



THE GLOBE PROGRAM

# Annual Review

2022-2023

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## The GLOBE Program’s 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.
- 2000: USA hosts the 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 the fourth GLE in Cape Town.
- 2009: GLOBE established Regional Coordination Offices in Africa, Asia and Pacific, Europe and Euraisa, Latin America and the Caribbean (LAC), and North Africa and Near East (NENA) to support professional development workshops, capacity building, and regional sustainability efforts; 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; offers 51 protocols; data reaches 128 million measurements.
- 2016: GLOBE provides online eTraining; hosts International Virtual Science Symposium and six regional U.S. Student Research Symposia; offers student scientific campaigns; launches a new mobile program app called GLOBE Observer.
- 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; all six GLOBE regions have entered over one million measurements into the GLOBE database.
- 2019: GLOBE (via the GLOBE Zika Education and Prevention Project) connects with Google Voyager to highlight a GLOBE story, “Stopping the Spread of Zika.”
- 2020: The GLOBE Program celebrates its 25th Anniversary! For the first time, the GLOBE Annual Meeting goes completely virtual.
- 2021: GLOBE hits a new milestone with over 200 million measurements in the database; GLOBE receives the American Geophysical Union (AGU) Excellence in Earth and Space Science Education Award.
- 2022: Inaugural cohort of GLOBE Student Vloggers completes a successful first year.
- 2023: The GLOBE Annual Meeting is again an “in-person” event in Denver, Colorado, USA.

## The GLOBE Program

The GLOBE Program (GLOBE) is an international science and education program sponsored by NASA; supported by the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA) and the United States Department of State (DoS). GLOBE is hosted and implemented worldwide by the University Corporation for Atmospheric Research (UCAR), located in Boulder, Colorado, USA. For more than 25 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.

The GLOBE Implementation Office is supported under NASA Grant and Cooperative Agreement C19M0120, awarded to UCAR.

## About The GLOBE Program Annual Review

This annual review reflects the hard work and dedication of the GLOBE Implementation Office (GIO), Data Information Systems (DIS), Regional Coordination Offices (RCOs), GLOBE Observer (GO), the United States Country Coordinator Office (US CCO) and the GLOBE Community from 1 June 2022 until 31 May 2023 with guidance and leadership from The GLOBE Program Office (GPO) at NASA Headquarters, and the other supporting agencies: National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), and the United States Department of State (DoS).

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## A MESSAGE FROM DR. TONY MURPHY

Director, Community Engagement and Program Strategy

GLOBE Implementation Office

GLOBE is a strong and exciting program. It has operated for 28 years; has over 240 million measurements in a continually growing global database spread across almost 50 scientific protocols and its six regions, and a community that is strong, vibrant, and dynamic. While the protocols are the core of the program, our community – every one of you – whether students, educators/teachers, parents, alumni, STEM professionals/scientists, citizen scientists, Working Group (WG) members, Country Coordinators (CCs) and advocates, Region Coordination Offices (RCOs) staff, GLOBE Program Office (GPO) staff, U.S. Federal Agency Sponsors, various international sponsors and supporters, GLOBE affiliates, Data Information Systems staff, and GLOBE Implementation Office (GIO) staff – every one of us, are critical to the operation and function of the program, to its evolution and future as a leader in Earth Science Education and a provider of open source

Once you get involved with GLOBE, it stays with you for life!

data. We all play a role in this dynamic global program; over time that role can evolve, as we grow from students, to alumni, or in some cases to educators, to parents, to STEM professionals, U.S. Partners or CCs; we may get involved in various ways in the program’s governance as members of WGs or become RCO staff. All we seem to know is that once you get involved with GLOBE, it stays with you for life! Why does this happen?

Is it the:

- way GLOBE Educators teach science?
- measurements taken of local surroundings with fellow students?
- research that students do to answer questions about their immediate environment?
- educational and creative opportunities offered, like vlogging, research opportunities, symposia, exhibitions, and learning expeditions?
- eTraining and/or training workshops?
- way you learn about other people and their homes, wherever in GLOBE’s six regions?

This list could go on with many more motives, and staying with GLOBE is all of these, and yet there is an even more incredibly powerful reason: and that is the Community! You are the reason people stay with the program. While the protocols and learning activities may be the core, the community is the heart of GLOBE!

The program continues to evolve as it should, growing from early years and maturing as we reach three decades of implementation. GPO leadership changes occurred, Amy Chen assumed the GLOBE Program Manager role from Allison Leidner in May, and new staff join GIO in various roles. John Ristvey rejoined the GIO leadership team as Director of Operations and Implementation, while I assume the role of Community Engagement and Program Strategy Director. As we head into year 29, the program and community are strong and looking forward to a wonderful end to three decades of GLOBE and welcome the new beginnings that lay ahead!



