THEGLOBEPROGRAM

Annual Review

2017–2018

Sponsored by: NASA Supported by: NSF NOAA Implemented by: UCAR

THE GLOBE PROGRAM

The GLOBE Program (GLOBE) is an international science and education program sponsored by the National Aeronautics and Space Administration (NASA); supported by the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the United States Department of State (DoS); and implemented by the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado,USA. GLOBE provides students and the public (worldwide) the opportunity to participate in data collection and the scientific process, and to contribute in a meaningful way to our understanding of the Earth system and the global environment. For over 20 years, GLOBE has connected students, teachers, and professional and citizen scientists from around the world to conduct hands-on science within their local environment to enhance their awareness of—and their scientific contribution to— the global environment.

GLOBE Milestones

1994 Earth Day, U.S. Government announces The GLOBE Program as a multi agency effort.

1995 Earth Day, The GLOBE Program launches (with 11 protocols); 33 countries join the program.

1998 Finland hosts the first GLOBE Learning Expedition (GLE) in Helsinki. USA hosts second GLE in Fayetteville, Arkansas.

2003 Croatia hosts third GLE held in Sibenik.

2004 GLOBE receives the Goldman Sachs Award for being an "outstanding program that makes use of media/technology to educate students or teachers about other world regions and cultures, or international issues."

2005 Earth Day; GLOBE celebrates its 10th birthday, with 15,000 schools in 106 countries.

2008 South Africa hosts fourth GLE in Cape Town.

2009 GLOBE established Regional Offices in Africa, Asia/Pacific, Europe, Latin America and the Caribbean (LAC), and North Africa and the Near East (NENA) to support professiona development workshops, capacity building, and regional sustainability efforts; data in GLOBE database reaches 20 million.

2011 GLOBE launches concept of Student Research Campaigns.

2014 India hosts fifth GLE in New Delhi.

2015 Earth Day, GLOBE celebrates its 20th birthday! GLOBE launches new mobile data entry app; offers 51 protocols; data reaches 128 million measurements.

2016 GLOBE provides online eTraining; hosts International Virtual Science Fair and six regional U.S. science fairs and various student scientific campaigns.

2017 Data reaches over 140 million measurements; International Virtual Science Symposium increases in number of submitted projects and worldwide representation; new mosquito protocol launched.

2018 Ireland hosts the sixth GLE in Killarney; data reaches over 150 million measurements; U.S. Department of State initiative on mosquito education launched.

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The GLOBE Implementation Office is supported under NASA Grant and Cooperative Agreement NNX17AD75A, awarded to the University Corporation for Atmospheric Research.

First meeting of the GLOBE Strategic Plan Committee, including GIO support staff

Spring 2017—Virginia, USA

A Message from Dr. Tony Murphy

Director, GLOBE Implementation Office

The past year has been marked with many achievements: two new countries joining (Liberia and Republic of Seychelles); the International Virtual Science Symposium (IVSS) growing in numbers; our measurement count moving beyond 150 million; an increasingly engaged world community initiating local and regional events (such as science symposia and student exchanges); planning for the up coming GLOBE Learning Expedition in Ireland; several new science protocols and learning activities; a new mosquito measurement as part of the GLOBE Observer app allowing a new mosquito initiative in three GLOBE regions; and the release of the new GLOBE Strategic Plan. This last item merits some special attention here as it impacts everyone in the GLOBE community.

Our Strategic Plan 2018–2023 is the result of many months of strategic thinking about GLOBE's role as a world leader in Earth Science and education. Where do we see ourselves five years from now? How do we best engage the youngest in our community? How do we provide cutting-edge technology as well as other communication tools to help our older students conduct, understand and share their research? How do we best utilize the data being submitted? How can we expand the circle of inclusion that invites everyone in our community to participate and have a voice? We were mindful of these questions while considering, as well, how to leave the door open to innovative thinking and the need to seize opportunities that are currently unforeseen but which may manifest in the years ahead.

Coming up with a framework: defining our organizational elements, assessing and prioritizing our needs, discussing improvements, and crafting performance indicators; this has been an area of focus for the better part of the past year. In the spring of 2017 an international strategic planning task force was formed to solicit input from all of our stakeholder groups: working groups, regional coordinators and country coordinators, the U.S. partner forum, teachers, alumni, sponsors and scientists as well as the infrastructure builders at the GLOBE Implementation Office (GIO) and SSAI. The draft document was shared with the greater GLOBE community at the GLOBE Annual Meeting in June 2017 for input from everyone there. Over many months of talking and writing and honing, a document emerged called the Strategic Plan 2018–2013 and it was released in April 2018. This document will guide us during the next five years and is available to all on the GLOBE website.

The Strategic Plan helps guide us in many ways, helping to align people and performance across the world. The plan helps build commitment and a culture of inclusiveness. It helps us chart our course, not only by doing things right, but by doing the right things.

I would like to thank those who worked on the document directly, and also to those who read, reviewed and provided feedback. We have already deployed this document to craft the presentation of the Annual Review that you are reading now. What's new in these pages this year, is the organization of information to focus on our three strategic areas: science, education and community.

The GLOBE Program has become a leader in higher education by building exceptional research strength and curriculum tools that prepare students for productive and meaningful lives. We also have a rich history of community service and global impact. The GLOBE world is one world—unified, committed. We work together across borders; we introduce our students to one another; we create bonds of friendship that might otherwise never be. I am proud of being a part of this world and I want to thank you for your part in it.

Sincerely,

Tony Murphy

SECTION 1

The GLOBE Program

GLOBE Impacts Around the World

The international GLOBE network now includes representatives from 148 U.S. partners and 120 participating countries. Our intrepid GLOBE students have now contributed to the over-150 million measurements in the GLOBE database.

GLOBE at a Glance

Thanks to the continuing efforts of the GLOBE community, meaningful measurements are always a top priority! The table below shines a light on some of the critical results of the community's ongoing efforts during 2017.

The GLOBE Community: An Overview

GLOBE, sponsored by NASA, and supported by the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the United States Department of State (DoS), is a community of practice—continuously engaging in the development and dissemination (the creation, learning, teaching, and sharing) of educational and outreach products designed to engage the community in authentic scientific exploration.

GLOBE's Regional Footprint

REGION	SCHOOLS	TEACHERS	PRE-SERVICE	STUDENTS	ALUMNI	GLOBE OBSERVERS
Africa	852	674	601	4,493	31	298
Asia and Pacific	3,280	1,762	493	36,593	21	4,347
Europe and Eurasia	4,559	3,629	255	83,693	28	6,071
Latin America and Caribbean	1,280	1,482	628	30,282	27	2,513
Near East and North Africa	624	565	140	36,817	527,290	26
North America	21,222	22,609	3,476	527,290	26	60,271

2017 At a Glance

REGION	COUNTRIES	TOTAL NUMBER OF SCHOOLS	CHANGE IN NUMBER OF SCHOOLS YEAR-OVER-YEAR	TOTAL CUMULATIVE MEASUREMENTS	MEASUREMENTS ENTERED IN 2015
Africa	26	852	60	1,090,084	146,896
Asia and Pacific	18	3,280	263	1,065,552	63,435
Europe and Eurasia	41	4,559	164	52,68,079	4,215,784
Latin America and Caribbean	20	1,280	262	1,078,595	51,462
Near East and North Africa	13	624	52	993,983	148,004
North America	2	21,222	1,743	91,620,284	4,031,797
TOTAL	**120**	**31,817**	**2,544**	**148,516,577**	**8,657,378**

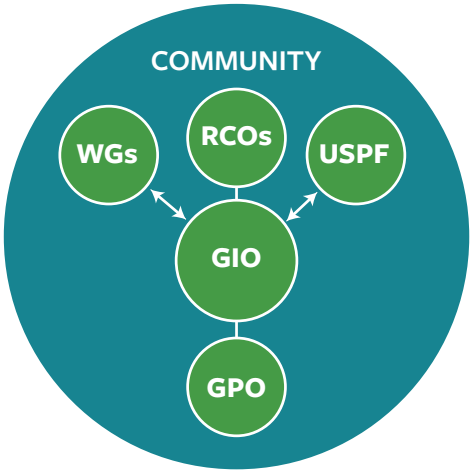
GLOBE Regions: GLOBE administration is divided into six regions: Africa, Asia and Pacific, Europe and Eurasia, Latin America and Caribbean (LAC), Near East and North Africa (NENA), and North America (which consists of Canada and the United States). Each region has a Regional Coordination Office (RCO) shown below. GLOBE partners (Country Coordinators and U.S. Partners) facilitate the implementation of GLOBE in their country or within their service area.

GLOBE Working Groups: GLOBE Working Groups (WGs) are dedicated to enhancing the role of partners, scientists, and educators in shaping the future of GLOBE—and in supporting the development and implementation of GLOBE worldwide. There are four GLOBE WGs (Science, Education, Evaluation, and Technology), with up to seven members (serving on a rotating basis) of the GLOBE community.

U.S. Partner Forum: The U.S. Partner Forum works to enhance the contribution of GLOBE toward improving STEM (Science, Technology, Engineering, Mathematics) education in the United States. The U.S. is divided into six regions: Pacific, Midwest, Northeast and Mid-Atlantic, Northwest, Southeast, and Southwest. Each region has one representative on the U.S. Partner Forum who works to guide the work of GLOBE in the United States.

The GLOBE International STEM Network (GISN): The GISN, with nearly 400 members, is an international network of STEM professionals who work with GLOBE students around the world. These scientists and professionals mentor teachers; explore national and international components of science and research; design and create unique field campaigns; and inspire students to engage in the hands-on exploration of cutting-edge science and research.

