Mr. Kambiwoa was in residence at the GLOBE Program Office in Boulder, Colorado, for 5 weeks during May and June 2008 and initiated work on an E-book project that will support teachers in Africa in the mastery of the use of scientific instruments employed in GLOBE protocols. When finished, the E-book will be freely accessible on the GLOBE Web site.



Top of page: Students from Niger Republic (image from the Niger Classroom Guide). Above left: Mr. Lawrence Kambiwoa at the GLOBE Program Office. Above right: Teacher Workshop at the Regional Conference Center, Yaoundé, Cameroon.

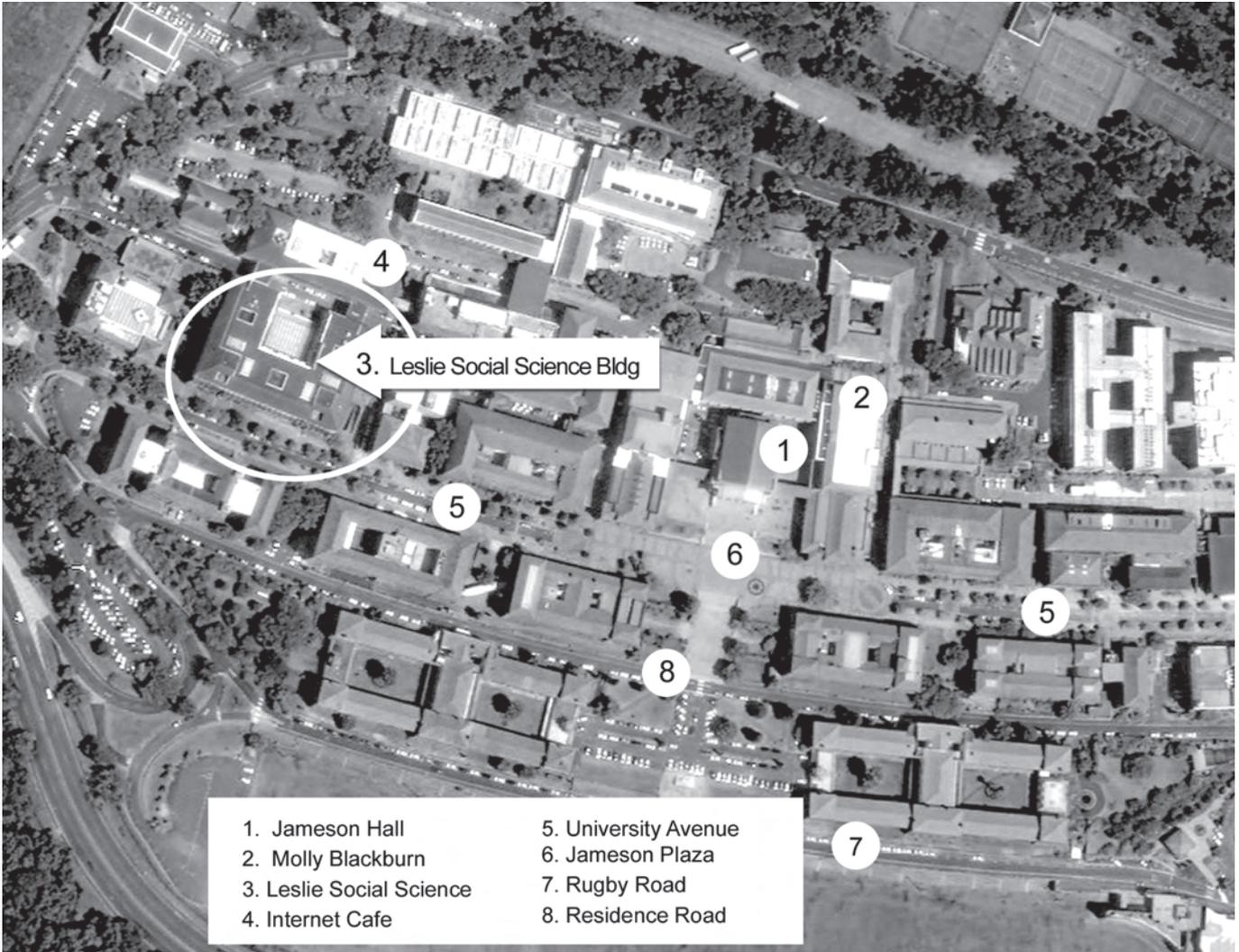
These activities, all of which support GLOBE regionalization efforts in Africa, are even more important in light of the statement by the Intergovernmental Panel on Climate Change (IPCC) that, "Africa is one of the most vulnerable continents to climate change and climate variability." Through these and other collaborative projects that are currently developing throughout the continent, students in the GLOBE Africa Region will be well prepared to lead their communities in the GLOBE Student Research Campaign: On Climate Change 2010-2012. For more information about this future GLOBE research campaign, see page 20.

The GLOBE Program is grateful for the hard work and dedication of the 2008 Annual Conference Organizing Committee, without which this meeting would not be possible. Special thanks to Mrs. Margaret Besong, GLOBE Africa GIAC Representative from Cameroon, and Mr. Mark Brettenny, long-time supporter of GLOBE in South Africa, who both served as Co-Chairs of the 12th Annual GLOBE Conference and 2008 GLOBE Learning Expedition.



# 2008 GLOBE Annual Conference

University of Cape Town, Leslie Social Sciences Hall: 3A/Leslie Foyer





# 2008 GLOBE Annual Conference Agenda

University of Cape Town

Leslie Social Sciences Hall: 3A/Leslie Foyer

Tuesday, 24 June 2008 10:30 – 17:00

- 10:30–10:35**      **Opening Welcome**  
**Conference Co-Chairs: Dr. Teresa Kennedy, Mrs. Margaret Besong and Mr. Mark Brettenny**
- 10:35–10:45**      **Opening Address**  
**Dr. Margaret (Peggy) LeMone, GLOBE Chief Scientist, National Center for Atmospheric Research (NCAR), Boulder, Colorado U.S.A.**
- 10:45–12:00**      **Session 1: Participant Presentations—GLOBE Implementation and Educational Research**
- 12:00–13:15**      **Luncheon, Poster Displays and Exhibits**  
*Sponsor: Forestry Suppliers, Inc.*
- 13:15–15:00**      **Session 2: Participant Presentations—GLOBE Science and Research**
- 15:00–15:15**      **Break**
- 15:15–16:15**      **Session 3: Presentations—GLOBE Science and Research**
- 16:15–16:55**      **Session 4: Supporting Student Initiatives**
- 16:55–17:00**      **Annual Conference Closing and Networking Plans**



## Featured Speaker

**Dr. Margaret (Peggy) LeMone, GLOBE Chief Scientist, National Center for Atmospheric Research (NCAR), Boulder, Colorado U.S.A.**

Dr. Peggy LeMone is a senior scientist at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, and has served as GLOBE's Chief Scientist since 2003. Dr. LeMone is an internationally renowned field scientist, having participated and playing a leading role in over 25 field campaigns around the world. Her first major field effort was the GARP Atlantic Tropical Experiment (GATE), which involved 72 countries in studying the weather and climate in West Africa and the Atlantic Ocean. During GATE, she lived in Dakar, Senegal, for one summer. Other field efforts have taken her to Australia, the Solomon Islands, Mexico, and Taiwan. Dr. LeMone has published over 70 articles in science journals, including articles in World Book Encyclopedia and over one hundred conference reports. She has also worked on several textbooks, including a high school Earth science textbook, and is the author of *The Stories Clouds Tell*, a short booklet published by Project ATMOSPHERE of the American Meteorological Society.



## **SESSION 1: GLOBE Implementation and Educational Research Presentation 10:45–12:00**

### **Presentation Abstracts**

#### **10:45–10:55 Expository Programs: An Approach to Enhance the GLOBE Program**

Dr. Juan Lopez-Garriga, GLOBE Puerto Rico Country Coordinator and Professor,  
University of Puerto Rico, Mayagüez, Puerto Rico

Professor Samirah Mercado, University of Puerto Rico, Mayagüez, Puerto Rico

#### **Presentation Abstract:**

Our initiative is an expository program where a nucleus of university students (fellows) with multidisciplinary knowledge and skills in science and technology establish strong, scientific and technological links with K-12 teachers and students through GLOBE. The partnership helps to integrate the GLOBE protocols into the school's curriculum and to incorporate mathematics, science, and technology into the schools. The fellows are trained in the protocols along with leadership skills providing them the tools to lead the activities of: (a) science demonstrations, (b) week-long teacher workshops, (c) Saturday academies, and (d) weekly visits to schools. Since 1991, 279 science shows have been presented impacting more than 91,000 students. However, while these demonstrations create the spark that many students need to develop an interest in science, the day-to-day nurturing of this excitement and science knowledge needs to be encouraged by their K-12 teachers. Since 1998, university fellows (112) have trained over 400 teachers and 20,000 students in GLOBE activities, enhancing their science and mathematics knowledge and their scientific and experimental skills. One result has been substantial increases in the number of freshmen students that are pursuing careers in science and engineering at the University of Puerto Rico, Mayagüez Campus.