## WELCOMING JOHN RISTVEY

Director of Operations and Implementation

GLOBE Implementation Office

The GLOBE Program is pleased to welcome John Ristvey as Director of Operations and Implementation for the GLOBE Implementation Office. Ristvey holds an M.S. in Secondary Science Education (University of Houston-Clear Lake, Texas, USA) and a B.S. in Biology (Grove City College, Pennsylvania, USA), along with certifications in teaching secondary science.

In April 2023, John began providing leadership, operations savvy, strategy tools and overall direction for GIO. His primary duties include overseeing GIO budget, finances and reporting. He also oversees GIO staffing, needs and logistics.

Since 2014, Ristvey has served as Director of the UCAR Center for Science Education (UCAR SciEd), another program under the umbrella of UCAR Community Programs (UCP), also centered in Boulder, Colorado, USA. In this role, he was responsible for leadership and day-to-day operation of UCAR SciEd, including development of new ideas and funding streams, as well as the direction

My goal is to help GLOBE be the best program it can be.

of staff, management of budgets, and establishment of strategic priorities. As a GLOBE Partner with UCAR SciEd, Ristvey was the Principal Investigator (PI) on a project led by UCAR SciEd: GLOBE Weather curriculum, which is an instructional materials development project that resulted in a five-week curriculum unit designed to help middle school students understand weather at local, regional and global scales. Ristvey is also active in the Colorado GLOBE Earth System Science (ESS)/Collaborative. In 2022, he co-led a workshop of ESS Collaborative/ GLOBE Teams in Estes Park, Colorado.

The goal of “GLOBE Weather Pathways for Students with Disabilities” funded by the NSF GEOPaths program is to develop and test an approach to provide middle school educators with the experiences, tools and abilities to adapt geoscience curricular resources to meet the needs of students with disabilities and articulate career pathways and opportunities in STEM for them.

In this project he is working with teams of educators to develop accommodations of activities from GLOBE Weather for exceptional needs students. Prior to his time at UCAR, he worked at McREL and served as Co-PI on the NASA Planetary Science Education and Public Outreach Forums (SEPOF), led by the Lunar and Planetary Institute. During this time he also conducted education and public outreach for various NASA Discovery Program missions, including Dawn, EPOXI, Stardust/NEXT, Deep Impact and Genesis.

“I am excited to work with an excellent team at GIO. Everyone is very passionate about the GLOBE mission and serving the GLOBE community. Tony Murphy and I are committed to providing an exceptional experience of GLOBE implementation to our community,” Ristvey said. “My goal is to help GLOBE be the best program it can be. To do that, I am interested in learning the perspectives of the GLOBE Community. Please reach out to me (jristvey@ucar.edu) to share your ideas. GIO works collaboratively with our sponsors, partners and the worldwide GLOBE Community. We are committed to excellence in the service we provide.”



## GLOBE: Creating an International Community of Practice

Since its creation in 1995, The GLOBE Program has been dedicated to the vision of “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” and to the mission “to increase awareness of individuals throughout the world about the global environment, contribute to increased scientific understanding of the Earth, and support improved student achievement in science and mathematics.”

Through inquiry-based, interdisciplinary efforts designed to explore the various Earth spheres, GLOBE gives students from around the world a hands-on way to experience the journey that is science – from data collection and analysis to research and scientific adventures. GLOBE’s protocols are developed by the scientific community and validated by teachers in classrooms – whether inside (with students creating data visualizations) or outside (with students sifting, sorting, and exploring).

For over 25 years now, GLOBE has invited students, educators, and professional and citizen scientists from around the world to work collaboratively to create an international community of practice. Wenger-Trayner & Wenger Trayner (2015) defines a “Community of Practice” as communities that share a concern or passion for something they do. They interact regularly to learn and improve their practice; through these interactions they develop an overlapping knowledge base, set of values, history and experiences (Barab, et al, 2004) . In its day-to-day efforts, GLOBE offers unique opportunities for the community to engage in authentic scientific exploration using the same language: science.

The people of GLOBE, by expanding personal comprehension and increasing precise data measurements, regularly engage in hands-on investigations to deepen their comprehension of, and commitment to, our interconnected planet. GLOBE now consists of dedicated and engaged community members from over 125 countries and over 100 U.S. partnerships.



Students at Maple Street School sampling water organisms; Rochester, New Hampshire, USA.



The GLOBE Europe and Eurasia region brought together 170 students, teachers and researchers from several countries for its 2022 GLOBE Regional Learning Expedition in Käsmu, Estonia.