GLOBE Community Organizational Structure



KEY

WGs	Working Groups
RCOs	Regional Coordination Offices
USPF	U.S. Partner Forum
GIO	GLOBE Implementation Office
GPO	GLOBE Program Office

The GLOBE Implementation Office: Serving the Community

The GIO, hosted by the University Corporation for Atmospheric Research (UCAR) as one of the UCAR Community Programs (UCP) in Boulder, Colorado, USA, works in close collaboration with NASA and the program-associated WGs to provide robust support for the common elements of education, evaluation, science, technology, and communications. These common elements, and the NASA-hosted Data Information System (DIS), are instrumental to enabling the worldwide implementation of GLOBE. GIO provides technical support services; undertakes activities to encourage community engagement, growth, and training; coordinates and facilitates field campaigns, student symposia, international engagement and meetings; and generates high quality education and science materials and resources.

GIO's commitment to collaboration with our community members—listening to your suggestions and responding to your needs—is the key to the enduring success of GLOBE around the world.

SECTION 2

Science in Action

GLOBE and NASA

Missions and Measurements

Thanks to a rich collaborative and interactive relationship, GLOBE supports NASA's enduring satellite efforts. The associated field measurement campaigns, grounded in cutting-edge science, provide GLOBE students the opportunity to collect field data that NASA scientists then use to help validate and calibrate satellite instruments. There are two active field measurement campaigns where abundant protocol data are critical to enduring success:

The GLOBE El Niño/ENSO (El Niño-Southern Oscillation) Student Research Campaign

The ENSO Student Research Campaign. "Phase II: Taking Data to the Next Level" ended in June 2017. There were 1,627,681 measurements taken from the suite of six GLOBE protocols. In September 2017, "Phase III: Water in Our Environment" began. The backbone of this phase is three "Guiding Investigative Questions" that help students explore their environment while taking protocol measurements in collaboration with other schools. Students and teachers are actively sharing how they are exploring water in their environments through the campaign's monthly Science and Research Webinars and the Short Observation and Data Analysis (SODA) Webinars.

The Urban Heat Island Effect/Surface Temperature Student Research Campaign

In 2017 (October and December) and 2018 (March), GLOBE hosted the annual Urban Heat Island Effect/Surface Temperature Student Research Campaign. The campaign is focused on examining the impact urbanization has on surface temperature and how the surface temperature changes the dynamics of the Earth's atmosphere. The main research question is "How does surface cover affect surface temperature?" The campaign encourages participating students to set up research studies at their schools. And, thanks to community support, an ever-growing number of schools are now taking surface temperature observations, enabling more students to engage in meaningful research projects.

NASA-funded Earth Science Projects

The GLOBE Implementation Office provides support for four innovative, educational, and inspiring NASA-funded Earth Science Projects:

GLOBE Mission EARTH (GME)

GME is a collaborative of multiple institutions across the United States formed to increase involvement in The GLOBE Program with the goal of connecting students to scientists in the common pursuit of real-world science.

AEROKATS and ROVER Education Network (AREN)

The goal of AREN is to train the next generation of scientists, engineers, and other professionals to observe and understand our planet Earth through

experiential learning using NASA technology and data in real-world settings.

Impacts and Feedbacks of a Warming Arctic: Engaging Learners in STEM using NASA and GLOBE Assets (Arctic and Earth SIGNs)

This program connects youth and adults to climate issues and Earth science learning through inquiry-based GLOBE investigations and community stewardship projects.

NASA Earth Science Education Collaborative (NESEC)

GLOBE is working with NESEC on enhancing STEM teaching and learning by creating engaging, meaningful, and authentic STEM experiences and resources. NESEC's interrelated activities and partnerships include citizen science with 1) GLOBE Observer; 2) GLOBE student investigations with NASA; and 3) strategic partnerships and collaborations.

CITIZEN SCIENCE

GLOBE Observer App in Action—Sun, Clouds, and Mosquitoes

2017 United States Eclipse

The Earth is solar-powered. So, what happens when the sun's light is blocked, even temporarily? Well, many members of the public and the GLOBE community answered the call to become a citizen scientist by downloading and using the GLOBE Observer App—and submitting crucial data during the 21 August United States solar eclipse. Over the course of the eclipse, approximately 106,600 observations were made, from a total of 10,553 GLOBE Observers.

Participants from many countries contributed measurements, including observers from the United States, Canada, Mexico, Dominican Republic, Puerto Rico, Guatemala, Honduras, Colombia, Panama, and Costa Rica. The data entered during this unique event helped improve our understanding of how solar energy is absorbed and reflected in Earth's atmosphere.

GLOBE Cloud Protocol—Featuring NASA Satellite Comparison

Clouds are powerful agents of global change. They affect the overall temperature or energy balance of the Earth and play a large role in controlling the planet's long-term climate. To understand the impact of clouds over time, we need accurate data on clouds. NASA has a number of satellites orbiting the Earth and collecting data about clouds and the Earth's energy. These satellites give us a big picture of what's going on, they sometimes have trouble with the details.

Starting in 2017, NASA and The GLOBE Program began inviting the public to submit ground cloud observations following an updated and enhanced Cloud Protocol. A team from NASA Langley Research Center (Hampton, Virginia, USA) is now comparing observations with data from satellites for validation purposes. The call went out for help in collecting cloud data to better understand the different types of clouds and the effects they have on Earth's climate. GLOBE and NASA would like to thank everyone who answered the call—and contributed to this sky-high endeavor!

GLOBE Mosquito Habitat Mapper

The GLOBE Observer App, which is available in iOS and Android formats, allows anyone in a GLOBE country to enter data about clouds directly into the GLOBE database. As of 2017, it now includes a new tool—a Mosquito Habitat Mapper. This tool supports citizen scientists in efforts to map, count, and identify mosquito larvae found in breeding sites.

GLOBE AND U.S. DEPARTMENT OF STATE

Global Mapping Project

GIO is pleased to announce a new initiative in partnership with the U.S. Department of State: "GLOBE Zika Education and Prevention." This project will push the edge of citizen science impact, aiming to enlist thousands of students, teachers, and community members in the collection of data on mosquitos for a global mapping project. This project has an ambitious target of 100,000 data submissions contributed in 2018—and hundreds of thousands of submissions by the end of 2019.

The project will work with community members to safely collect larvae samples in 22 Zika-affected countries in three GLOBE regions. The program will encourage STEM studies and will build networks

with public health officials to better control mosquitos and reduce mosquito-borne infectious disease. GLOBE encourages all of our GLOBE countries to join in this collaborative effort. Global data collection on this scale will help international scientists predict new outbreaks—and will help to minimize the adverse impacts of mosquitoes.

SECTION 3

Education in Action

WINNING RESEARCH

2017 GLOBE International Virtual Science Symposium Highlights

In 2017, GLOBE held its fourth International Virtual Science Symposium (IVSS). This completely virtual science symposium allowed GLOBE students (K–16) to use the GLOBE data that they entered into the database, to collaborate with GISN members, and to apply their work to a real-world problem. GISN members and GLOBE community members from all six GLOBE regions stepped up to volunteer to mentor students and help score the submitted projects.

Four eligible projects (two from the U.S. and two international) were awarded with NSF stipends to help offset the costs of attending the 2017 GLOBE Annual Meeting in New Haven, Connecticut, USA:

USA:

"Why Doesn't Grass Grow on our Playground?" (Norwalk, Ohio)

"How Do the Species of Macroinvertebrates in the Boulder Creek Compare with the Water Chemistry of the Stream?" (Lafayette, Colorado)

International:

"Global Warming and His Actions in Maximal and Minimal Temperature Variations on the Continent" (Aquitaine, France)

"Checking the Validity and the Quality of Wells' Water in Jabel Al-Mukkaber Area" (Jerusalem, Israel)

In all, 147 projects were submitted from all six regions.

→ GLOBE Weather 2017 field test teachers and developers.

↑ GLOBE Weather 2017 field test teachers and developers.

GLOBE AND UCAR SCIED

It's All About the Weather!

In 2017, GIO engaged in an innovative new endeavor with the UCAR Center for Science Education (UCAR SciEd) and Biological Sciences Curriculum Study (BSCS) Science Learning to create a set of educational materials aligned with GLOBE and NGSS for middle school grades.

The primary "deliverable" for this task is a middle school science unit on weather that will be structured around the BSCS 5E (engage, explore, explain, elaborate, and evaluate) instructional model. The goal is that this will be available for both GLOBE and non-GLOBE teachers, encouraging non-GLOBE teachers to join the community.

LEARNING GLOBE

Updates, Enhancements, and Creative Innovations

TEACHER'S GUIDE

The Teacher's Guide—a centerpiece of GLOBE—is constantly being updated and improved to account for changes in practices (such as new data collection equipment or methods) and to reflect changes with campaigns and data entry (such as with the Mobile Data Entry App). In 2017-2018, the following updates, enhancements, and innovations were presented to the community:

- **Earth Networks**
  All Teacher's Guide references to Earth Networks have been updated to reflect the change in name from "WeatherBug" to "Earth Networks."

- **Site Definition Sheet**
  The Site Definition Sheet, a data sheet used in all spheres when setting up a site, has been updated to more closely match the site definition section of the Data Entry App.
- **Clouds Protocol**
  The clouds protocol was updated to include satellite data comparison.
- **Cloud Chart Translations**
  Updated cloud charts have been translated in Spanish, French, and Japanese.
- **Frost-Tub**e
  A new protocol was created for the Arctic & Earth SIGNs (STEM Integrating GLOBE and NASA) project. The protocol has students collect data on permafrost by measuring the length and depth of the unfrozen active layer using frost tubes.
- **Standing Carbon**
  A new protocol (and new learning activities) measuring standing carbon was released spring 2018.

eTraining

The GLOBE eTraining Program offers teachers a powerful, and immediate, portal where they can access the training materials they need to lead a classroom in data collection and lab procedures associated with GLOBE protocols. There are now 47 eTraining modules available.