#### **11:00–11:10 Building Conceptual Understanding of Cloud Formation Among Elementary Students Through Cultural Infusion and the GLOBE Atmospheric Investigation**

Dr. Kimberly A. Staples, U.S. GLOBE Partner, Kansas State University, Manhattan,  
Kansas, U.S.A.

#### **Presentation Abstract:**

What do 2<sup>nd</sup> graders (students 7-8 years old) really understand about types of clouds? The Elementary GLOBE protocol includes assessments designed to develop students' ability to observe cloud types. This research investigated the effect of infusing multicultural competencies into the Atmospheric Investigation on 2<sup>nd</sup> graders' conceptual understanding of cloud formation. Using culture as a context, preservice teachers assessed and evaluated the degree to which sixty-seven 2<sup>nd</sup> grade students could begin to apply reasoning patterns to explain cloud formation based on their everyday real-world environment. Two groups of (3) preservice teachers enrolled in one section of elementary science methods were instructed to: a) research the demographics of students assigned to their groups, and b) develop extension questions that specifically connect knowledge of culture and cognitive ability to concepts of cloud formation. Two additional groups of preservice teachers enrolled in a different methods section, taught by the same instructor, implemented the Investigation without modification. During the clinical practicum, both teaching teams taught a common learning cycle lesson. Each student drew an illustrative diagram to represent reasoning patterns. The instructor designed a rubric to evaluate the illustrative diagrams. This presentation will offer participants an opportunity to analyze diagrams for reasoning patterns among elementary students.



### **11:15–11:25 GLOBE Integration Program in Science Education for Sustainable Development**

Mrs. Ngosse Bousso Fall, GLOBE Senegal Country Coordinator

Professeur Lycee Seydina Limamoulaye, Dakar, Senegal

#### **Presentation Abstract:**

Environmental education and scientific research disciplines are essential for sustainable community development, yet they have not been imposed in most educational systems. Through the implementation of its technological capabilities, the GLOBE Program is an additional asset to educational, scientific, technological and environmental policy and should be integrated into the teaching of science for quality education, sustainable development, Information and Communication Technologies (ICTs) in the teaching of science, the civilization of the third millennium and support materials for awareness campaigns on environment issues. In addition, the GLOBE Program must be integrated into all levels of the school experience. This presentation invites GLOBE students and educators around the world to combine efforts and continue collaborative research projects for sustainable development.

### **11:30–11:40 Integrated Design for Geoscience Education: On-line Learning Modules**

Dr. Tina J. Cartwright, Marshall University, Fairmont, West Virginia, U.S.A.

Mr. Todd Ensign, U.S. GLOBE Partner and Education/Technology Specialist, NASA IV&V Educator Resource Center, Fairmont, West Virginia, U.S.A.

Dr. Deb Hemler, Fairmont State University, Fairmont, West Virginia, U.S.A.

#### **Presentation Abstract:**

Integrated Design for Geoscience Education (IDGE) is an NSF funded project which utilizes on-line learning modules based on The GLOBE Program to increase scientific knowledge and to promote careers in the geosciences for at-risk students. The Upward Bound (UB) program serves high school students who are preparing to enter postsecondary education and are from low-income families in which neither parent holds a bachelor's degree. During the summer of 2006 and 2007, an inquiry-based laboratory science course based on NASA's GLOBE Program protocols and learning activities was infused in the summer UB program. In 2008, advanced students will continue through a second year course culminating in a Learning Expedition to Costa Rica. This on-line and field-based course involves UB students in the active collection and analysis of environmental data, promoting a multi-disciplinary integrated approach to geoscience instruction. Science content specialists have developed multiple on-line learning modules which facilitate the development of geosciences thinking skills. IDGE plans to better prepare UB students to succeed in post-secondary laboratory sciences, increase students' critical thinking skills, and promote positive attitudes towards careers in science. The program also strives to increase students' critical thinking skills and to promote positive attitudes toward careers in science.

### **11:45–11:50 GLOBE Incarcerated in Trinidad and Tobago: 2006-2008**

Mr. Henry Henderson Saunders, GLOBE Trinidad and Tobago Country Coordinator, Ministry of Education, Arima, Trinidad, West Indies

#### **Presentation Abstract:**

The GLOBE Program was introduced to the Youth Training Centre (YTC) in May 2006, in an effort to provide incarcerated youths with an opportunity to develop literacy and numeracy skills and to contribute to Prison Reform in Trinidad and Tobago. The initiative has been a tremendous success since it provides the captive audience with opportunities to develop some basic life-skills and contribute to building self-esteem. This research details a study that was conducted to determine the level of Environmental Awareness of inmates and the impact the GLOBE Program has on the participants. Additional follow-up activities, planned to contribute to the general wellbeing of inmates, will be presented.

### **12:00–13:15 Luncheon, Poster Displays and Exhibits—Sponsor: Forestry Suppliers, Inc.**



## **SESSION 2: GLOBE Science and Research Presentation Abstracts**

### **13:15–15:00**

#### **13:15-13:25 Celebrating International Polar Year (IPY) with the GLOBE Pole-to-Pole Videoconference**

Professor Maria del Carmen Galloni, GLOBE Argentina Country Coordinator, Universidad de Ciencias Empresariales Y Sociales, Buenos Aires, Argentina

##### **Presentation Abstract:**

In 2007 and 2008, students from Alaska and Argentina compared polar climates and environments through a Seasons and Biomes Project Pole-to-Pole Videoconference. Represented by researchers at the University of Fairbanks in Alaska and the South Pole, and by researchers at the Austral Center for Scientific Research and the Ministry of Education, Culture, Science and Technology of Tierra del Fuego in Argentina, teachers and students of GLOBE from both latitudes participated in the videoconference that took place between the North and South Poles.

#### **13:30–13:40 Sipeth’ Amaz’ Olwazi Egagasini - Waves of Knowledge**

Mr. Thomas Mtontsi, South African Environmental Observation Network (SAEON), Pretoria, South Africa

Dr. Juliet Hermes, South African Environmental Observation Network (SAEON), Pretoria, South Africa

Ms. Sibongile Mokoena, GLOBE South Africa Country Coordinator, South African Environmental Observation Network (SAEON), Pretoria, South Africa

Ms. Penelope Price, South African Environmental Observation Network (SAEON), Pretoria, South Africa

Mr. Johan Pauw, South African Environmental Observation Network (SAEON), Pretoria, South Africa

##### **Presentation Abstract:**

In a bid to gain a better understanding of what ‘offshore marine’ science is all about, the SAEON (South African Environmental Observation Network) Egagasini node Education Officer recently headed south through the ‘roaring forties’ to 58 degrees South, on the *SA Agulhas*, South Africa’s polar research vessel. Joining scientists on this oceanographic research cruise to Marion Island in the Southern Ocean involved integrating into the research team and playing an active role in the different aspects of the daily data collection program. This experiential learning will be captured in the form of a video documentary, with accompanying reading materials that can be taken to schools and used to promote an understanding and awareness of, and generate an interest in, our oceans; publicize the work done by scientists in generating knowledge about oceans to educators and learners in order to foster an understanding and interest; create public awareness about the role of oceans in today’s weather and climate; encourage inquiry-based learning, and demonstrate possible curriculum links for educators and senior learners; and expose learners to career opportunities existing in marine sciences.

#### **13:45–13:55 Storycaching GLOBE: Combining Data with Community Discourse to Encourage Sustainability**

Dr. Georgia A Cobbs, U.S. GLOBE Partner, University of Montana, Missoula, Montana, U.S.A.

Dr. Martin G. Horejsi, University of Montana, Missoula, Montana, U.S.A.

##### **Presentation Abstract:**

What if you collected GLOBE data at a particular bend in the river because it was your grandfather’s favorite fishing hole? Although the pH, dissolved oxygen and turbidity data confirm why fish prefer living there, something



your grandfather already knew, you wish you could also attach your grandfather's stories to the GLOBE site. Storycaching is the intersection of a GPS and an iPod. By connecting a story (Podcast) with a specific place (GPS coordinates), personal and community dimensions are added to the GLOBE data collection. Listening to a Storycache at specific GPS coordinates attaches relevance to a GLOBE site, creating personal awareness and appreciation by stressing the importance of the site within its community. Our presentation demonstrates how the simplicity of creating podcasts combined with the ubiquitous nature of iPods and GPS, allows all GLOBE participants to share stories about their sites. Further connections, including Google Earth, will be shared, opening the door to Storycaching GLOBE for all.