### GLOBE’s international framework includes:

- ◆ **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). GLOBE Partners (Country Coordinators and U.S. Partners) facilitate the implementation of GLOBE in their countries or within their service areas. GLOBE Regional Coordination Offices (RCOs) manage their regional networks and are in regular communication with the GIO.
- ◆ **GLOBE Working Groups:** GLOBE’s five Working Groups (Diversity, Equity, Inclusion and Accessibility; Education; Evaluation; Science; and Technology) are dedicated to enhancing the role of the program’s diverse community members in shaping the future of GLOBE, and in supporting the development and implementation of GLOBE worldwide.
- ◆ **U.S. Partner Forum:** The U.S. Partner Forum (USPF), which represents six regions (Midwest, Northeast and Mid-Atlantic, Northwest, Pacific, Southeast, and Southwest) works to enhance the contribution of GLOBE toward improving STEM (Science, Technology, Engineering, and Mathematics) education in the United States.
- ◆ **The GLOBE International STEM Network (GISN):** The GISN is an international network of STEM professionals. These experts mentor; explore national and international components of science and research; design and create unique field campaigns; and inspire students to engage in cutting-edge STEM and research.

Whether in-person or virtual, GLOBE Annual Meetings, GLOBE Learning Expeditions (GLEs), and regional meetings bring the GLOBE community together as one. The goal of these efforts is to share best practices and solutions to common issues; engage in collaborative data-collection activities and horizon-expanding expeditions; consider challenges and opportunities; and work together to chart the course of The GLOBE Program.





Asia and Pacific participants at the 2022 Lake Pokhara Expedition; Pokhara, Nepal.

## GLOBE Implementation Office: Serving and Supporting the Community

The primary goal of the GLOBE Implementation Office (GIO) – hosted by the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado, USA – is to serve and support the community, putting in the daily work necessary to ensure the continued success of the program’s international, educational and scientific endeavors. This includes building and nurturing an ever-growing international network of informed and inspired people and providing the implementable science and education necessary to achieve data and research goals; collaborating with the Data Information Systems (DIS) Team to ensure a robust technological backbone, as well as clearly articulating with Working Groups and the U.S. Partner Forum training framework necessary to sustain the ever-expanding program network in the United States and internationally.

GIO works to provide informed support for the common elements of science, communication, education and evaluation, and overall community engagement – all with a focus on diversity, equity, inclusion, and accessibility. These common elements, along with DIS technological structure – which is focused on the database, website, and app – are crucial and instrumental to enabling the worldwide implementation of GLOBE.

### GIO staff

- ◆ **initiate** and sustain activities that encourage and promote diverse community involvement, engagement, and expansion;
- ◆ **provide** up-to-date training and mentoring;
- ◆ **coordinate and facilitate** campaigns, Intensive Observation Periods (IOPS), projects, and meetings;
- ◆ **engage** with other groups, such as the DIS team, the GLOBE Observer (GO) team (associated with the program’s mobile app);
- ◆ **provide** cutting-edge technical support services;
- ◆ **collaborate** with staff from the other sponsoring agencies, such as the U.S. Embassy personnel in numerous countries;
- ◆ **act** as a resource for a number of NASA-funded Science Activation (SciAct) projects (managed by GLOBE Partners); and
- ◆ **generate**, with various community members and others, high-quality education and science materials and resources.

In accordance with *The GLOBE Program Strategic Plan 2018-2023*, GIO’s strategic priorities are “to improve student understanding of environmental and Earth system science across the curriculum; contribute to scientific understanding of Earth as a system; build and sustain a global community of students, teachers, scientists and citizens; and engage the next generation of scientists and global citizens in activities to benefit the environment.”



Visit to a GLOBE school in Amman, Jordan during the NENA Regional Meeting.

## GLOBE: Collecting Field-focused Data for Innovative Research

The GLOBE Program is based on science – from data collection and entry to analysis, research, and collaborative scientific endeavors. GLOBE offers field-focused opportunities for community members to collect and submit data that can be used in scientific research efforts. The table to the right shines a light on some of the critical results of the community’s ongoing data measurement efforts during 2022-2023.

By early 2023, more than 44,000 teachers from over 38,000 schools contributed over 230 million measurements to the GLOBE database for use in their inquiry-based science projects. In addition, citizen scientists using The GLOBE Program’s app, GLOBE Observer, had contributed almost 1 million measurements.

| REGION                      | Number of countries entering data from 1 May 2022 through 15 April 2023 | Total number of measurements entered by 15 April 2023 | Total number of measurements entered from 1 May 2022 through 15 April 2023 | Total number of measurements entered by citizen scientists/orgs from 1 May 2022 through 15 April 2023 |
|-----------------------------|---|---|--|---|
| Africa                      | 15  | 1,504,433   | 5,183  | 667   |
| Asia and Pacific            | 16  | 4,706,398   | 604,907  | 13,128  |
| Europe and Eurasia          | 43  | 86,766,187  | 3,851,330  | 19,161  |
| Latin America and Caribbean | 19  | 1,937,230   | 149,065  | 9,407   |
| Near East and North Africa  | 11  | 3,195,365   | 326,937  | 500   |
| North America               | 2   | 183,626,352   | 17,516,275   | 90,512  |
| <b>TOTAL</b>                | <b>106</b>  | <b>281,735,965</b>                                    | <b>22,453,697</b>  | <b>133,375</b>  |



## Validating NASA Missions: GLOBE Field Measurement Campaigns/IOPs

The GLOBE Program supports NASA's satellite missions through ongoing hands-on field measurement campaigns and Intensive Observation Periods (IOPs). GLOBE campaigns/IOPs are regional and worldwide efforts that provide students the opportunity to work beyond the boundaries of the traditional classroom – to go out into their environment and observe, question, research, explore, measure and collect measurements that NASA may use to validate its scientific instrumentation and data.