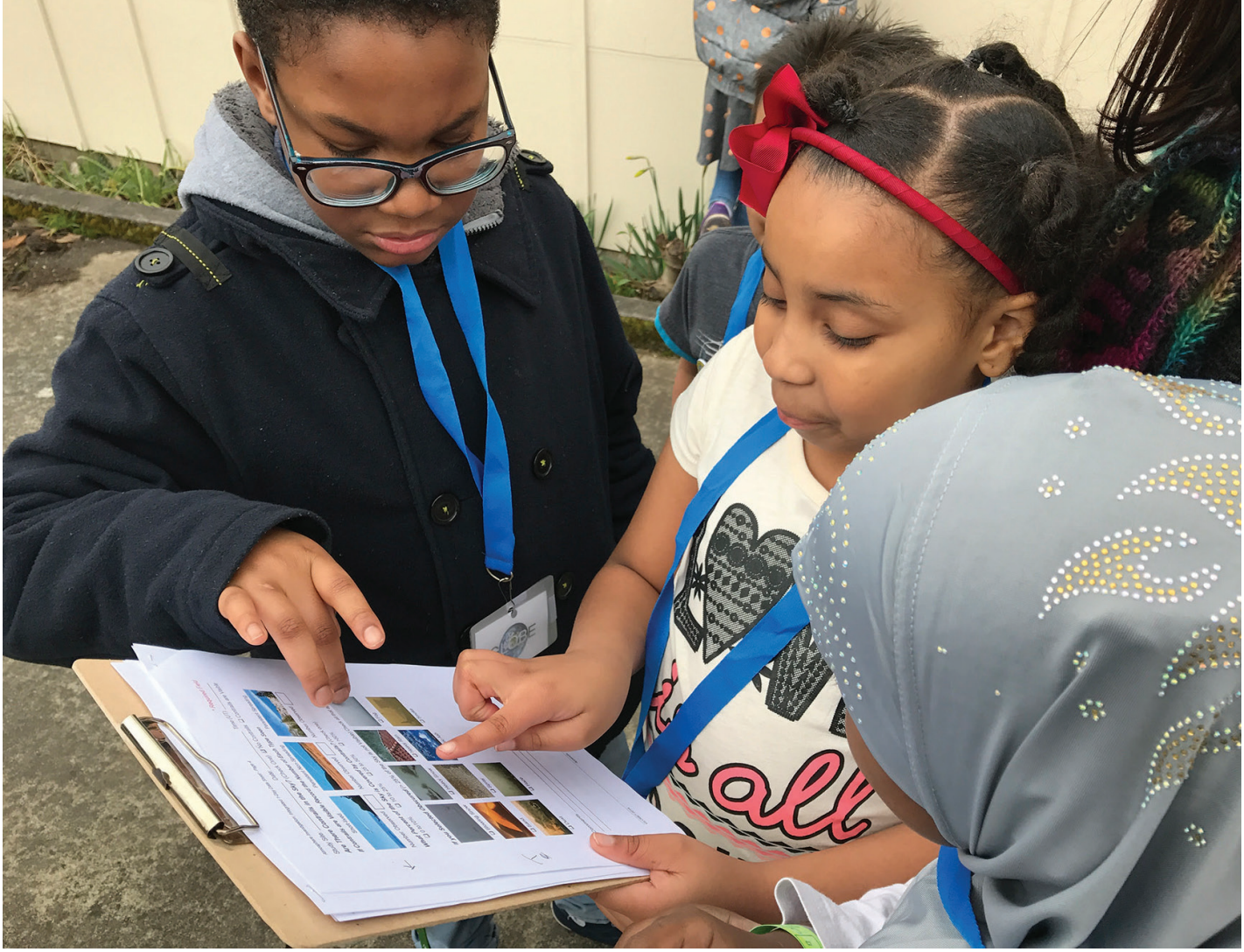
EXPANDING HORIZONS

GLOBE Collaborative Engagements

GLOBE's ongoing collaborative engagements continue to focus on expanding and enhancing the work of The GLOBE Program. Collaborative efforts include:

Eco-Schools

GLOBE and Eco-Schools USA are continuing efforts to integrate school sustainability and Earth system's observations and data collection. On the international level, GLOBE continues to facilitate collaboration between GLOBE countries and Eco-Schools (including via the Foundation for Environmental Education Board, which operates the worldwide Eco-School program).



SciGirls

GLOBE is continuing its educational partnership with SciGirls (an NSF-funded STEM education production in the United States). Efforts focus on training GLOBE partners in SciGirls methodologies to help increase interest in STEM by girls and minorities.

Peace Corps

GLOBE is strengthening its partnership with the U.S. Peace Corps. In 2017, a vibrant, hands-on GLOBE training took place at the "Addressing Environmental Shocks and Stresses Workshop" at Peace Corps Headquarters. GLOBE also established the Peace Corps partnership page on the GLOBE website in order to support Peace Corps Volunteers and to encourage WorldWise Schools to participate in GLOBE.

USAID

GLOBE supported the Institute for Global Environmental Strategies' (IGES) USAID Zika project in Peru and Brazil by coordinating in-country collaboration and support. GLOBE received support from IGES to purchase mosquito kits for in-country use and the distribution of action-based grants.

UCAR's COMET Program

GLOBE deepened collaborative efforts with UCAR's COMET Program (through funding from USAID) on designing and fabricating a low-cost 3D-Printed Automatic Weather Stations (3D-PAWS). Work is underway to enable automatic data entry, which will allow data to be sent directly to the GLOBE database.

INCLUDES

GLOBE is participating in an NSF INCLUDES Project, "Collaborative Research:Integrating Indigenous and Western Knowledge to Transform Learning and Discovery in the Geosciences." This project is designed to connect Native American students and scientists in the geosciences.

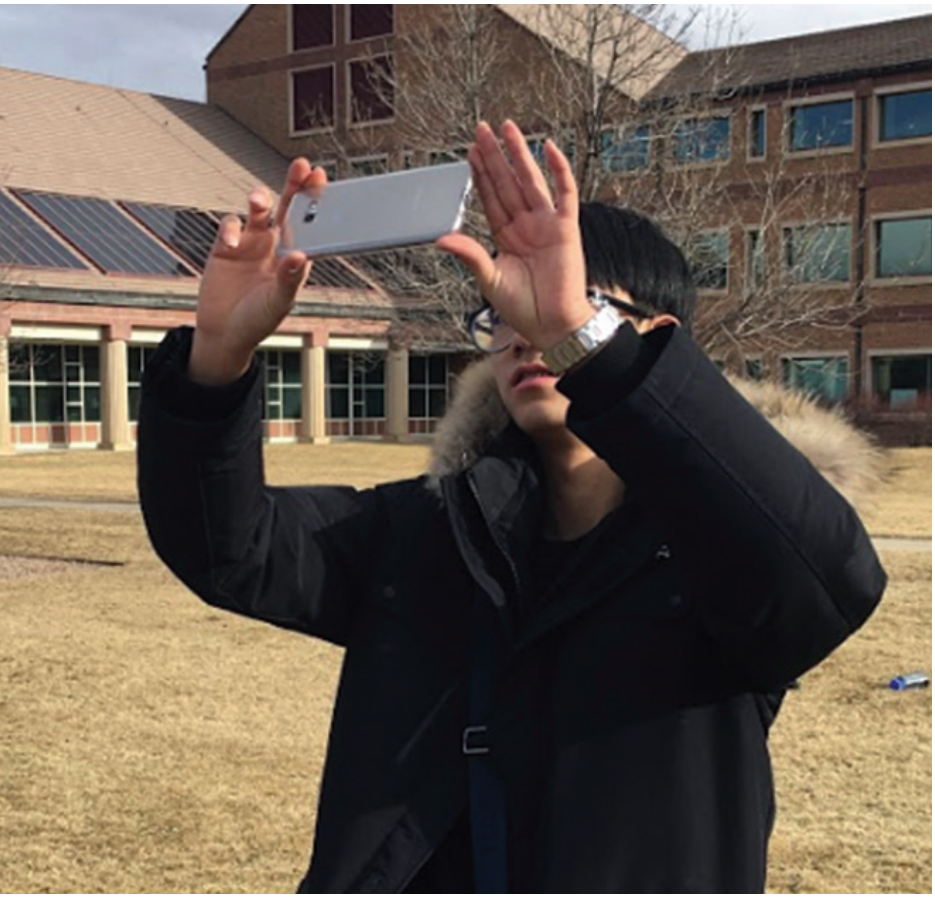
SECTION 4

Technology/Website in Action

GLOBE MOBILE DATA ENTRY APP

Connecting in the Field

GLOBE Data Entry App Version 1.3 is now available (for Android and iOS)—and it's all about making data entry easy for the GLOBE community. This latest version of the Data Entry App allows users to create and edit sites, even without an active internet connection. It also streamlines some aspects of data entry, and allows the use of a phone or tablet camera to document sites and measurements. Download the Data Entry App—and put science, and adventures in learning, in the palm of your hands!