#### **14:00–14:10 Variation of Water Quality Along the Abattoir Channel and Nnkoko-Busabaga Stream Running Through Farmed Areas of Lugazi Town Council**

Mr. Emmanuel Wamala, Wanyange Girls School, Jinja, Uganda

##### **Presentation Abstract:**

Streams in Lugazi town council receive effluent and nutrients. Effluent is mainly from households and industries while nutrients are from agricultural farms. There is an increased discharge of these wastes into the streams due to an increase of socio-economic activities in the town. This influences the water quality of streams used by the local community. Variation of water quality of stream and abattoir effluents were investigated using GLOBE protocols in Lugazi town council, Mukono district in January, 2008. Water quality changes indicated significant differences between the six stations sampled while pH and dissolved oxygen were not significantly different.

#### **14:15–14:25 Using GLOBE Data to Estimate Efficiency of Solar Panels**

Dr. Paul Ruscher, U.S. GLOBE Partner, Florida State University, Tallahassee, Florida, U.S.A.

##### **Presentation Abstract:**

In a recent study at the Florida A&M University at Florida State University (FAMU/FSU) College of Engineering, it was determined that there are both materials science and environmental limitations on the efficiency of most commercially available solar panels. This is important as economies develop across the world and people begin to explore solar energy to provide "green" or renewable energy sources. How much energy can one expect to receive from typical solar panels? Unfortunately, most panels are manufactured with respect to middle-latitude standards, and don't account for atmospheric factors appropriate for tropical latitudes, where many are deployed. Solar radiation may be more intense at low latitudes, but it turns out that many environmental factors limit the efficiency to negatively compensate for these gains, such that "rated" power is often not achieved. By using GLOBE data for cloud cover, air temperature, wind speed, surface temperature, relative humidity, water vapor, air pressure, and aerosol, it may be possible for GLOBE schools to inform local communities about the possible limitations that affect the amount of energy that can be extracted from solar panels. We will present some examples of these factors and how GLOBE data might be used in a special investigation, and will seek partners in this project.

#### **14:30–14:40 Light Pollution in the City of Busan—"Where Have All the Stars Gone?"**

Dr. Kyunghoon Lee, Korea Science Academy, Busan, South Korea

Dr. Minhea Kim, Korea Science Academy, Busan, South Korea

Dr. Uitae Kim, Korea Science Academy, Busan, South Korea

##### **Presentation Abstract:**

The Korea Science Academy (KSA) SEM Observatory has been tasked with finding undiscovered variables and studying outer galaxies since the Observatory's opening in 2003. Since that time, KSA SEM has been conducting observations to find new minor planets. However, we are faced with a serious problem caused by light pollution from the downtown area located near the SEM observatory. In addition, we realized the global seriousness of light



pollution when participating in the 2006 GLOBE at Night campaign and obtained additional data and information from the International Dark-Sky Association (IDA). Consequently, we felt the need for research of light pollution near the SEM Observatory and, therefore, our research includes gathering data for the range of light pollution around the observatory every day after sunset using a SBIG STL-11K CCD attached circular fisheye lens. In addition, every hour we scanned the variation of brightness between the zenith and the surface through the comparison of magnitude against reference stars. Current research has expanded to include taking more observations at three sites in Busan City to compare with prior data and create maps documenting light pollution in Busan City.

#### **14:45–14:55 Watershed Mania Continues!**

Dr. Lynne H. Hehr, U.S. GLOBE Partner, Center for Math and Science Education,  
University of Arkansas, Fayetteville, Arkansas, U.S.A.

Dr. John G. Hehr, Dean's Office, Fulbright College of Arts and Sciences and Professor,  
Department of Geosciences, University of Arkansas, Fayetteville, Arkansas, U.S.A.

#### **Presentation Abstract:**

Located in the Northwest Arkansas, Beaver Lake is the primary source of fresh water for more than 300,000 people. For the past ten years, the area that surrounds it has experienced an enormous growth rate that continues to place an ever-increasing demand on the reservoir. One result of this growth is that the water quality of the lake is effected by everything that happens in the entire watershed. The idea of a watershed and its impact on a local region can be a very difficult concept for elementary students to understand. Through active, hands-on modeling and game-playing, the Beaver Lake Watershed Program, in conjunction with the University of Arkansas's Center for Math and Science Education, is in the process of developing classroom materials to assist teachers in helping students better understand the dynamics of a watershed, in general, and Beaver Lake Watershed, in particular.

#### **15:00–15:15 Break**

### **SESSION 3: GLOBE Science and Research Presentation Abstracts**

#### **15:15–16:15**

#### **15:15–15:25 The Role of Reed Grass (*Arundo donax*) in Riparian Vegetation to Mitigate River Pollution: The Case of Bulbula River, Addis Ababa**

Dr. Mekuria Argaw Denboba, GLOBE Ethiopia Country Coordinator and Professor,  
Addis Ababa University, Addis Ababa, Ethiopia

#### **Presentation Abstract:**

In Addis Ababa, solid and liquid waste management facilities are inadequate and wastes end up in many of the rivers and streams such as the Bulbula River. This study aims to assess sources of pollutants and their sinks (plants and soils) to suggest management practices for the riparian vegetation. Water, soil and plant samples were collected from three zones of the watershed: upper, middle and lower. The results show severe pollution of the river by  $\text{Cl}^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{Mn}^{2+}$  and  $\text{Fe}^{2+}$  due to high amounts of wastes disposed into the river from municipal sources, garages, hospitals and congested settlements. Much of the P, N,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Cu}^{2+}$  are stored in the soil in the middle and lower zones. The soil may serve as a sink to many of the pollutants. The plant analysis indicates that *Arundo donax* absorbs  $\text{Fe}^{2+}$ ,  $\text{Mn}^{2+}$  and  $\text{Zn}^{2+}$  than  $\text{Cu}^{2+}$ , N and P, at the middle and lower zones of the river bank, where much of the pollutants get into the river. *Arundo donax* accumulated high amounts of  $\text{Fe}^{2+}$  and  $\text{Mn}^{2+}$ , without developing chlorotic symptoms. Hence, *Arundo donax* reduces excess metals and serves to clean up toxic materials from polluted rivers.

**15:30–15:40 GLOBE in Madagascar**

Mr. Paul Randrianarisoa, GLOBE Madagascar Country Coordinator, Ministry of National Education and Scientific Research, Tsimbazaza-Antananarivo, Madagascar

**Presentation Abstract:**

Madagascar joined the GLOBE program on 11 June 1997 and in October 2007, reinforced the importance of GLOBE in Madagascar through the establishment of the Madagascar Malaria Project. The objectives of the Malaria Project are to assist students and communities in their local fight against the anopheles vectors of malaria; to have scientists and researchers use quality GLOBE malaria data in their research; and to develop educational curriculum and materials. To date, advancements include fostering decisions by the Government department; establishing contacts to promote partnership and finalizing the Malaria Project documents for use in schools. The theme was chosen by students who collect continuous data in collaboration with scientists. Implementation efforts resulted in teachers becoming more aware of the GLOBE inquiry-based approach to science education. Plans for 2008 include continued use of GLOBE data to fight malaria vector and to identify at-risk areas as well as the climatic parameters having influence over malaria vector space-time distribution. In addition, studies on (a) larval lodgings, (b) climatic parameters that condition their space-time distribution, and (c) physiochemical variables that condition the larval outbreak are currently underway. A unique project, in the planning stages, focuses on research in using natural local plants for fighting malaria. GLOBE in Madagascar plans to continue expanding educational applications through continued teacher training, using GLOBE protocols to answer student questions, finalizing the Malaria Teacher's Guide and promoting additional partnerships to ensure sustainability.

**15:45-15:55 GLOBE Implementation in Thailand****Part I: Integrated GLOBE Soil Protocols for Climate Change Impacts on Land Degradation Monitoring**

Mr. Patrawut Pusingha, GLOBE Thailand Representative, The Institute for the Promotion of Teaching Science and Technology (IPST), Bangkok, Thailand

**Presentation Abstract:**

Warming of the global climate system is recognized as a serious problem which is affecting all systems on Earth. Higher temperatures lead to a high rate of evaporation and dry conditions, resulting in soil moisture losses and droughts. This can cause sudden dramatical changes such as the expansion of saline, acid sulfate, lateritic soils, and more. These changes have contributed to land degradation. Therefore, large-area and long-term field studies are required to evaluate observed impacts of climate change on land degradation. GLOBE Soil Protocols, such as soil temperature, soil moisture, and soil pH combined with soil electric conductivity (EC) can be simply used to monitor such changes. Through Student-Teacher-Scientist-Community Collaboration Research, this will not only enable improved understanding of where and when impacts become detectable, and where the hotspots or vulnerable areas lie, but also lead to the appropriate mitigation and adaptation preparations.

**Part II: Earth System Science in Thai School Curriculum**

Ms. Suwinai Mongkonthan, GLOBE Thailand Representative, Institute for the Promotion of Teaching Science and Technology (IPST), Bangkok, Thailand

**Presentation Abstract:**

IPST has developed an Earth System Science (ESS) curriculum for students in grades 4-6 and 7-9 that includes a Teacher's Guide and Student's Activities designed to help students develop skills to learn about the natural environment, interconnected and interdependent of the Earth system, by doing hands-on and minds-on scientific research. At present, the ESS curriculum materials have been implemented in 30 schools through out Thailand. ESS teacher training workshops, as well as follow-up activities, have been offered. The materials are currently being revised and the number of schools involved in the project is increasing.