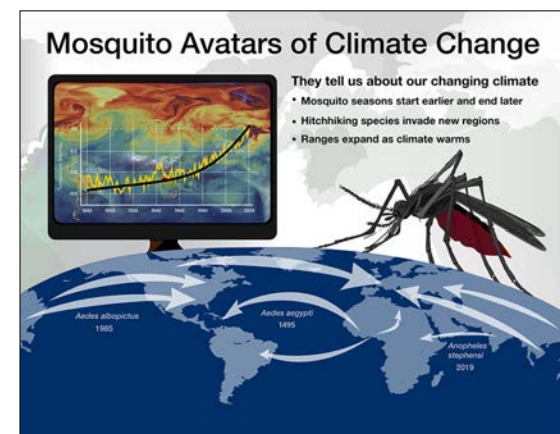
The current campaigns are:

◆ **The Trees Around the GLOBE Student Research Campaign:** This campaign, launched in 2018 in conjunction with NASA's Ice, Cloud, and Land Elevation Satellite 2 (ICESat-2) launch, is a student research campaign focusing on tree height, land cover and "greenings." From May 2022 through May 2023, the campaign had 1,600+ active participants from 60 countries. In early 2023, data counts included: tree height (17,000+ from 5,200+ global sites), land cover (7,000+ from 5,000+ global sites), and greenings (6,500+ from 300+ global sites). A major portion of these data are the result of the 2022 Spring Tree Height and Land Cover IOP, which added 2,500+ tree height and 400+ land cover observations from 1,100+ sites in 42 GLOBE countries to the GLOBE database.

◆ **The GLOBE Mission Mosquito Campaign:** This campaign, which began in 2018, is creating an organized citizen science community that conducts and reports local observations using The GLOBE Program's app, GLOBE Observer/Mosquito Habitat Mapper Tool. Through this effort, citizen scientists identify potential mosquito breeding sites, sample and count mosquito larvae, and (with optional equipment) examine and photograph specimens to identify genus. This ongoing campaign has included interactive webinars, research and data collection, blogs and reports, and the development of innovative resources – all to find new and innovative ways of combating mosquitoes as vectors for numerous diseases.



Child Cub students, participating in Environmental Camps for Conservation Awareness in Nepal, learn how to use the Mosquito Habitat Mapper tool on the GLOBE Observer app.



Example of innovative educational resource showing the connections between a changing climate and mosquitoes' geographic distribution. Graphic created by the GLOBE Mission Mosquito team.

◆ **The Urban Heat Island Effect (UHIE)-Surface Temperature Student Research IOP:** This ongoing campaign, which is now an IOP, takes place in October, December and March. It is focused on examining the impact urbanization has on Earth's surface temperature and how the surface temperature changes the dynamics of Earth's atmosphere. From May 2022 to May 2023, the IOP supported activities in Greece, Malta, Netherlands, Qatar and the United States to promote the study of the urban heat islands by K-12 students. Students from 162 schools in 29 countries, took 8,929 surface temperature observations.

GLOBE campaigns and IOPs are highly valued components of The GLOBE Program that facilitate interaction among students, educators, and scientists. They stimulate student measurement activity and provide a focus for learning by GLOBE students, while also providing scientists with research-quality measurements. In April 2023, GIO launched revised web pages to better facilitate knowledge sharing and interaction among GLOBE countries, regions, students, educators, and scientists. These revised pages now include information on specific differences (and similarities) across campaigns and IOPs, how to propose a successful campaign and IOP, and how GIO provides support to these invaluable efforts.



Elementary students at Maple Street School sketching on data sheets; Rochester, New Hampshire, USA.

## Enhancing Innovative Efforts: GLOBE/NASA Science Activation Projects

GIO provides support – through ongoing communications efforts, and assistance with planning efforts -- for four innovative NASA-funded Earth Science Activation (SciAct) projects (through STEM agreements with GLOBE U.S. Partners). From 2022-2023, this work included:

◆ **GLOBE Mission EARTH (GME):** GME focuses on bringing together scientists, science educators, and other experts to develop a K-12 "Earth as a System" curriculum progression, embedding NASA assets and GLOBE resources into the classroom. Overall, more than 3,000 students participated. Professional development training involving more than 33 subject matter experts were held throughout the United States (and virtually). Engagement during the 2022-2023 period included: a virtual "Kids Club" for K-3/4 students, STEM Enhancement in Earth Sciences (SEES) for high school students, and projects with undergraduate

engineering students designed to develop instruments that high school students could use in research.