WEBSITE UPGRADES

GLOBE Made Easy

Several exciting changes have been made to the GLOBE website over the last year – all with the goal of improving the level of ease and comfort in navigating through the variety of GLOBE-related options, including:

- a new "Partner Dashboard" enabling Country Coordinators and Partners to approve accounts quickly; to send out bulk emails to various group members; and to see what's going on in their organization by viewing a summary of user activity;
- a website "makeover" sprucing up a number of pages, including the Teacher's Guide pages; the homepage; the region, country, state, and partner pages; the school pages; and the member pages;
- a number of customized support videos enabling community members to see, step by-step, what needs to be done in order to achieve success; and
- an enhanced, mobile-friendly, visualization (viz) system allowing users to select the date and type of data desired; to create table and graph information; and to experience an improved interface optimized for phone and table viewing.

SECTION 5

Communication in Action

Getting the Word Out to the Community

As a regular part of daily activities, GLOBE engages in numerous tasks designed to inform, educate, and inspire the worldwide community. This includes researching, writing, and posting daily GLOBE-related and sponsor-related stories; providing communication support for events, webinars, trainings, and field and data measurement campaigns; providing communication support for member, partner, and collaborating organization efforts; providing extensive social media outreach; creating and disseminating monthly community letters, mass mailings, and eNewsletters (the "News Brief" and the "Director's Letter to the Community"); creating extensive video and photographic materials; and engaging in numerous other support and outreach endeavors. Keeping you informed and inspired—that's what it's all about!

News and Events

On a regular basis, GLOBE encourages community members, sponsors, partners, and collaborating orgranizations and programs to provide the information necessary to ensure that the website is constantly being updated with vital information regarding GLOBE-related news and events. Nearly 500 GLOBE-related news and events were posted to the website in 2017 alone!

GLOBE IN VIDEOS

Virtual Visual Messages

GIO Director Dr. Tony Murphy travels the globe to meet with, and connect with, community members on a regular basis; however, there are times when he is not able to attend all of the important GLOBE events that are taking place in so many countries.

Crafting virtual personal messages is a way to connect from afar and to keep everyone up-to-date on GLOBE happenings.

Star Stories: Inspiring Us All

GLOBE is always seeking to shine a spotlight on outstanding examples of community members and their activities—and share them as "Star Stories." Star Stories focus on vibrant examples of extraordinary projects, people, and activities being conducted around the world in connection to GLOBE.

SOCIAL MEDIA

In the Moment and On the Go

Over the past few years, GLOBE has expanded efforts to reach out to community members—in the moment and on the go—through an expansive social media platform that includes Facebook, Twitter, Instagram, and Pinterest. So, no matter where you are—or how you are—pursuing your GLOBE endeavors, you can simply "click in" to connect with the latest news, events, trainings, data challenges, and other rich resources GLOBE shares every day.

SECTION 6

The GLOBE Community

GLOBE Welcomes Two New Partnering Countries

Liberia: On 25 September 2017, an agreement between NASA and the Ministry of Education, to implement The GLOBE Program in Liberia, was signed. Liberia is now the 119th country to participate in GLOBE.

Republic of Seychelles: On 25 August 2017, an agreement between NASA and the Ministry of Education and the Ministry of Environment of the Republic of Seychelles, for cooperation in The GLOBE Program, was finalized. Seychelles is the 118th country to participate in GLOBE.

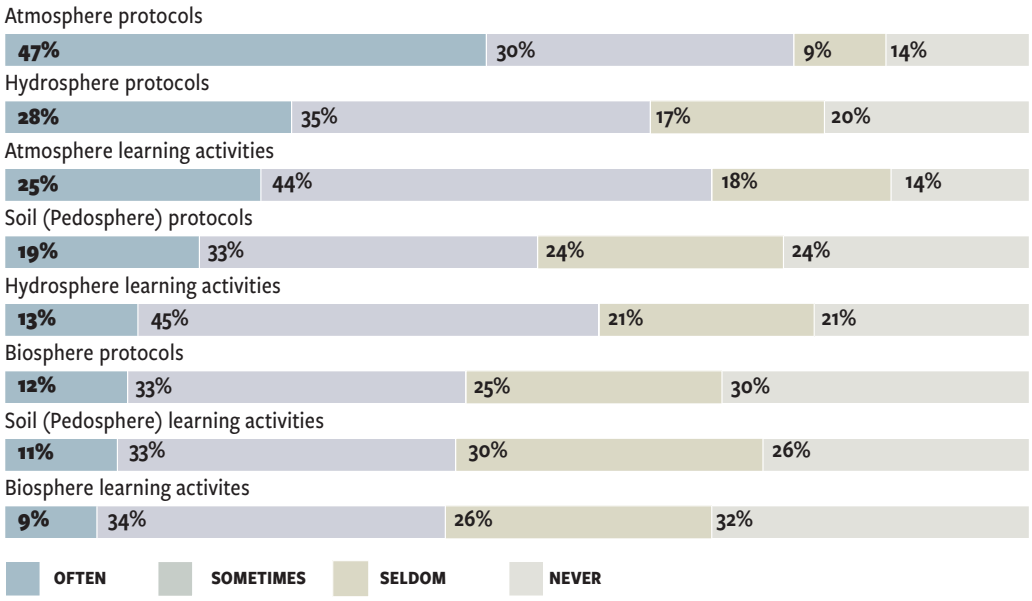
GLOBE Annual Survey Highlights

The GLOBE Annual Survey is one of GLOBE's primary data-collection tools. The results are available on the GLOBE website, but a few noteworthy results include:

- Among the protocols and learning activities, atmosphere protocols were most frequently used by U.S. Partners, CCs, and teachers, with 47 percent of the respondents indicating that they use these protocols "often."
- The most popular GLOBE events were the regional meetings, with 55 percent of the respondents participating in them. GLOBE webinars and the GLOBE Annual Meeting were also popular events, each receiving over one-third of the responses.

The results from the survey are being included as baseline targets for the performance measures developed for the new GLOBE Strategic Plan.

2017 Survey results



2017 GLOBE ANNUAL MEETING AND STUDENT FIELD EXPERIENCE HIGHLIGHTS

The 21st GLOBE Annual Meeting took place in New Haven, Connecticut, USA, from 30 July through 03 August 2017. The theme was "Coastal Resilience in Urban Environments." More than 250 participants from 40 countries took part in the welcoming events, informative presentations, networking sessions, poster presentations, and field studies. Thirty-eight students from nine countries participated in the Student Research Exhibition and Field Experience. Presentations, posters, and learning activities kept the students busy from morning to night.

↑ Participants at the 2017 GLOBE Annual Meeting in New Haven, Connecticut, USA

GLOBE Around the World—Spotlight on the Regions

Africa Highlights

↑ Participants at the 2017 Africa Regional Meeting in Mauritius.

2017 REGIONAL MEETING

In May, the 2017 Africa Regional Meeting took place in Belle Rose SSS, Mauritius. Participants from Kenya, Namibia, Ethiopia, Mauritius, South Africa, Uganda, Madagascar, and the United States attended the event. The meeting concentrated on capacity building, website interactions, administration tools, and addressing the disconnect between collected data and the submission of the collected data.

SCIENCE

International Biomes Project

The International Biomes Project took place in the Outeniqwa Mountains in George, South Africa. Five scientists (four international scientists and one local scientist) and thirty-four trekkers participated. The project was followed by headmasters sharing information on their biomes to area schools—which resulted in a following of nearly 8,000 learners.

Africa Highlights

EDUCATION

Events, Meetings and Activities

A variety of educational activities, meetings, and events occurred in various forms throughout the region, ranging from creating awareness at science festivals and open days to a planning meeting for the "weather ready" nations. This meeting included North West University's Professor Roelof Burger and scientists from the National Center for Atmospheric Research (Boulder, Colorado, USA). The meeting (through funding from USAID) supported the fabrication of low-cost 3D-Printed Automatic Weather Stations (3D-PAWS) is a continuation of the scientific work conducted with the Africa Region at Lake Victoria in 2016. These automated weather stations were installed in several schools in the region.

↑ Participants at the ESTH Conference in Botswana.

COMMUNITY

Environment, Science, Technology, and Health (ESTH) Conference

The activity that provided the greatest benefit to the GLOBE community in Africa was the RCO participation at the U.S. Department of State's Environment, Science, Technology, and Health (ESTH) Conference for Africa Embassies and missions. This event was held in Gaborone, Botswana. At the meeting, participants managed to get the ball rolling on a process that culminated in Botswana becoming interested in joining GLOBE. This was a bottom-up approach that paved the way for close cooperation that the region enjoys with U.S. Embassies in all the participating Africa countries (and with non-GLOBE countries, in that it provides the potential for them to join the community).

In addition, the community was greatly enhanced with the addition of the Republic of Seychelles (25 August 2017) and Liberia (25 September 2017) as new GLOBE countries.

GLOBE Around the World—Spotlight on the Regions

Asia and Pacific Highlights

↑ Participants at the 2017 Regional Meeting in Manila.

2017 REGIONAL MEETING

In May, the 2017 Asia and Pacific Regional Meeting took place in Manila, Philippines. Eighty-five participants (from India, Thailand, Taiwan, Philippines, Republic of Korea, Palau, Micronesia, Nepal, Magnolia, Vietnam, Maldives, Sri Lanka, and the United States) took part.

The event included a presentation by GIO Director Dr. Tony Murphy on The GLOBE Program, a variety of focused presentations by Country Coordinators, and a training (with trainers from Taiwan and India) covering GLOBE protocols. During the event, the Country Coordinators agreed to organize at least one program each year, in each country.

↑ Participants at the GLOBE Science Talent Hunt in New Delhi, India.