**16:00–16:10 Electronic Applications of the GLOBE Earth System Science Poster Activity**

Dr. Michael R. L. Odell, University of Texas at Tyler, Tyler, Texas, U.S.A.

Dr. Mitchell D. Klett, Northern Michigan University, Marquette, Michigan, U.S.A.

Dr. Teresa J. Kennedy, University Corporation for Atmospheric Research, Boulder, Colorado, U.S.A.

**Presentation Abstract:**

The GLOBE Earth System Science (ESS) Poster activity provides a relevant overview of the importance of data collection and analysis to monitor change over time. A demonstration of the electronic implementation of the GLOBE ESS Poster activity will provide a model for classrooms equipped with simple technologies, such as computer and projector capabilities, as well as high-tech classrooms connected to the Internet. Additional activities aligned with UNEP's *One Planet Many People Atlas of Our Changing Environment* will provide a connection to the ESS Poster activity on changes in the global environment acquired and assessed through state-of-the-art remote sensing technology. These activities are a modification of the paper version of the poster containing additional data sources and activities that actively engage students in a whole-class setting. Since many schools are working hard to reduce paper consumption and to instill an awareness of the environmental impact of excessive paper use, promotion of the utilization of technologies as a primary means of pedagogical presentation to model prudent use of paper products in the classroom will be addressed. Each participant will receive an electronic copy of the activity and support materials.

**SESSION 4: Supporting Student Initiatives****16:15–16:55****16:15–16:40 Panel Discussion: National and Regional GLOBE Student Events**

Mrs. Dana Votapkova, GLOBE Czech Republic Country Coordinator, TEREZA Association, Prague, Czech Republic—Planning Committee for 1998 GLE in Finland

Dr. Lynne H. Hehr, U.S. GLOBE Partner, Center for Math and Science Education, University of Arkansas, Fayetteville, Arkansas, U.S.A.—Host for 2000 GLE in Arkansas

Mrs. Diana Garasic, GLOBE Croatia Country Coordinator, Education and Teacher Training Agency, Zagreb, Croatia—Host for 2003 GLE in Croatia

Mrs. Margaret Besong, GLOBE Cameroon Country Coordinator, Ministry of Education, Yaounde, Cameroon—Co-Host for 2008 GLE in South Africa

Mr. Mark Brettenny, GLOBE in Africa, Mossel Bay, South Africa—Co-Host for 2008 GLE in South Africa

Mrs. Zakeya Ali, Near East GLOBE International Advisory Committee Representative, Ministry of Education, Muharaq, Bahrain—Host for 2005-2007 Annual Young Scientists Regional Event in Bahrain

Dr. Charlie Navanugraha, GLOBE Thailand Representative, The Institute for the Promotion of Teaching Science and Technology (IPST), and Faculty of Environment and Resource Studies, Mahidol University, Nakhon Pathom, Thailand—Host for 2007 GLOBE Regional GLE in Thailand

**Panel Abstract:**

Information and examples for organizing national and regional GLOBE student research competitions and events will be provided through an interactive panel discussion.



**16:45–16:55 The GLOBE Parent Council**

Mr. Keith Young, GLOBE Parent Council, Detroit, Michigan, U.S.A.



The GLOBE Parent Council (GPC) is a parent advocacy group committed to supporting the activities of the GLOBE worldwide community of students, teachers, scientists and citizens through the creation of sustainable support models for GLOBE schools. The GPC strives to inspire the next generation of global scientists through support of community-based Earth system science research activities aimed at increasing environmental awareness and promoting scientific discovery on local, national, regional and global scales. The GPC is working to create and maintain a collaborative international parent network committed to supporting implementation efforts lead by GLOBE Country Coordinators and U.S. Partners; seeking external funding for GLOBE student projects and research activities; and creating a culture of positive engagement between parents and their students through community involvement in vital environmental issues.

**16:55–17:00 Conference Closing and Networking Plans**

Conference Co-Chairs: Dr. Teresa Kennedy, Mrs. Margaret Besong and Mr. Mark Bretteny

**THANK YOU FOR ATTENDING  
THE 12<sup>TH</sup> ANNUAL GLOBE CONFERENCE!**



**Questions about GLOBE?**

**We can help!**

**Contact the Help Desk Staff:**

**GLOBE Help Desk:** <Help@GLOBE.gov>

**Contact your Regional Desk Officer:**

**Africa:** <africa@globe.gov>

**Asia and the Pacific:** <asia-pacific@globe.gov>

**Europe and Eurasia:** <europe@globe.gov>

**Latin America and the Caribbean:** <latinamerica-caribbean@globe.gov>

**The Near East and North Africa:** <neareast@globe.gov>

**North America:** Canada: <canada@globe.gov>

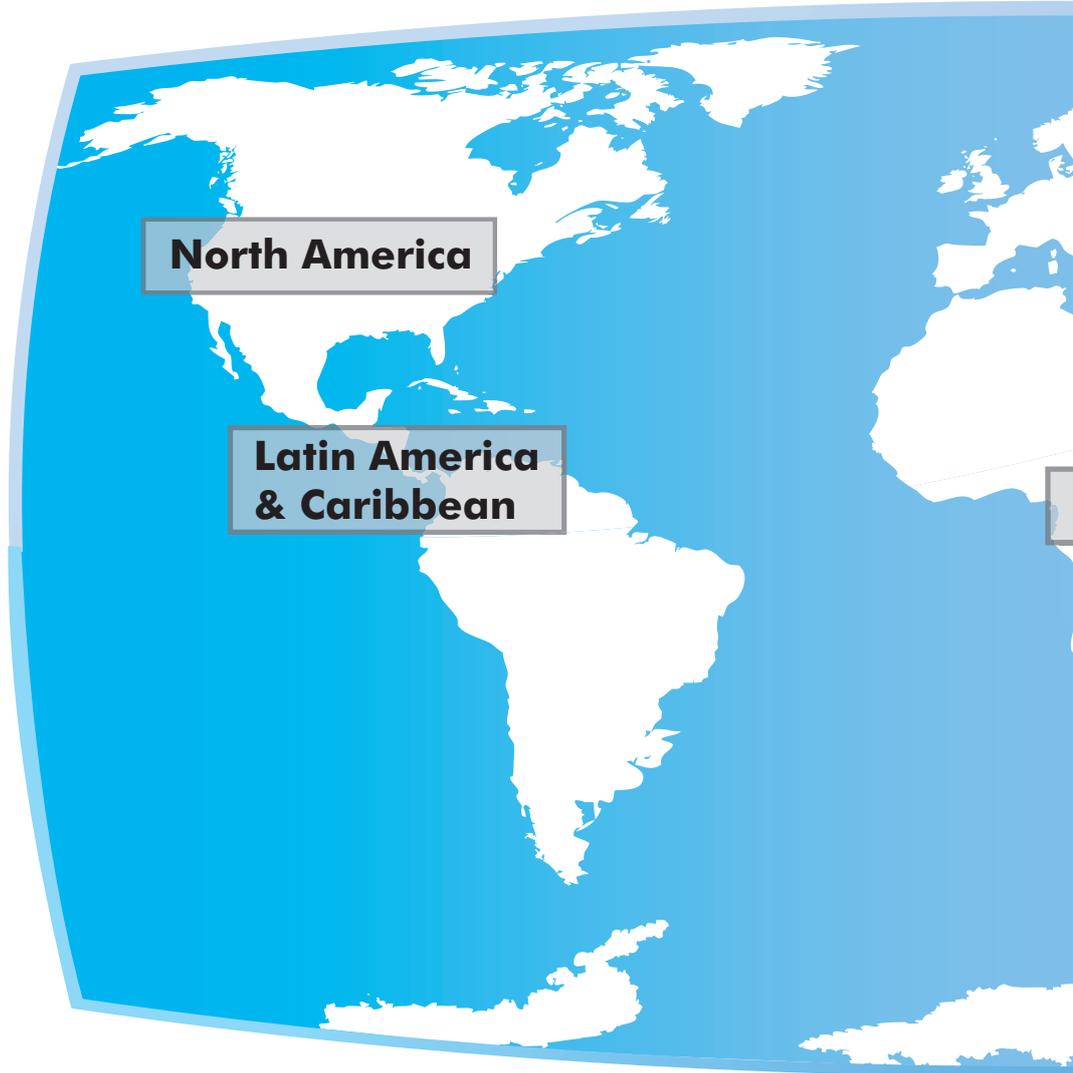
The United States: <united-states@globe.gov>



Hours are Monday through Friday, 8:00 AM – 5:00 PM Mountain Standard Time, U.S.A.