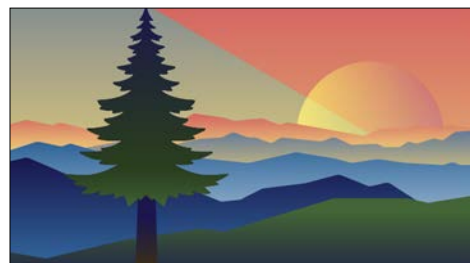
◆ **AEROKATS and ROVER Education Network (AREN):** The goal of AREN is to inspire the next generation of scientists, engineers, and other STEM professionals to observe and understand Earth through experiential learning using NASA technology and data in real-world settings. In 2022-2023, AREN conducted a range of activities, including professional development sessions. During the AREN Remote Sensing Summer Institute, activities included core GLOBE-related data collection and research endeavors, training sessions, as well as assistance with online eTraining.

◆ **Impacts and Feedbacks of a Warming Arctic:** Engaging Learners in STEM using NASA and GLOBE Assets (Arctic and Earth SIGNs): This project connects youth and adults to climate issues and Earth science learning through inquiry-based GLOBE investigations and community stewardship activities. In 2022-2023, the project involved over 1,440 students in GLOBE activities; engaged over 300 educators through professional development efforts; hosted the first Alaska U.S. Student Research Symposium (engaging 67 students from 14 communities); partnered with "Fresh Eyes on Ice" to expand the use of the program's app, GLOBE Observer to track ice conditions of freshwater rivers – just to name a few expansive efforts!

◆ **NASA Earth Science Education Collaborative (NESEC):** NESEC is a partnership between four organizations that are GLOBE partners: Institute for Global Environmental Strategies (IGES), and the Earth Sciences divisions at three NASA Centers (Goddard Space Flight Center, MD; Jet Propulsion Laboratory, CA; and Langley Research Center) VA. In 2022-2023, NESEC efforts included participation from all 50 states, the District of Columbia and Puerto Rico, and 105 GLOBE countries; encouraged the use of The GLOBE Program's app, GLOBE Observer (GO), by more than 245,000 citizen scientists (with more than 162,000 observations); led two data challenges; led student research campaigns to engage the community in the study of Earth system phenomena related to air quality, trees and mosquito habitats.

All of these efforts – and many more – were crafted, supported, and conducted with the goal of educating and energizing the ever-expanding GLOBE community.





A GLOBE Israel student uses the GLOBE Observer's Trees tool to measure tree height.

## Mobilizing GLOBE's Reach: GLOBE Observer Challenges

The GLOBE Program's mobile app, GLOBE Observer (GO), extends the reach of GLOBE by providing a way for community members to take and submit observations. These citizen scientist observations help professional scientists track changes in clouds, plants, trees, land cover and other life in support of Earth system science research. Currently, there are over 250,000 people that use the GO app.

Below are a few of the challenges charged to inspire the community in 2021-2022:

- ◆ **The NASA GLOBE Land Cover Challenge 2022:** Land Cover in a Changing Climate (July- August 2022): During this challenge, volunteer scientists used the GO app to collect observations of land cover, tying in with the 50th anniversary of the Landsat satellite and with a special focus on land cover in a changing climate. Participants submitted over 1,600 observations during the challenge period. Observations came from 180+ individual observers at over 1,100 different data collection sites in 28 countries and from all six GLOBE regions.
- ◆ **The Trees Challenge 2022:** Trees in a Changing Climate (October–November 2022): This challenge, which followed the Land Cover Challenge, continued efforts to observe the environment by measuring tree height and tree circumference using The GLOBE Program's app, GLOBE Observer's tree tool. Data collected is used to compare the space-based tree height data from ICESat-2 and the Global Ecosystems Dynamics Investigation (GEDI) instrument on the International Space Station. Observations from various sources allow scientists to create global maps of land cover and forests and can help us understand how our planet is responding to a changing climate. This challenge resulted in 4,753 observations from 754 unique participants, which spanned more than 1,500 unique sites from 50 different GLOBE countries.



GLOBE atmosphere training in Benin, Africa.

## Expanding Horizons: A Revitalized GLOBE International STEM Network

The GLOBE International STEM Network (GISN) links STEM professionals with GLOBE educators and schools, providing them the opportunity to work directly with students on specific educational activities. As of early 2023, the GISN had 124 active members from all six regions: Africa (17); Asia and Pacific (26); Europe and Eurasia (16); LAC (9); NENA (6); and North America (50).