SCIENCE

GLOBE Science Talent Hunt

In September 2017, the RCO for the Asia and Pacific Region hosted the GLOBE Science Talent Hunt in New Delhi, India. The aim of the event was to develop a scientific attitude (and aptitude) among the youth and students. The event brought together teachers, educators, trainers, and scientists from different schools so that they could share ideas on improving science education and contribute to the future of science communication. Ninety participants from GLOBE schools in Delhi, Rajasthan, Andhara Pradesh, and Telangana were in attendance.

During the event, students presented projects and demonstrated activities on GLOBE, ECO-engineering, and environmental sound technology. Teachers and students also participated in GLOBE atmosphere protocols and data entry training. They collected data on temperature (maximum and minimum), as well as on cloud type and cloud cover. The students participated in a poster-making competition (submitting more than 85 posters). Students also participated in a science-based model competition (creating more than 28 models). Event participants also discussed the importance of protocols and the impact to the local environment that comes from engaging in a focused study of the atmosphere.

GLOBE Around the World—Spotlight on the Regions

Asia and Pacific Highlights

↑ Participants at the GLOBE Science Festival in Taiwan.

GLOBE Science Festival

In July 2017, GLOBE Taiwan organized a GLOBE Science Festival in Taipei. There were 34 participants (from India, Mongolia, the Philippines, Thailand, and Taiwan) in attendance. GIO Director Dr. Tony Murphy gave a video address to help kick-off the event during the opening ceremony. The event was dedicated to showcasing 11 GLOBE student projects, including poster presentations.

↑ Participants at the GLOBE TTT in Bangkok, Thailand.

EDUCATION

GLOBE Train The Trainer (TTT) Workshop

In December, GLOBE Thailand organized a TTT workshop, which was attended by 42 participants (from Thailand and Taiwan). GIO Director Dr. Tony Murphy and Dr. Dixon Butler also attended the event, sharing presentations on The GLOBE Program. The training was presented in two parts, covering basic and advanced protocol work in atmosphere, hydrosphere, and pedosphere.

GLOBE Teacher Training

In May 2017, a GLOBE Teacher Training was held in Manila which was sponsored by GLOBE Philippines and PSHS, and focused on soil and atmosphere protocol.

During the same month, a GLOBE teacher's training was held in Seoul, Republic of Korea. Approximately 20 teachers attended from schools in Seoul. GLOBE materials, translated in Korean, were utilized. GLOBE protocol instruments including pH meters, TDS meters, soil charts, and cloud charts. were distributed during the training.

In August 2017, a GLOBE Teacher Training was held in Hanoi, Vietnam. Approximately 55 teachers attended the event. The RCO provided two trainers and supplied GLOBE materials.

In October-November 2017, a GLOBE "refresher" Teacher Training was held in New Delhi. Eight teachers and 32 students attended the training from nearby schools. There, students participated in hands-on training covering atmosphere and soil protocols. They also engaged in other GLOBE-related projects. The RCO provided trainers and GLOBE materials.

GLOBE Around the World—Spotlight on the Regions

Asia and Pacific Highlights

↑ Students from the Republic of Korea visited GIO in Boulder, Colorado, USA.

Students Visit the GIO

In early 2018, students from Masan Yongma High School, Republic of Korea, visited the GIO in Boulder, Colorado, USA. The six students, accompanied by their teacher and the South Korean Country Coordinator, were selected to participate based on the quality of their research projects. The prize was awarded by the Korea Foundation for the Advancement of Science and Creativity (KOFAC).

The students visited Westview Middle School in Longmont, Colorado, and the St. Vrain Valley Schools Innovation Center (also in Longmont) to share and compare GLOBE experiences and research enthusiasm—and learn about STEM education in the United States. In addition, they spent time at the University of Colorado's CIRES (Cooperative Institute for Research in Environmental Sciences) headquarters to engage in a StarLab event with the University of Colorado at Boulder's Fiske Planetarium (Boulder, Colorado). They also visited the National Center for Atmospheric Research (NCAR) Mesa Lab in Boulder, Colorado.

COMMUNITY

GLOBE Learning Expedition to Lake Pokhara

The RCO partnered with the Indian Environmental Society (IES), in collaboration with ECCA of Kathmandu, to organize a six-day GLOBE Learning Expedition in Kathmandu and Pokhara, Nepal. The purpose of the event was to understand the effects of climate change in the region and to engage in field studies. A total of 38 participants from the region attended the expedition. The participants were from Thailand (10), Oman (7), India (11), and Nepal (10). The participants conducted various protocol activities, including those covering atmosphere and pedosphere. They collected data of current temperature, pH, turbidity, and conductivity, as well as on cloud type and cloud cover, and soil temperature and texture. Participants also learned how to upload the data to the GLOBE website database.

↑ Participants at the GLOBE Learning Expedition at Lake Pokhara, Nepal.

National Child Club Conference

In June 2017, GLOBE Nepal organized a National Child Club Conference in Kathmandu. Over 100 participants took part in the event, which was conducted by the Environmental Camps for Conservation Awareness (ECCA) in Jwagal, Lalitpur, Nepal. The theme of the conference was "Future Now for Sustainable Education and Environment." During the conference, participants were introduced to The GLOBE Program and to its environmental investigations.

↑ Participants at the National Child Club Conference in Nepal.

GLOBE Around the World—Spotlight on the Regions

Europe and Eurasia Highlights

2017 REGIONAL MEETING

In November, the 2017 Europe and Eurasia Regional Meeting took place in Zichron Yaacov, Israel. Participants from Belgium, Croatia, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Ireland, Israel, Italy, Kyrgyzstan, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Russia, and Ukraine attended the event.

Participants consisted of 35 Country Coordinators, trainers, scientists, and teachers. Everyone came together to learn about the most recent activities of The GLOBE Program in the region and worldwide. The meeting was organized in cooperation with GLOBE Israel, the GLOBE Europe and Eurasia Board, and the Europe and Eurasia RCO. The event was supported by the Israeli Ministry of Education and the U.S. Embassy.

The meeting included highlights presented by each country representative, updates on GLOBE development, an invitation to the 2018 GLE in Ireland, and discussion on various GLOBE-related topics. Country Coordinators, as well as local teachers, attended training sessions, which were designed in a way that was useful for both beginners and advanced GLOBE members. Participants were able to choose from a wide array of trainings, including those covering atmosphere, mosquito habitat, hydrology, phenology, clouds, data entry, and visualization tools. As a part of the training, GLOBE Israel facilitated visits to two schools in Kfar Yona, where GLOBE representatives from the United States and Europe had a superb opportunity to learn, hands-on, about GLOBE Israel activities in the Jewish and Arab sectors.

↑ Participants at the 20107 Regional Meeting in Zichron Yaacov, Israel.

GLOBE Around the World—Spotlight on the Regions

Europe and Eurasia Highlights

SCIENCE

GLOBE Annual Conference and Competition

In May 2017, teachers and students from 40 Croatian GLOBE schools came together in Zadar to take part in the 20th Annual GLOBE Conference and Competition—an event organized and funded by The Education and Teacher Training Agency. The main part of the event, the Student Conference, was organized with the aim to increase scientific literacy, project-based learning, and STEM competencies within the GLOBE community and beyond. Each school benefitted from the mentorship of a scientist during project work, aswell as during the preparation of student research reports. Over the past few years, this practice has resulted in a considerable increase in the quality of GLOBE research projects. The second part of the event was a "GLOBE Survey Competition." During this time, student teams, following a map, searched for sites with hands-on tasks—such as determining the texture of a soil sample, measuring the pH of a soil sample, or finding out the reasons why farmers throw ash on the field.

Scientist-Student Partnership

Between January and April 2017, students from all around the world participated in the 2017 GLOBE IVSS by uploading their research projects. From a total of 147 projects uploaded, students from the Europe and Eurasia Region contributed 26 projects. Students of Heerenlanden College, Netherlands, prepared a research project on "Aerosols in Urban and Non-urban Areas." They invested time into research, and they contacted Herman Russchenberg, Professor of Atmospheric Remote Sensing at Delft University of Technology, and consulted with him about their research.

European Phenology Campaign

The 2017-2018 European Phenology Campaign offered an opportunity for students to learn about phenology and seasonal changes of trees (such as oak, lime, beech, birch, sour-cherry, hazel, and fig). During autumn, students observed color changes and the falling of leaves using both the GLOBE Green-Down Protocol and the GrowApp smartphone application. Students paired up with other schools and compared how the same tree species develop in different climate. Thousands of beautiful pictures of trees were collected in GrowApp – and the RCO selected the best ones. The winning photos were highlighted on the new GLOBE 365 Poster, which presents phenological phases and gives ideas on what features to observe over the year. The poster was distributed to GLOBE classrooms around the Europe and Eurasia countries. The spring campaign, with observation of bud burst and greening-up, began in January 2018. The working group for the campaign is supported by scientists from Netherlands, Croatia, Czech Republic, Switzerland and Germany.

EDUCATION

Student Research Experience

The Europe and Eurasia Region stands out with the number of GLOBE events that are organized with the aim to provide a field research experience to students and to support their team spirit. Between May 2017 and April 2018 several expeditions, science camps, and science games were organized. To name a few: GLOBE Competition in Croatia (May 2017); GLOBE Games in Czech Republic (May 2017); GLOBE Games in Poland (June 2017); GLOBE Games in Ukraine (June 2017); Summer Camp in Lithuania (July 2017); Learning Expedition in Estonia (August 2017); Summer School in Latvia (August 2017); GLOBE Games in Latvia (October 2017); and the Rivers in Spring Water Day in Italy (March 2018).