# GLOBE REGIONAL CONSORTIA



**North America Consortium (2)**

 Canada  
 United States of America

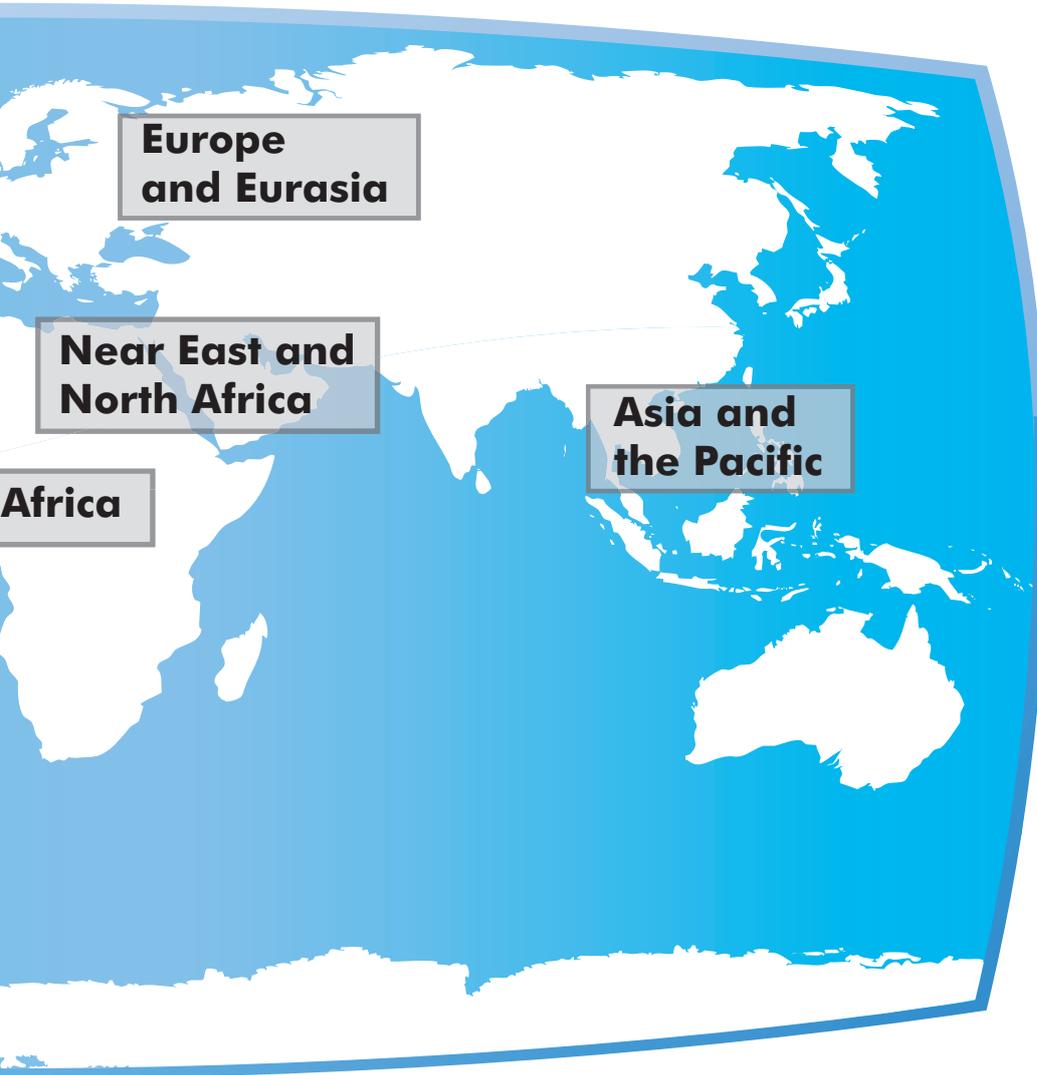
**Latin America-Caribbean Consortium (18)**

-  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 Consortium (11)**

 Bahrain	 Morocco
 Egypt	 Qatar
 Jordan	 Saudi Arabia
 Kuwait	 Tunisia
 Lebanon	 United Arab Emirates
 Mauritania	

FOR INFORMATION  
 ABOUT ALL GLOBE COUNTRIES  
 GO TO <[WWW.GLOBE.GOV/COUNTRIES](http://WWW.GLOBE.GOV/COUNTRIES)>.



- Europe-Eurasia Consortium (40)**
- Austria
  - Belgium
  - Bulgaria
  - Croatia
  - Cyprus
  - Czech Republic
  - Denmark
  - Estonia
  - Finland
  - France
  - Germany
  - Greece
  - Hungary
  - Iceland
  - Ireland
  - Israel
  - Italy
  - Kazakhstan
  - Kyrgyzstan
  - Latvia
  - Liechtenstein
  - Lithuania
  - Luxembourg
  - Macedonia
  - Malta
  - Moldova
  - Monaco
  - Netherlands
  - Norway
  - Poland
  - Portugal
  - Romania
  - Russia
  - Serbia and Montenegro
  - Spain
  - Sweden
  - Switzerland
  - Turkey
  - Ukraine
  - United Kingdom

- Africa Consortium (22)**
- Benin
  - Burkina Faso
  - Cameroon
  - Cape Verde
  - Chad
  - Congo
  - Ethiopia
  - Gabon
  - Gambia
  - Ghana
  - Guinea
  - Kenya
  - Madagascar
  - Mali
  - Namibia
  - Niger
  - Nigeria
  - Rwanda
  - Senegal
  - South Africa
  - Tanzania
  - Uganda

- Asia-Pacific Consortium (17)**
- Australia
  - Bangladesh
  - Fiji
  - India
  - Japan
  - South Korea
  - Maldives
  - Marshall Islands
  - Micronesia
  - Mongolia
  - Nepal
  - New Zealand
  - Pakistan
  - Palau
  - Philippines
  - Sri Lanka
  - Thailand



## **POSTER Presentations—GLE and Annual Conference**

Poster presentations will be displayed in conjunction with all GLE Delegation Exhibits located in the Leslie Social Science Building Foyer. Posters will be presented by GLOBE Students, Teachers, Scientists, Country Coordinators, U.S. Partners, Collaborating Organizations and Sponsors. Listed below are the poster presentation abstracts submitted by GLOBE Country Coordinators and U.S. Partners. Formal poster presentations will take place on Sunday, 22 June, from 17:00-18:30.

### **GLOBE Program: A Model to Improve the Teaching and Learning of High School Chemistry**

Mrs. Samirah Mercado, University of Puerto Rico, Mayagüez, Puerto Rico

#### **Poster Abstract:**

The GLOBE Program in Puerto Rico supports the development of strong links between universities and K-12 educational science initiatives. One of the sciences most impacted by the GLOBE Program is chemistry. This initiative links K-12 students, teachers, university students, and college professors with the goal of improving STEM education. A research study was conducted to define the effect and influence of the GLOBE Program in high school chemistry. The study hypothesis stated that the link between universities and K-12 schools through GLOBE improves the teaching and learning of high school chemistry. Questionnaires, surveys, and interviews were administered to obtain the data used to answer the study questions. Additionally, a chemistry test was administered to program and non-program participant students to detect misconceptions in chemistry. Data suggested that GLOBE enhances the teaching of chemistry and motivates high school students by: (1) improving their achievement in chemistry, (2) developing critical science process skills, (3) developing technological skills, (4) reducing chemistry misconceptions, and (5) increasing university enrollment in chemistry-related programs.

### **North Florida Partnership Activities – Distance Learning, Conference Sessions, and Preservice Education**

Dr. Paul Ruscher, U.S. GLOBE Partner, Florida State University, Tallahassee, Florida, U.S.A.

#### **Poster Abstract:**

For the past several years, the GLOBE partnership in North Florida has lacked core funding with which to carry out teacher training or other means of support for teachers, so we have concentrated on three models of training: (1) Distance Learning for GLOBE; (2) Florida Association of Science Teachers and NASA Workshops; and (3) Teaching Earth and Space Science – GLOBE. In addition to involving undergraduate students in our observation program (since 1999, FSU has collected over 16,000 observations), to transforming our non-science majors classes, GLOBE has been infused in our Meteorology curriculum. This poster will list our selection of protocols for conference sessions, distance learning components (including native people's science objectives), and materials used for preservice teachers in a Science Education graduate major. Our experiences in developing some of GLOBE's newer protocols (Relative Humidity, Barometric Pressure) and refining GLOBE's cloud protocols gave us the impetus to develop a partnership; we have been working with the state Department of Education as it reworked its standards in 2007–2008 to ensure that benchmarks involved in environmental education (appropriate for GLOBE) are included. We are pleased to report on their adoption and will also provide the examples of new benchmarks and standards appropriate for GLOBE.