In 2022-2023, GIO worked to revitalize and expand the GISN. These efforts included implementing a new two-step membership application process to better understand how potential GISN members would like to participate and engage with the network and the GLOBE community. The goal of this process is to allow GIO to better serve GISN members and gauge active status. In addition, following a thorough review of GISN members, GIO also initiated a GISN recruitment plan to increase GISN representation in more GLOBE countries and amongst GLOBE alumni. GIO also began hosting an informal monthly GISN "Social Hour" to provide time for GISN members to interact with one another to share research and form collaborations.

In addition, GIO redesigned the GISN newsletter sent on a quarterly basis to all active members. This publication informs, encourages, and updates GISN members about ongoing – and new – efforts designed to promote Earth science and education in schools and classrooms. It also publicizes increasing opportunities to serve as student mentors for research projects, volunteer as judges for school and virtual science symposia, and to form meaningful relationships with students, educators and STEM professionals.





Filming the *Agents of Change: GLOBE in Europe and Eurasia* video episode in Croatia.

### Growing the Teaching Community: Restructured eTraining Modules

As always, GLOBE remains dedicated to inviting – and inspiring – educators (formal and informal) and environmental observers (citizen and professional) to dive into the educational and scientific wealth of the program. To enter GLOBE data into the ever-expanding database (through the website or through the GO app) educators with approved accounts simply need to complete the necessary training by attending a GLOBE workshop or by completing the online eTraining modules.

Once training is complete, educators can enter measurements – and join a community of thousands of educators and observers from around the world! There are now 43 eTraining modules available (including modules introducing The GLOBE Program and all four protocol areas or spheres: Atmosphere, Biosphere, Hydrosphere and Pedosphere).

In 2022-2023, GIO began the process of restructuring the GLOBE eTraining Modules (with Education Designers from the UCP COMET Program), which includes updating the scientific content of the modules, creating layouts that increase accessibility and enhance user experience, and rewriting assessments to align more with content and better support critical learning.



First group of Certified Mentor Trainers (March 2023); GLOBE Philippines.

### Building on GLOBE Success: New Education Pre-Evaluation Report

The *GLOBE Informal/Formal K-12 Comprehensive Education Pre-Evaluation Activities Report Brief* is now complete and available to read on the GLOBE website. Dr. Allison K. Leidner, GLOBE Program Manager, NASA Headquarters, said, “I am excited to share these evaluation findings with our entire GLOBE community as we work together to build on GLOBE’s nearly 30 years of impactful programming.”

“During the 2022 GLOBE Annual Meeting, I shared that the GLOBE Program Office (GPO) initiated the first set of activities to support a program-level evaluation. This first step specifically focused on the development of a baseline assessment for GLOBE’s activities and reach in informal and formal K-12 educational settings in the U.S. The overarching goal of investing in evaluation activities is to understand outcomes from the program, which in turn can serve as an evidence base for the program and inform continuous program improvement.”

The Report Brief, an executive summary of this first stage of the evaluation findings, highlights many strengths of the program, and identifies several opportunities for further growth. “As we digest the results of this report, we are also looking to the future. First, GPO will further invest in evaluation activities, considering all aspects of GLOBE, so we can continually improve the program,” Leidner said.



GLOBE students collecting data during a Maple Street School trip; Rochester, New Hampshire, USA.





### Encouraging GLOBE Student Research: The 2023 GLOBE IVSS

In 2023, The GLOBE Program celebrated the tenth year of the International Virtual Science Symposium (IVSS). First hosted in 2012, the IVSS is an opportunity for GLOBE students to share their research with other students, educators and STEM professionals. The IVSS encourages students to formulate research questions, engage the scientific method to answer those questions and, most importantly, share their research. In 2023, GLOBE received 253 student project submissions from 27 countries in all six GLOBE regions. Projects were submitted in six languages: Arabic, Croatian, English, French, Spanish, Portuguese and Thai.

On Earth Day, 22 April, a stipend drawing was held, and seven projects were selected randomly from a group of projects that received a four-star student research badge, and at least two other optional badges, to receive a stipend to participate in the student experience at the annual meeting. Because this annual meeting was virtual, the funds are used for educational materials for their classrooms. The stipends are funded through the annual meeting award from NSF. The seven projects were:

- ◆ **Africa Region:** Investigating the Impact of Mulching on Soils (Shree Swaminnarayan Academy; Teacher: Henry Moseti; Students: Khushi Aggarwal, Darren Amore, Khairoun Ridhwan and Celestine Claudei; Kenya)
- ◆ **Asia and Pacific Region:** Investigating a Comprehensive Study on the Factors Influencing Color Change in Caladium bicolor for Enhanced

Cultivation and Economic Benefits in Horticulture (Paphayomphittayakom School; Teacher: Pornpawit Tabchum; Students: Sinchai Nukhong, Natcha Siriwat and Piyatida Puangsanthea; Thailand)