Pre-service Teacher Program at University of Cologne

The University of Cologne is one of the largest universities in Germany, and it is the official "GLOBE Organizer for Higher Education Students and University-School Networks." The University has implemented GLOBE as part of the pre-service teacher program at the Department of Mathematics and Natural Sciences. The University offers a broad variety of lectures and seminars linking to GLOBE, such as "Understanding Science through Inquiry-based Learning and Participation," a course that provides examples of integrating science and educational research. The mutual benefit of integrating research projects with broad public participation is discussed, participation approaches are demonstrated, and the motivational aspects for STEM disciplines are addressed.

Europe and Eurasia Highlights

COMMUNITY

Restarting The GLOBE Program in Malta

In Malta, the program gained new momentum in 2017. The Ministry of Education's Directorate for Learning and Assessment Programmes and the University of Malta's Faculty of Education organized a training for teachers and trainers in June 2017. This was conducted by the RCO for Europe and Eurasia. Through outdoor hands-on sessions, teachers learned how to carry out meteorological measurements and how to observe and record data about the sky and clouds. They also tested out hypotheses about different microclimates in terrain with and without trees. Without a doubt, the enthusiastic teachers are the best asset toward restarting the program at these schools.

Launch of The GLOBE Program in Ireland

In 2017, the Environmental Education Unit of An Taisce applied for Country Coordinator status, which was granted in May 2017. Since that time, An Taisce has worked on restarting The GLOBE Program in Ireland. The plan is that over the next two years, a pilot program will be implemented with a limited number of schools; then there will be the potential to expand the program nationally. Around 20 schools and 24 teachers (predominantly science and geography secondary school teachers) have been registered. The first GLOBE teacher training, funded by the Irish Environmental Protection Agency, was organized in January 2018.

↑ Europe and Eurasia Region GLOBE Games, Czech Republic 2017

GLOBE Earth Day

In Estonia, Earth Day marks a very important event in the calendars of both GLOBE and the U.S. Embassy—and the joint celebration has become a tradition. In 2017, the Earth Day celebrations with GLOBE were outstanding, and many people in different parts of Estonia had a great opportunity to participate in various GLOBE activities, such as multilingual GLOBE training, tree planting, movie screenings, and a hike with a research experience. With the aim to celebrate the Earth Day, GIO organized an Earth Day Video Contest. The RCO received 48 video submissions from seven countries within the region. All the videos were excellent, showing the enthusiasm of students and teachers, as well as the diversity of GLOBE implementation in the region.

→ Students of Gymnazium Kadan are awarded Czech GLOBE Stars at the American Center, U.S. Embassy, Prague.

Czech GLOBE Star Awards

2018 marked the third year of the Czech GLOBE Star Awards Ceremony, which took place in January at the American Center, U.S. Embassy, in Prague. Three active GLOBE schools from Czech Republic were acknowledged for their amazing work in the program. Teachers and students received appreciation for their long-term efforts to promote The GLOBE Program in their local communities. Each of the schools organized an annual GLOBE event, where they presented hands-on science activities to students from other schools, as well as to the general public. All of the schools that received awards were given diplomas from the members of the Scientific Board of TEREZA Educational Center, and from the RCO of Europe and Eurasia.

GLOBE Around the World—Spotlight on the Regions

Latin America and Caribbean Highlights

↑ Participants at the training conducted by Peter Falcon (NASA)

2017 REGIONAL MEETING

In September, the 2017 LAC Regional Meeting was held in Mexico City. The event was attended by Country Coordinators, teachers, trainers, and scientists from 16 countries (Argentina, Bahamas, Bermuda, Bolivia, Brazil, Colombia, Costa Rica, Dominicana, Guatemala, Mexico, Panama, Paraguay, Peru, Surinam, Trinidad and Tobago, and Uruguay). In addition, Julio C. Durand and Amalia Aubone from the LAC RCO attended, as did GIO Director Dr. Tony Murphy, Rusty Low, David Overoye, and Peter Falcon.

All of the Country Coordinators made presentations covering GLOBE activities conducted since the previous regional meeting (which was held in Costa Rica, in September, 2016). During the meeting, Rusty Low conducted a workshop covering the Mosquito Habitat Mapper. NASA Trainer Peter Falcon also led a workshop on GLOBE protocols.

SCIENCE

Events, Activities, and Trainings

Numerous GLOBE-related science events and activities took place throughout the LAC Region, some of which are described below:

ARGENTINA: The project "Impact of Cloudiness on the Voltaic Performance," which is based on GLOBE protocols, was presented at the Tecnópolis fair in Buenos Aires, Argentina. Two GLOBE students, from Secondary School Number 241 of Santa Fe, Argentina, carried out the work.

PARAGUAY: GLOBE Paraguay created a national network of teachers and students interested in climate change and STEM disciplines, increasing the amount of scientific data about Paraguay available online.

DOMINICAN REPUBLIC: During the solar eclipse of August 21, 2017, an event was organized with GLOBE teachers to report on the event and, at the same time, introduce the GLOBE Observer and GLOBE Data Entry apps. Participants took many interesting pictures of the Moon passing between the Sun and the Earth through a telescope. Data on atmosphere was collected by the teachers and used in the classroom to study the partial eclipse visible within the Caribbean.

DOMINICAN REPUBLIC: GLOBE introduced the use of drones for scientific purposes to the public using GLOBE protocols and instruments to study aerosols, temperature, and humidity at different altitudes, identifying MUC's, and taking pictures with a camera that used infrared light on crops to analyze humidity and pests. The results of the studies will be presented at the GLOBE Learning Expedition 2018 in Ireland.

SURINAME: In 2017, Project Tullow supported "Hands-on Science" education in Suriname through the use of GLOBE protocols. They accomplished this by providing the necessary funding to the Green Heritage Fund Suriname (GHFS) to develop scientific thinking and interest for science and the local environment in primary and high school students. Through GLOBE research projects, participants learned to relate science with environmental issues in their own communities. The full project scope included: 1) the translation and adaptation of ten GLOBE protocols to a Surinamese context for all levels of education (from primary school to high school); and 2) the inception, coordination, and partial facilitation of seven new GLOBE initiatives in Suriname that can serve as best case practices, and that can generate new GLOBE initiatives across the country.

↑ GLOBE Dominican Republic introduced the use of drones for scientific purposes to the public.

GLOBE Around the World—Spotlight on the Regions

Latin America and Caribbean Highlights

EDUCATION

Events, Activities, and Trainings

Numerous GLOBE-related education events and activities took place throughout the LAC Region, some of which are described below:

ARGENTINA: Peter Falcon (NASA) visited the Austral University in Argentina and hosted an open chat with students, teachers, and community members. Falcon shared his work experience at the Jet Propulsion Lab in Pasadena, California, USA, and his work on The GLOBE Program. In addition, the trainer conducted two workshops on clouds and SMAP for GLOBE students during their visit to Argentina and Uruguay.

URUGUAY, ARGENTINA AND PERÚ: Marta Kingsland, Country Coordinator of GLOBE Argentina; Andrea Ventoso, Country Coordinator of GLOBE Uruguay; and Claudia Caro, scientific translator for the RCO and Master Trainer from GLOBE Perú, recorded and published a virtual training in Spanish covering the 2018 IVSS. The recording explained the key points for submitting projects.

PERU: Over 140 teachers and 50 students from Peru participated in trainings on atmosphere, soil, and mosquito protocols in January and February, with the support of the Ministry of the Environment and the Ministry of Education.

PARAGUAY: Two training workshops for 31 schools with 80 teachers and Peace Corps Volunteers were conducted, where participants expanded their knowledge in the areas of atmosphere and hydrology.

URUGUAY: GLOBE Uruguay worked on the translation and adaptation of the GLOBE eTraining modules in Spanish. This effort began with the atmosphere module, which was launched on the Educantel platform (a tool developed by the National Telecommunications/ANTEL Administration). GIO Director Dr. Tony Murphy recorded an introductory video for the launching event. The next step is launching the hydrosphere module on the same platform for a wider spectrum of teachers, which will include physics teachers and students.

↑ GLOBE Argentina participants at GLOBE workshop.

BRAZIL: In 2017, 158 people participated in a training conducted by GLOBE Brazil, which included elementary, middle school, and high school teachers and the Brazilian Space Agency staff. During this period, 3,647 data measurements were entered to the GLOBE website. A total of five workshops were held by GLOBE Brazil during 2017.

COMMUNITY

Numerous GLOBE-related community events and activities took place throughout the LAC Region, some of which are described below:

PERU: GLOBE Peru worked alongside the Ministry of Education to promote the introduction of The GLOBE Program into the school curriculum. The Ministry of Education delivered 1,600 GLOBE atmosphere research kits and began to promote the program as a strategy to implement comprehensive environmental projects in schools.

ARGENTINA: Students of Primary School Number 23 of Buenos Aires, celebrated World Environment Day with an outdoor cycling activity. The activity included fieldwork with the GLOBE Cloud Chart.

DOMINICAN REPUBLIC: GLOBE organized a two-day Science Fair to celebrate Earth Day and the anniversary of The GLOBE Program. GLOBE students presented projects about aerosols to their teachers and to event guests. The fair attracted the interest of the press for the main topic (which is not well known on the island) and for its applications to daily life—as well as for its creative solutions to local issues of science. There were 136 presentations in all.

↑ GLOBE Peru participants at World Environment Day cycling event.

GLOBE Around the World—Spotlight on the Regions

Near East and North Africa Highlights

↑ Participants at the Bahrain Researchers and Inventors Committee Meeting.