### **GLOBE Inquiry Activities in Japan Supported by Regional Scientists and Organizations**

Dr. Tomoyasu Yoshitomi, Tokyo Gakugei University, Tokyo, Japan

#### **Poster Abstract:**

GLOBE Japan activities have expanded to include regional characteristics and issues, such as endangered or rare species and air pollution caused by auto emissions, in addition to the standard protocols. This poster will show recent GLOBE activities in junior high and high schools supported by the Japanese Ministry of Education, Culture,



Sports, Science and Technology. Highlights include interactions between schools and outside scientists and organizations such as universities and environmental non-profit organizations (NPOs). Their involvement included research planning, field investigation instruction, lectures at schools, and other related activities supporting inquiry field expeditions and encouraged awareness of regional environments.

### **GLOBE FRANCE: from Calisph'Air to HydroSat**

Professor Danielle DeStaerke, Centre National d'Etudes Spatiales (CNES), Toulouse, France

Dr. Dianne Q. Robinson, Hampton University, Hampton, Virginia, U.S.A.

Ms. Annie Carrasset, Collège Cantelane, Bordeaux, France

Ms. Nicole Herman, Lycée Roosevelt, Reims, France

Mr. Eric Abgrall, Lycée Jolimont, Toulouse, France

Ms. Vanessa Magro, Collège La Chênaie, Mouans Sartoux, France

Ms. Aurelie RADIS, Collège La Chênaie, Mouans Sartoux, France

### **Poster Abstract:**

Calisph'Air, in its fourth year of implementation, focuses on atmosphere and climate, in connection with the PARASOL and CALIPSO satellite missions. This project provides students with the opportunity to learn by taking scientifically valid measurements, including aerosols, reporting results into the GLOBE database, and then using the data in connection with data from other schools and satellite data to build a pedagogic project in alignment with the curriculum. The main objective is to help students explore and understand their local, regional and global environment through scientific investigation and to gain a better understanding of aerosols and clouds, which remains one of the principal uncertainties in the Global Warming process. This project is realized in collaboration with the CALIPSO Education and Public Outreach (EPO) Program managed by Hampton University for NASA. Many African, European and U.S. schools have participated in different measurement campaigns organized in the framework of the Calisph'Air Project. In addition, information on a new project called "Hydro Sat" will be presented. *Hydro Sat* focuses on the pollution of rivers and includes studies of groundwater and how pollution can be attributed to activities implemented long distances from the river. Through this project, watershed zones are examined in connection with Earth observation satellites such as SPOT.

### **Collaborations That Promote Science Conceptual Understanding Through GLOBE Learning Communities**

Dr. Kimberly A. Staples, U.S. GLOBE Partner, Kansas State University, Manhattan, Kansas, U.S.A.

### **Presentation Abstract:**

Researchers at Kansas State University invite participants to join the K-State-Cameroon-Saudi Arabia collaboration to engage in professional dialogue and evaluate the results of science instruction embedded with culturally relevant scenarios. The goal of this project is to increase preservice and inservice teacher ability to explain science concepts using GLOBE Investigations embedded with culturally relevant examples. Teachers, Scientists, Country Coordinators, and interested participants will be provided with the procedures for exchanging concept-building strategies through an online science teacher collaboration forum as well as information about the process of evaluating culturally relevant science explanations. Results of the effects of culture on language used to present science concepts in the "Explain" phase of inquiry-based science lessons will be shared. The results of creating an international collaboration will be reported to support the integration of the multicultural competency "Knowledge (Cultural Self)" during science teaching. Pre and Post-test Pluralism and Diversity Attitude Assessment (PADAA) surveys were administered to determine the degree of change in attitudes toward pluralism and diversity in science teaching. As a result, 22 preservice teachers increased ability to understand the role of cultural identity and how it influences verbal and non-verbal communication during science instruction when implementing GLOBE Investigations.



# INTERNATIONAL SCIENCE EDUCATORS— Shape Your Success at NSTA



The National Science Teachers Association (NSTA) is the largest organization in the world that promotes excellence and innovation in science teaching and learning for all. Through our unique international e-membership, priced at \$35 U.S. annually, international science educators can participate in all NSTA member benefits, including discounted registration at the NSTA national conference in New Orleans, Louisiana (March 19–22, 2009), and participation in the International Science Education Day at the conference.

### Membership Benefits:

- Award winning journal, electronically delivered to your inbox
- E-mail delivery of *NSTA Express*, a weekly newsletter and *Science Class*, a monthly theme-based newsletter
- Discounts on NSTA Press books—devoted to teaching strategies, content knowledge, skill development, assessment, inquiry based tools, and more
- E-mail Listservs and online journal archives
- Discounts on NSTA conferences and professional development programs

### International Day Benefits:

- Collaboration in science education with your peers from other countries
- Invitation to the NSTA President's International Reception, with notable guests
- Plenary address by a leading international educator
- Follow-up concurrent sessions and poster presentations
- Networking opportunities to connect with science educators globally



Visit [www.nsta.org](http://www.nsta.org) to become a member.

Our warmest thanks to the GLOBE Program, which works collaboratively with NSTA promoting science education.





## GLOBE International Advisory Committee

The GLOBE International Advisory Committee is an advisory body formed in 2006 to provide GLOBE Regional Consortia with a formal mechanism for community input in the overall implementation, enhancement, and sustainability of the GLOBE Program. The GIAC provides advice to the management of GLOBE that could assist the GLOBE Program Office (GPO) to make progress toward goals including student-teacher-scientist partnerships, regionalization and issues surrounding programmatic sustainability around the world.



Mrs. Zakeya Ahmed Ali, Chair (Term: 2006–2010), Bahrain  
Near East and North Africa (11 countries)



Mrs. Margaret Besong (Term: 2006–2009), Cameroon  
Africa (22 countries)



Professor Maria del Carmen Galloni (Term: 2006–2009), Argentina  
Latin America/Caribbean (18 countries)



Dr. Andy Tasker (Term: 2008–2010), United Kingdom  
Europe/Eurasia (40 countries)



Mr. Rajinder Mehta (Term: 2008–2010), India  
Asia/Pacific (17 countries)



Dr. Paul Ruscher (Term: 2006–2009), Florida, U.S.A.  
North America (2 countries)

### Previous GIAC Members



Mr. Karl Torstein Hetland (Term: 2006–2008), Norway  
Europe/Eurasia



Dr. Michael Odell (Term: 2006–2007), Texas, U.S.A.  
North America



GLOBE is proud to announce the initial development phase of the:

## The GLOBE Student Research Campaign on Climate Change—2010-2012

Our aim is to build a coalition of key partners from science, education, business, and policy areas to plan, fund, market, implement, and assess a **Worldwide Student Research Campaign on Climate Change**.

Over a 2-3 year period, beginning in 2010, our goal is to involve >1,000,000 students in Climate Change Research and **we need your help to achieve this goal**. This international event will enhance climate literacy and understanding for millions of people worldwide, through student research investigations on a set of interrelated climate topics.

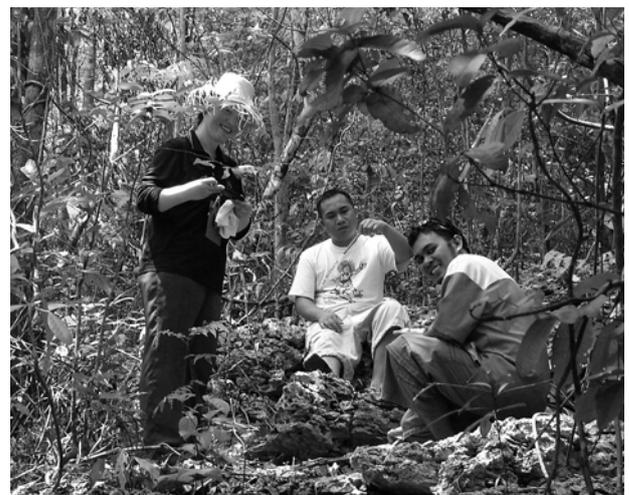


As the world’s largest international science education program, GLOBE endeavors to take environmental education to the next level by leveraging our scientific protocols, educational activities, experience, and worldwide network of GLOBE Partners, teachers, scientists, alumni, schools and countries.

GLOBE is in a unique position to enlist the support of some of the world’s leading climate change scientists, internationally recognized education and outreach experts, businesses, foundations, and policy makers through collaborative partnering efforts including our principle sponsoring and cooperating agencies (NASA and UCAR). GLOBE’s new NSF Earth System Science Projects (ESSPs), will be a key component of this effort, supporting student research on Climate and Energy (Carbon Cycle),

Climate and Water (Watershed Dynamics), Climate and Ecosystems (Seasons and Biomes), and Climate and Oceans (From Local to Extreme Environments).

The Climate Change Campaign will provide a variety of opportunities for meaningful, relevant and important student research that leads to understanding and action at local to global scales. GLOBE has always been considered a unique educational force to educate, train, inspire and encourage young people to preserve the environment for current and future generations. Through GLOBE’s new Climate Change Initiative, GLOBE will empower students, teachers and communities around the world to realize their individual and collective potential by addressing the single most challenging issue of our time.