- ◆ **Europe and Eurasia Region:** Connection between Peat and Plants; Teacher: Jaan Pärn; Students: Antonela Nikolić - III. Osnovna škola Varaždin, Lara Draganić - III. Osnovna škola Varaždin, Aistê Justinavičiūtė - Birštono Gimnazija, Domilē Laukaitytė - Birštono Gimnazija, Kadiliis Kütt - Kääpa Põhikool, Ema Težak - III. Osnovna škola Varaždin, Marit Löbu - Põlva Kool, Emili Matjushenko - Jõhvi Vene Põhikool, Kelly Saar - Antsla Gümnaasium, and Teele Piirimäe - Rakvere Reaalkool; Estonia)
- ◆ **Latin America and Caribbean Region:** Relación Entre El Avistamiento De Mariposas, Las Variables Ambientales Y La Vegetación Del Patio Escolar (Escuela No. 88 Alfredo B. Nobel; Teacher: Darío Greni; Students: Matias Cabrera, Rocío Cabrera, Lucas Damián, Paloma Galaviz, Martin Martinez, Lucas Caballero, Victoria Brener, Maite Verde, Adrian Suarez, Bastian Cuadro, Fabián Delgado, Francisco Andruskievicz and Pierina Briozzo)
- ◆ **Near East and North Africa Region:** Pedosphere Investigations (King Abdullah The Second School for Excellence Irbid; Teacher: Wejdan Melhem; Students: Rama Bani Yassin, Heba Altaweel, Sarah Hamadneh, Ameera Alghawi, and Nada Bataineh)
- ◆ **North America Region:** Comparing Select Atmospheric Parameters Between Disparate Geographic Locations Using Collaboration Between Two GLOBE Schools

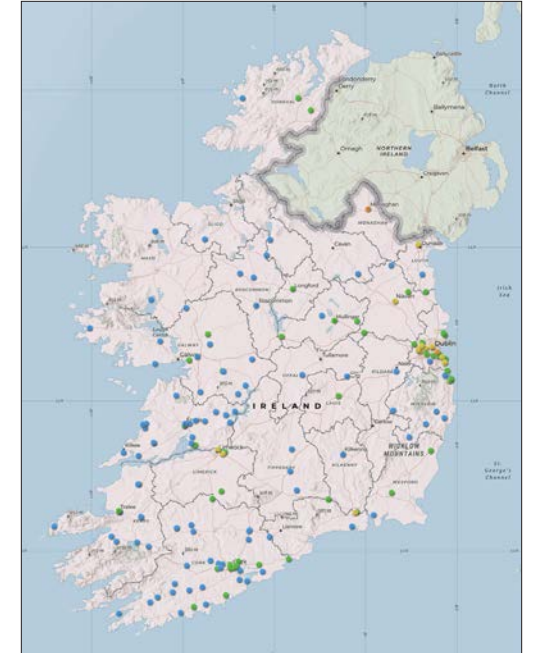
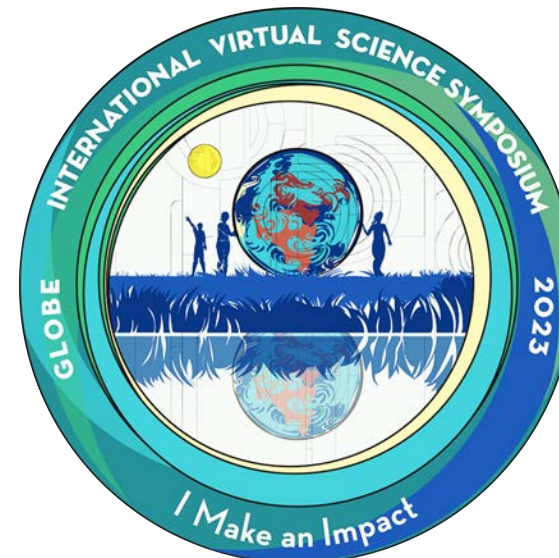


In 2023, GLOBE received 253 student project submissions from 27 countries in all six GLOBE regions for the tenth year of the IVSS.

(Crestwood High School; Teacher: Diana Rae Johns; Students: Adam Baydoun, Isabella Jomaa, Savannah Jomaa, Malik Mashlab. and students from Qatar)

- ◆ **North America Region:** Predicting Volume of Mosquito Borne Diseases Using A.M.E.A. Sensor/Radio Network (Institute for Global Environmental Strategies (IGES) GLOBE v-School; Teacher: Cassie Soeffing; Students: Miguel Jose Bueno, James Ervin, Anushka Jain, Owen Luo and Aarnav Tendulkar)

GLOBE would like to acknowledge the hard work and dedication of everyone (i.e., students, teachers, GISN members, GIO staff, and all of the volunteer judges) who participated in the IVSS. Without this assistance, and passion for science, this ongoing endeavor would not be possible!