2017 REGIONAL MEETING

In December, the 2017 NENA Regional Meeting was held in Oman. The event was attended by 45 participants from nine countries (Mauritania, Morocco, Jordan, United Arab Emirates, Qatar, Kuwait, Pakistan, Oman, and Saudi Arabia). The event was attended by teachers, students, and Country Coordinators (the Country Coordinator of Kuwait attended the meeting for the first time in many years). The meeting mainly focused on discussions and ideas relating to GLOBE in the region. There was also a presentation highlighting GLOBE achievements in each country. Plans for GLOBE, including goals, were also discussed. GIO Director Dr. Tony Murphy presented on the overall program, including WGs, coordination, training, participation in research, and overall participation.

The meeting also focused on understanding, and evaluating, scientific research related to GLOBE. There were also trainings on GLOBE protocols, including on hydrosphere, pedosphere, and land cover. David Overoye also provided a group training on website updates and upgrades, as well as individual training for Country Coordinators.

SCIENCE

Events, Activities, and Trainings

Numerous GLOBE-related science events and activities took place throughout the NENA Region, some of which are described below:

BAHRAIN: In May 2017, 25 schools participated in the Bahraini GLOBE Researchers and Inventors Committee Meeting. At this event, participants presented scientific research based on the use of GLOBE protocols (including hydrology, land cover, and soil). Participants also focused on research related to reusing grey water for watering plants after the sanitation process.

LEBANON: The GLOBE Lebanon Country Coordinator worked with a GLOBE scientist, George Metri, in order to enhance the quality of program in Lebanon.

UNITED ARAB EMIRATES: In January 2018, a device was invented by teachers and students from five primary schools in Al Sharja. (The device determines the land cover area dimensions.) This was a great experience for the participants, who were pleased that the device provided the same accurate results that GLOBE devices show.

EDUCATION

Events, Activities, and Trainings

Numerous GLOBE-related education events and activities took place throughout the NENA Region, some of which are described below:

SAUDI ARABIA: In February 2018, a field study for girls' primary schools, which included a GLOBE competition, was held. The student competition focused on GLOBE games and quizzes designed to enhance the design skills of participating students. Approximately 50 GLOBE schools participated in the event; and twenty schools received awards from the Saudi Country Coordinator for the girls' schools, Mrs. Salha Al Badawi from Al Kharj city, at the Closing Ceremony.

UNITED ARAB EMIRATES: A GLOBE training, with participants from 15 schools, was held. The event covered GLOBE protocols (including hydrology, soil, and atmosphere). Primary students, with the help of their teachers and trainers, were trained on how to take measurements.

↑ Participants at the GLOBE training in the United Arab Emirates.

↑ Bahrain

COMMUNITY

Numerous GLOBE-related community events and activities took place throughout the NENA Region, some of which are described below:

JORDAN, SAUDI ARABIA, OMAN: In July 2017, GLOBE students from Jordan, Saudi Arabia, and Oman attended the GLOBE Annual Meeting in Connecticut, USA. At this event, students had the chance to meet and connect with GLOBE community members from different countries and to exchange GLOBE-related experiences with them.

2017 EUROPE AND EURASIA REGIONAL MEETING: In October 2017, the NENA Country Coordinator, Salma Zoubi, participated in the regional meeting, held in Israel. This generated a positive impact on the cooperation between the two regions.

↑ NENA participants at the 2017 Annual Meeting in Connecticut, USA

GLOBE Around the World—Spotlight on the Regions

North America Highlights: United States

2018 REGIONAL MEETING

In March 2018, the North American Regional Meeting (NARM) and the annual TTT took place at Purdue University, in West Lafayette, Indiana.

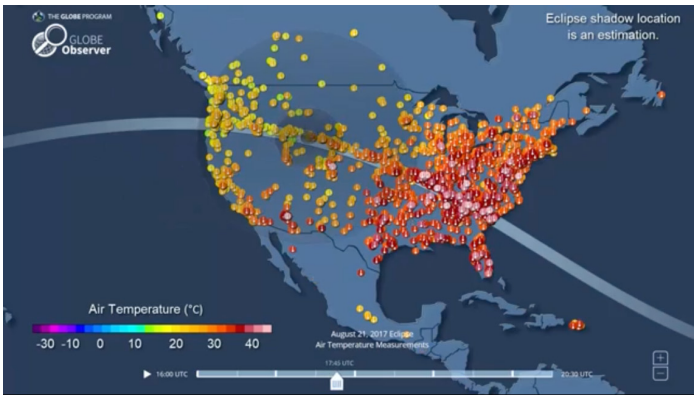
The Purdue University GLOBE Partnership hosted the North America Regional Meeting (NARM) and a Pedosphere Train-the-Trainer from 26-29 March 2018 in West Lafayette, Indiana. Steven Smith and Sarah Nern provided the pedosphere materials, and invited a local soil scientist for a three-tiered training model. (In this model, five Indiana teachers and 15 GLOBE community members participated in a workshop facilitated by five candidate trainers and four candidate Master Trainers, mentored by Master Trainer Lynne Hehr of the University of Arkansas/Fayetteville GLOBE Partnership.)

NARM began on 28 March with a welcome by the NASA Program Manager, Dr. Lin Chambers. Dr. Jonathan Hall Slade, Jr. of Purdue University then discussed how the effect of air quality policies can be seen in long-term data. The meeting was attended by approximately 50 people representing 30 partnerships and affiliated organizations. Dr. Tony Murphy, Jennifer Bourgeault, Jessica Taylor, and David Overoye shared program updates from the perspectives of the GIO, the United States office, and the Working Groups. Lightning talk sessions (a series of six-minute presentations followed by a block of time to speak with presenters) and strategic planning discussions filled the rest of the 1.5-day meeting. There was also time set aside for participants to network and build collaborative relationships throughout the meeting. The lightning talks covered multiple topics, including HoloGLOBE and a pre-service focus group, NGSS-aligned high school curriculum, and the fire fuel protocol (which is in development), and incorporating engineering into GLOBE.

↑ Participants at the 2017 North American Regional Meeting.

GLOBE Around the World—Spotlight on the Regions

North America Highlights: United States



SCIENCE

U.S. Eclipse

During the eclipse that took place in the United States in August 2017, GLOBE partnerships and teachers hosted groups for the purpose of collecting measurements using the NASA GLOBE Observer App. Over the course of the eclipse, approximately 106,600 observations were made, from a total of approximately 10,553 GLOBE Observers. In order to enhance the effort, the GLOBE Observer team wrote an article on how to analyze these data in support of both the IVSS and the U.S. Regional Student Research Symposia.

GLOBE Earth System Science Projects

Through funding from a NSF grant, GLOBE carbon cycle protocols and learning activities were developed and field-tested as part of the GLOBE Earth System Science Projects. Thanks to GLOBE Mission EARTH funding from NASA, the final step—developing the data entry and visualizations—was completed. Jennifer Bourgeault, and the team at the University of New Hampshire, worked with Science Systems and Applications, Inc. (SSAI) to develop data entry pages and the visualizations for the GLOBE carbon cycle materials. Funding from NASA also supported the updating of teacher and student materials, and the development and testing of the eTraining modules. (This same NASA grant also supports partial funding for two more years of the United States SRS, where professional development around the carbon cycle materials will be provided for teachers and GLOBE partners who attend.)

EDUCATION

U.S. Student Research Symposia

In 2017, U.S. GLOBE held the second annual Student Research Symposia (SRS), a series of six regional face-to-face symposia highlighting student research using GLOBE protocols or GLOBE data. Over 200 students from around the country presented 95 projects. Forty-seven partners (representing 29 partnerships) mentored student-teacher teams and attended the events. Photographs, live videos, and updates were posted to the GLOBE Facebook page and to Twitter (and these can be found on the SRS webpage).

Metropolitan State University of Denver (Denver, Colorado, USA) was awarded an NSF ITEST grant that provides funding for GLOBE workshops. The first week-long professional learning workshop included 18 teachers and six GLOBE partners. This workshop took place in Denver in June 2017; it connected human health to GLOBE measurement protocols. This project includes funding for participating GLOBE partners to hold a workshop at their home institutions designed to integrate human health resources into subsequent GLOBE workshops.

This year, U.S. GLOBE distributed funding in the form of mini-grants to five GLOBE partners to offset costs of Elementary GLOBE aerosols teacher workshops. A NASA grant also supported workshop materials being posted to the GLOBE website (as resources for other partners and Country Coordinators). A total of nine mini-grants were awarded over the course of the project.

REGIONS	LOCATION	DATE	PROJECTS	STUDENTS	TEACHERS	PARTNERS/ PARTNERSHIPS*
Southeast	George C. Marshall Space Flight Center Madison County, Alabama	27-29 April	12	31	09	10/07
Midwest	Purdue University West Lafayette, Indiana	19-20 May	23	33	07	05/03
Southwest	Metropolitan State University of Denver Denver, Colorado	19-20 May	12	31	09	04/03
Northeast and Mid-Atlantic	Palmyra Cove Nature Center Palmyra, New Jersey	19-20 May	34	74	24	06/05
Northwest	South Dakota Schools of Mines and Technology Rapid City, South Dakota	01-02 June	05	14	03	05/05
Pacific	NASA Jet Propulsion Laboratory Pasadena, California	02-03 June	09	18	10	07/05

* Plus the Lietzel Center, University of New Hampshire Partnership-at-Large

North America Highlights: United States

COMMUNITY

Watercoolers

U.S. GLOBE partnerships formed a Professional Learning Community (PLC), which regularly present to one another virtually. The meetings, called Watercoolers, are scheduled every three weeks, with two presenters. Topics this year have included:

- Leveraging GLOBE Resources to Implement Middle School Science and Math Standards
- Nation's Capital Girl Scouts and GLOBE
- Citizen Science for Girls
- One Tiny Piece Activity (Soils)
- Data Mapping with Online GIS Tools
- HoloGLOBE
- How Does the Texas Tech Outdoor School Incorporate GLOBE?
- Fire Fuel Protocol Revision
- Ground-based Cloud Observations: Satellite Imagery Matching Process
- Planning for Inquiry: How to Help Students Succeed
- Afterschool GLOBE Clubs
- Tips for Successful Grant Writing for NASA, NOAA and NSF

GLOBE Mission EARTH

In the United States, GLOBE Mission EARTH continues to provide additional resources and opportunities for the community, such as Zoom meetings for partners that provide pre-service professional learning (so that they can share ideas and provide webinars for GLOBE teachers and students). Teacher/student webinar topics included: Classroom Career Connections; Elementary GLOBE Teachers Share-a-Thon; GOES-R Global Weather; Why Does the Color of the Sky Change?; and Observing the Solar Eclipse.