**We are interested in your ideas! Please send specific investigation topics and questions around Climate-Water, Climate-Energy, Climate-Ecosystems, Climate-Human Health, and any other topics and questions of interest for the GLOBE Climate Campaign you may have to <ClimateChangeCampaign@globe.gov>.**



## UCAR International Affiliates Strengthen GLOBE Implementation

GLOBE is an interagency program funded by the National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF), supported by the U.S. Department of State, and implemented through a cooperative agreement between NASA and the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado.

UCAR manages the National Center for Atmospheric Research (NCAR) on behalf of the National Science Foundation. UCAR also manages a number of programs under the auspices of the UCAR Office of Programs.

UCAR is a consortium of 71 U.S. Member Institutions and 17 Academic Affiliates (Non-Ph.D. granting institutions), as well as 48 International Affiliate institutions (37 in 22 GLOBE countries) involved in atmospheric and related sciences.

UCAR established the International Affiliates Program in the 1980's to foster collaborative research and education programs among UCAR members and international academic, research, and operational institutions; to enhance communications about atmospheric and related science programs and resources worldwide; and to create a collegial environment supportive of cooperation and understanding. UCAR Members and Affiliates are located in 28 countries plus the United States.

UCAR serves as a hub for research, education, and public outreach for the atmospheric and Earth-system science community. This connection provides students and their teachers around the world with direct communication to scientists as well as opportunities to participate in their research.

Scientists in the national and international UCAR community are working with GLOBE schools and mentoring students to make their learning experience more engaging.

UCAR Affiliates are located in the following GLOBE Countries:

ARGENTINA	GHANA	KOREA	RUSSIA
AUSTRALIA	INDIA	MEXICO	SPAIN
CANADA	ISRAEL	NIGERIA	SWEDEN
DENMARK	ITALY	PANAMA	UNITED KINGDOM
EGYPT	JAPAN	PERU	
GERMANY	KENYA	PHILIPPINES	



The GLOBE Program Office wishes to thank UCAR's International Affiliates and Scientists for their ongoing support of GLOBE priorities and initiatives focused on promoting student research around the world.

For more information about UCAR International Affiliates, please visit  
<<http://www.ucar.edu/governance/iap/index.jsp>>.

For U.S. Member Universities, please visit  
<<http://www.ucar.edu/governance/members/institutions.shtml>>.



# WMO-GLOBE Collaboration

On 23 March 2007, the World Meteorological Organization (WMO) and the National Aeronautics and Space Administration (NASA) agreed upon *Terms of Reference* to allow the commencement of GLOBE and WMO collaboration on common goals. These goals include increasing environmental awareness throughout the world, developing scientific understanding of the global environment, and supporting achievement in science and mathematics education around the world.

The WMO School and Public Environmental Education Program collaborates with GLOBE International Partners to assist schools, academic institutions and the public with developing an awareness of the environment among students, educators and communities, with particular emphasis on understanding the physical processes associated with weather, climate, water and related environmental issues.

The collaboration promotes the development of products or services associated with learning about weather, climate and water, primarily within the education system of WMO Member Countries, including provision of educational materials, curriculum development and support for educators, as well as specifically aimed initiatives focused at developing the professional expertise required by the National Meteorological and Hydrological Services (NMHSs) and others within the meteorological and hydrological communities.

The overall objective of the WMO-GLOBE partnership is to inform and educate the public, primary and secondary school students, policy and decision makers, and other interested parties about the scientific understanding and socioeconomic benefits to be derived from weather, water, climate and related environmental services such as preparedness for and mitigation of natural hazards, and environmental stewardship.



**World Meteorological Organization**



The GLOBE Program Office wishes to thank the WMO network, including the National Meteorological and Hydrological Services in GLOBE's 110 partner countries, for their ongoing support of GLOBE priorities and initiatives focused on promoting student research around the world.

For more information about the World Meteorological Organization see [http://www.wmo.ch/pages/index\\_en.html](http://www.wmo.ch/pages/index_en.html).



## GLOBE & HOLBROOK TEAM TO PROVIDE



### INTERNATIONAL PROFESSIONAL DEVELOPMENT OPPORTUNITIES

Over the years, Holbrook has teamed with GLOBE Country Coordinators, U.S. GLOBE Partners, and Teachers to facilitate the intersection between tourism, education, and research. Holbrook, a specialist in short-course field studies for over 25 years, and The GLOBE Program, a world-class environmental science education program in its 13<sup>th</sup> year of operation, bring together global perspectives and integrated professional development opportunities for educators in countries across the globe.



Past trips have included teachers using GLOBE protocols in the *Galapagos Islands* and *Costa Rica* to study the local environment! It is the intention of each GLOBE-Holbrook experiential learning program to offer custom-tailored instructional and learner objectives following GLOBE research models, and to use GLOBE protocols and activities for environmental measurement, aligned with international environmental research, offering the ultimate laboratory for global studies and rigorous student research.



Paramount to each expedition around the world is our collaboration with the GLOBE Community, providing opportunities for woven and integrated professional development for both local instructors alongside visiting international instructors and educators. Each workshop focuses on:

- Environmental Stewardship
- Community Exchange and Service
- Educational Exchange of Primary, Secondary and Higher Education Models of hands-on, inquiry-based science education
- Observation, data collection and analysis utilizing GLOBE student research models, protocols, and visualization tools located on the GLOBE Web site.



Look for future GLOBE-Holbrook professional development opportunities coming soon! For more information, contact the GLOBE Help Desk at <help@globe.gov> to receive more information about opportunities under development.



 **HOLBROOK**



# IGLO INTERNATIONAL ACTION ON GLOBAL WARMING

A project of the Association of Science-Technology Centers on the occasion of International Polar Year, designed to raise worldwide public awareness about global warming and ways the polar regions profoundly influence Earth's climate, ecosystems, and human society.

## New Collaborating Organization!



### Who

IGLO (International action on **GL**obal warming) is an initiative of the Association of Science-Technology Centers (ASTC), an international organization of science centers and museums dedicated to furthering the public understanding of science. It is a major component of the 4<sup>th</sup> International Polar Year (IPY) scientific program that was launched on March 1, 2007 and continues through March 2009. IGLO is supported by organizations such as NASA, NOAA, and NSF. Partners include UNESCO World Science Day, the International Polar Foundation, the GLOBE Program, and the World Ocean Network. IGLO also is endorsed by the International Council for Science and the World Meteorological Organization.

**IGLO**  
1025 Vermont Avenue NW  
Suite 500  
Washington, DC 20005  
202/783-7200 ext. 118  
www.astc.org/iglo  
iglo@astc.org

### What

IGLO is a multi-partner global initiative that raises public awareness of climate change. Extensive surveys have shown that visitors see science centers as reliable and legitimate sources of information. This capability makes us ideally suited to lead this non-partisan effort to raise climate-change awareness and bridge the gap between scientific research and public understanding. Using existing regional networks, IGLO addresses thousands of teachers, students, and interested citizens worldwide. We create international partnerships that will diversify the discussion on possible climate-change solutions and increase the impact of collective efforts necessary to move forward.



### When, Where

- **May 20, 2008**  
The Albedo Experiment: Twenty science centers worldwide will create mock "ice caps" as NASA satellites fly overhead to measure their reflectivity
- **June 15-20, 2008**  
5 Science Centre World Congress: Results of the Albedo Experiment are presented for debate on the scientific method and science communication
- **Fall 2008**  
Science center-based event in South America: Participants will share their observations of the local impacts climate change has had on their region
- **February 2009**  
IPY-IGLO virtual world tour of symbolic sites threatened by global warming



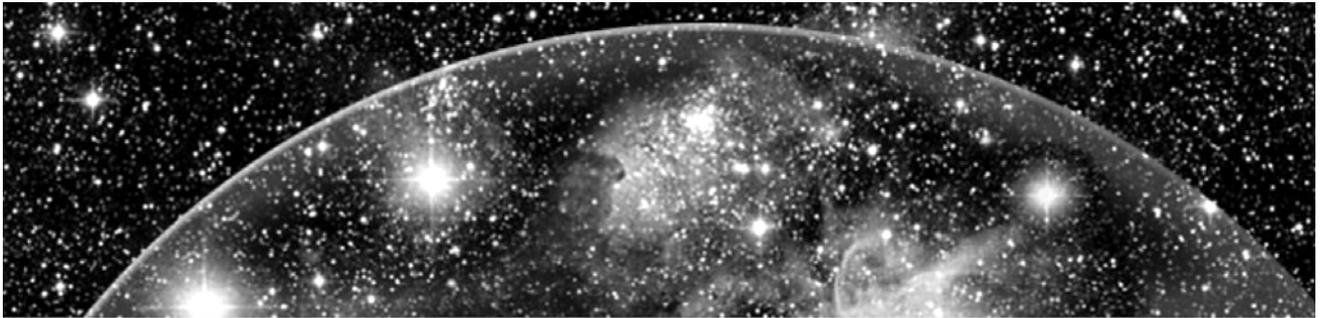
### Why

IGLO is the first international cooperation of science centers on a single topic of global significance. For institutions who participate in IGLO's common activities and exchange best practices, this initiative creates opportunities for science centers to increase local visibility, apply innovative technologies and techniques to projects, and develop new partnerships to advance science communication. Communications efforts include monthly newsletters, a Web site, a blog, and a database of more than 1,500 science center professionals. We also maintain an online Toolkit of educational activities and resources. Ultimately, IGLO will demonstrate the crucial role science centers play in science communication and education and emphasize their influence on shaping individual behavior.





## GLOBE® STARS



The GLOBE Program Office wants to hear stories of projects and people who shine. These are our *Stars*, the bright lights that spark our imagination and inspire us with news of GLOBE at work in the world. Tell us about the stars in your universe! Write to us about students, teachers, schools, projects or awards that you would like to bring to the attention of the worldwide GLOBE community. We encourage you to put the story in your own words, so do your best to send us a polished piece. Our editorial staff is here to help with the final version, but the story is really yours to tell. We welcome photographs to accompany the text, and please note the photo release form, found on the Web Site (on the News and Events Archive page) is required for use of any photo. Send your **GLOBE Stars** to <communications@globe.gov>.

## GLOBE Communications Resources at [www.globe.gov](http://www.globe.gov)



### MEDIA MATERIALS

Many documents to facilitate your efforts to promote the GLOBE Program in your region have been posted on the GLOBE Web site. You will find the GLOBE Program Summary along with several inserts for your GLOBE information packets. GLOBE ads, brochures and posters are also posted—Just print them out for immediate use! Go to the *For Partners* area of the Web site and follow the trail below:

For Partners ►► Resources ►► Media Materials

### MEDIA INSTRUCTIONAL MATERIALS

Bring media attention to your GLOBE work, including how to write a press release, and to your Pre-Workshop Public Outreach. First log in to access the *Partner Administration* page and then follow the trail below.

For Partners ►► Administration ►► Support Materials ►► Communications

### NEWSLETTERS

Bi-Annual GLOBE Regional Newsletters will bring you up to date with news at the GLOBE Program Office (GPO) and in your region. Go to the *For Partners* area of the Web site and click on Newsletters.

For Partners ►► Newsletters

### CALL FOR PUBLICATIONS AND NEWSPAPER ARTICLES

Please send us citations of your publications and copies of newspaper articles documenting your implementation efforts to add to the GLOBE database located on the Web site. Thank you!

For more information contact <communications@globe.gov>.



## The GLOBE Online Annual Partner Survey

At the end of each calendar year, GLOBE seeks valuable input to the Program from our key leaders and implementers—our GLOBE Country Coordinators and U.S. Partners! GLOBE leaders from around the world provided input into the creation of the survey tool.

### WHAT is the purpose of the GLOBE Online Annual Partner Survey?

- ▶ **The GLOBE Annual Partner Survey is an online measuring tool used by GLOBE leaders around the world to monitor activities and outcomes related to their implementation efforts aimed at achieving sustainable success.** The Online survey offers quick and easy accessibility to partnership activities from prior years. Since survey data are now stored electronically on the *Partner Administration* pages of the GLOBE Web site, located under the *Partnership Profile* section, it is readily available at all times!

### WHY should you submit information into the GLOBE Online Annual Partner Survey?

- ▶ Once completed, survey responses are placed into an annual activities summary that can be used for internal and external reporting purposes.
- ▶ The survey allows GLOBE Partners to monitor their implementation efforts in reaching their partnership goals.

### HOW does GLOBE utilize data from the survey to benefit GLOBE partnership activities?

- ▶ The GLOBE Program Office utilizes information reported in the surveys to show yearly progress to our funding agencies and to maintain on-going support for GLOBE implementation activities underway.
- ▶ GLOBE Program Office Desk Officers review the information submitted by the countries in their assigned regions, and link countries to similar activities occurring in their region, and in other GLOBE regions around the world.

**The Online Annual Survey allows GLOBE Partners to capture the history of their efforts throughout the year.** In past years, Partners were asked to complete a detailed, hardcopy survey, and mail the heavy packet back to the GLOBE Program Office. Partners were left with no record or report of their implementation efforts. Using the online system, Partners need only update the information previously submitted to the system, making completion of the survey much faster as well as providing an electronic record that stays with the partnership for their personal use!

**The Online Annual Survey provides flexibility in completing survey sections as time allows.**

Information submitted to each section can be saved at any point, allowing Partners to return and review or complete the survey at a later time. Remember, information submitted from prior years that still accurately describes your implementation activities will not need to be resubmitted since it remains in the system!

**The GLOBE Online Annual Partner Survey is an important tool assisting the GLOBE Program Office to better serve our Partners, while at the same time facilitating the development of sustainable models for program implementation. Please help us by completing your survey by the end of February each year! Thank you!**

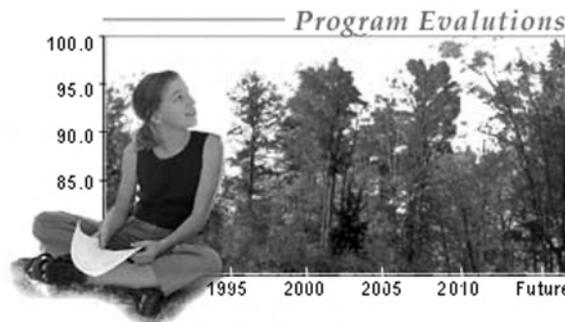


# GLOBE Evaluation

The GLOBE Program is a worldwide community of students, teachers, scientists, and citizens working together to better understand, sustain, and improve Earth’s environment at local, regional, and global scales. GLOBE’s primary goals are to

- Improve student achievement across the curriculum with a focus on student research in environmental and Earth system science;
- Enhance awareness and support activities of individuals throughout the world to benefit the environment;
- Contribute to scientific understanding of Earth as a system; and
- Inspire the next generation of global scientists.

GLOBE is an ambitious attempt to put the concepts of authentic learning, student-scientist partnership, and inquiry-based pedagogy into practice on an unprecedented scale. Please send your evaluation and assessment methods and findings to <evaluation@globe.gov> to be included in comprehensive GLOBE Program evaluation reports.



To view 10 years of GLOBE Program evaluations see <www.globe.gov/evaluation>.

**My Wonderful World**  
A National Geographic-led campaign

Geography is essential in today's interconnected world—  
But our kids aren't getting enough of it!

FOR PARENTS

FOR EDUCATORS

FOR KIDS & TEENS

**Three-quarters**  
of recent U.S. high school graduates see geography as "very important" to their careers.  
Source: National Geographic Survey

- ABOUT THE CAMPAIGN
- BLOG: NEWS & NOTES
- JOIN THE CAMPAIGN
- TEST YOUR GLOBAL IQ
- GAMES 7 COOL STUFF
- SPREAD THE WORD
- NOTIFY YOUR LAWMAKERS
- MEDIA CENTER

**Go Inside:**

**View the Campaign Video**

Why geography matters—in just 60 seconds. Understand the connection between people and places.

**Join the Campaign**

Join My Wonderful World and add your name to the thousands who agree that *geography matters*.

You'll get regular updates of the news and tools you need to give our kids the power of global knowledge.

We're not asking for your money, just your voice. About the Campaign

First Name \*

Last Name \*

Email Address \*

Age \*

Country/Place

Zip

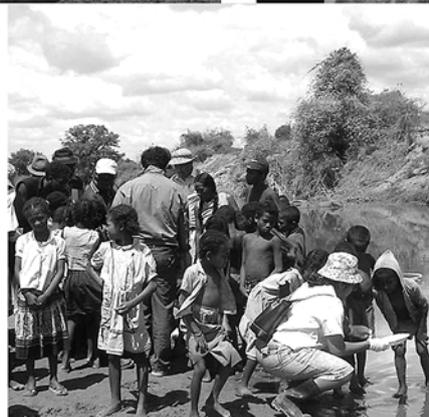
\* Required

**MWW Blog:** Join the Conversation

**Printable Travel Games:** **Geography to go!**



# NOTES



The GLOBE Program Office and GLOBE Canada  
are pleased to announce that the  
13th GLOBE Annual Conference will take place in Calgary, Canada.



*13<sup>th</sup>* **GLOBE**  
*Annual Conference*  
*Calgary, Alberta*  
**CANADA**  
*2 - 7 August 2009*



More information will be available on the GLOBE Web site soon.  
We hope to see you next year in Canada!



NASA



NSF



U.S. Department  
of State



UCAR

Colorado  
State  
University

CSU



12<sup>TH</sup>  
**GLOBE ANNUAL CONFERENCE**  
GLOBE Student Research for Sustainable Communities  
*Cape Town, South Africa*

22 - 27 June 2008