GLOBE "Bootcamp"

In November 2017, 22 U.S. GLOBE partners, from a range of new and experienced GLOBE partnerships, gathered in New Orleans, Louisiana, USA, to engage in a week of active learning and discussion regarding the use of GLOBE with the communities they serve. The week was facilitated by Dr. Janelle Johnson from Metropolitan State University of Denver, Jennifer Bourgeault (U.S. GLOBE CC), and Kristin Wegner (GIO). Onsite trainers included Todd Toth (NASA Goddard), Anne Lewis (South Dakota Discovery Center), and Dr. Blakely Tsurusaki (University of Washington-Bothell). David Overoye (SSAI) facilitated the GLOBE website sessions during the week.

This workshop included three unique off-site experiences at local partnership study sites. Participants went to the bayou with local GLOBE partners, Dr. Ivan Gill and Dinah Maygarden (University of New Orleans), for hydrosphere measurements with teachers. Xavier University of Louisiana hosted the group, who heard from Dr. Morewell Gasseller's pre-service teachers. The group also visited a third GLOBE partnership, the INFINITY Science Center (the visitor center for NASA Stennis Space Center), to carry out hydrology protocols.

↑ Participants at the GLOBE Bootcamp at Xavier University in New Orleans, Louisiana, USA.

GLOBE Around the World—Spotlight on the Regions

North America Highlights: Canada

↑ Participants at an in-service field study using GLOBE protocols.

SCIENCE

Protocol and GLOBE-related Trainings

GLOBE Canada tracked over 500 K–12 students (225 in grades 7–12; 310 in grades K–6) involved directly in GLOBE protocols. Canada continues to implement and revise its snow protocols, as the country has experienced extensive cold weather and a large accumulation of snow.

↑ Participants (Grade 5) working on GLOBE protocols.

EDUCATION

Pre-service and In-service Trainings

A strong focus of GLOBE Canada has been on the training of pre-service and in-service teachers. As the education climate in Canada moves to an inquiry-based focus that facilitates experiential and place-based learning, more educators are seeking out The GLOBE Program to support field-based pedagogies. GLOBE Canada tracked over 150 in-service and pre-service teachers, and school administrators (30 in-service teachers; 105 pre-service teachers; 25 administrators).

North America: Canada Highlights

COMMUNITY

Partnerships

Many Canadian students, teachers, professors, and scientists are partnering within K-12 schools, universities, and NGOs to facilitate rich teaching and learning experiences related to The GLOBE Program. GLOBE Canada is also supporting three community-based research partnerships. They include:

Partners Learning in Place: Researching the Facilitation and Impact of Experiential and Place-based Outdoor Education at Connect Charter School (FHCE-Innovation Fund, 2017–18

The purposes of this project is to:

1. explore how place-based education (PBE) impacts sustained collaborative efforts between university educational setting and Charter School (grades 4–9) educational setting; and
2. explore collaborative efforts with a focus upon PBE and land-based pedagogies that aim to improve student learning through integration.

Partners in Place: Building Community through Experiential Education (Calgary Foundation-Community Grant, 2018–19)

Beginning in 2018, a two-day PBE symposium will create a forum for dialogue between Connect and TsuuT'ina educators (as well as those in other school jurisdictions), as well as pre-service teachers and faculty from Mount Royal University. Participants will return to their respective schools to continue the discussions, and to put into practice the ideas generated by the symposium. Sharing collective understanding of PBE (GLOBE) with other educators and agencies involved in community building are a primary objective of this research project.

Developing a Sense of Place in Education Theory and Practice Through School and Community Partnerships (Institute for Environmental Sustainability IES Research Grant, 2015–17)

The purpose of this project is to develop a strong research partnership among not-for-profit organizations (Ann and Sandy Cross Conservation Area and Tim Horton Children's Foundation), Aboriginal communities (Blackfoot and Tsuu T'ina), and a post-secondary institution (Department of Education and Iniskim Centre) around PBE (GLOBE).

The particular focus of the inquiry is to better understand (and eventually articulate) the particular ways in which Aboriginal communities value place-based knowledge. By initiating a research network and partnership among Aboriginal, not-for-profit organizations and academic communities, the goal is to: 1) learn about the ways in which community members can participate in conversations about the value of PBE as it applies to environmental sustainability and education; and 2) consider how Aboriginal knowledge systems can inform and/or challenge critical investigations through ecological studies, environmental assessments, and cultural activities intended to connect students with their specific place on the Earth. The goal of this proposal is to formalize a research partnership and, through this partnership, develop a research proposal for a Social Sciences and Humanities Research Council (SSHRC) of Canada grant application.

↑ Participants at a pre-service field study.

Thanks to our GLOBE partners around the world.

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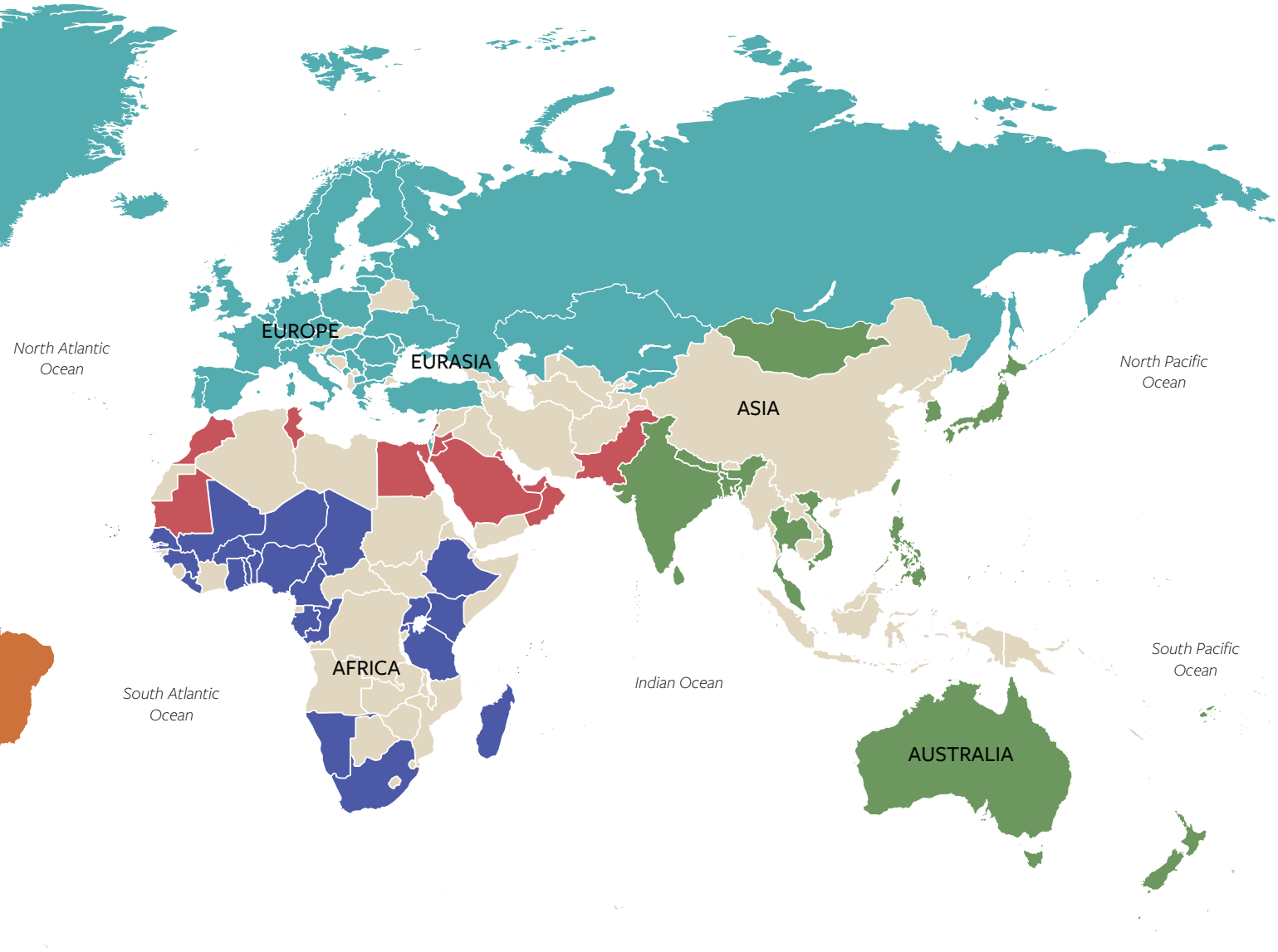

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Notes:

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