GLOBE Ireland Air Quality Campaign students assess and map traffic-related air pollution at their schools.

### Expanding Student Opportunities: Enhanced Air Quality Campaign Efforts

The quality of the “air” in neighborhoods, towns and regional areas can have significant impacts on human health. To help scientists and researchers monitor and compare air quality around the world, several GLOBE countries and regions have created Air Quality Campaigns that provide students (as well as teachers and professional and citizen scientists) the expanded opportunity to submit air quality data to the GLOBE database.

In 2022-2023, GIO updated the GLOBE website including the Air Quality Campaign landing page, the regional air quality campaign pages, and pages associated with air quality resources. The goals of this expanded educational and scientific effort are to: create a better understanding of what air pollution is and how it travels through the atmosphere; gather data on local air quality and learn to present this information in a clear and engaging way; critically review submitted data through comparison with satellite and ground monitor measurements; and to stimulate collaboration between GLOBE students, schools and professional scientists.





GLOBE students entering data during the August 2022 GLOBE Regional Learning Expedition at Käsnu, Estonia.

### Upgrading the GLOBE Website: Behind-the-Scenes Efforts

In 2022-2023, GLOBE continued “behind-the-scenes” enhancements and upgrades to the GLOBE website. Recent work includes improvements that strive to provide enhanced ease-of-use features, including:

◆ **New Features for Teachers and Students:** GLOBE rolled out a set of new features to help teachers track their students’ contributions to GLOBE. Teachers have an improved student account creation process, can create unique names for their student accounts, and can (on the teacher’s “MyPage”) see a list of all students and the total number of observations each student has made. A teacher can also now make their own GLOBE Team(s), assign students to the team, and see how much data each student has entered. Student accounts now have both generic and personalized naming to uniquely identify each student.

**General Website Enhancements:**

- ◆ **About GLOBE:** The “About” section of the website has been updated to provide clearer information on what GLOBE is; how teachers, citizen scientists and others use GLOBE; and the benefits of joining the program.
- ◆ **Create an Account:** Improved “Account Creation” forms are now available on the website to inform users as to which account is best for them, with a step counter to help walk everyone through the account-creation process.
- ◆ **Roadmaps:** To help the community navigate The

GLOBE Program and website, roadmaps have been created that contain tasks commonly performed by GLOBE members to “Do GLOBE.” There is a roadmap for each user type: Formal and Informal Educators, Citizen Scientists, Students, STEM professionals, etc. Members can quickly learn where to go to complete tasks such as: access account settings, manage organizations, set up student accounts, submit research reports and more.

- ◆ **Tutorial Center:** All site tutorials have been brought together into one location. YouTube videos are available for many of the tutorials and are broken down into small chapters to provide specific instructions on how to complete a needed task.
- ◆ **GLOBE Observer App Enhancements:** GLOBE’s Biosphere and Hydrosphere Protocols have been added to the GO app. Now, all trained users (trained at an in-person workshop or via eTraining) can access Atmosphere, Biosphere and Hydrosphere protocols from within the app. A new simplified site setup process and improved interface makes it easy to enter data from any mobile device.
- ◆ **Site Re-architecture:** A team of representatives from across GLOBE has contributed to a concept to re-architect the GLOBE website for easier navigation. This has been a year-long process of surveys, discussions and testing – resulting in an approach that GLOBE believes will help simplify the community’s ability to find, and work with, content across the GLOBE site. The move into the new site architecture will take place in phases and will take place over the next year.

The goal of this extensive effort is to ensure that people visiting – and using – the GLOBE website can maneuver through features and options with greater ease of use and a greater sense of hands-on accomplishment.

### Assisting and Training the Community: GLOBE Website

The Community Support Team (CST) is constantly engaged in website assistance in order to facilitate ease of its use for the overall GLOBE community. To achieve that goal, CST has created a wide variety of customized videos to allow the community to see, step-by-step, what needs to be done to achieve success on the website. For example, in 2022-2023, as part of this ongoing process, CST provided 15 unique video trainings and 35 illustrative walk-throughs to ensure community success with GLOBE endeavors.

**In addition, CST:**

- ◆ **provided** website training for the Regional Coordination Offices (RCOs), and continued to provide additional training for all ongoing website updates;
- ◆ **provided** training for GLOBE U.S. Partners and Country Coordinators;
- ◆ **updated**, maintained and/or created pages on the website, and continued to work on maintaining the main publications pages;
- ◆ **created** online communities and managed new/existing measurement campaigns, and provided updates, as needed;
- ◆ **created** new animated images for GLOBE website tutorials to help demonstrate the step-by-step actions described in tutorials;
- ◆ **provided** training for new GLOBE Partners (U.S. and international);
- ◆ **created** and maintained a list of issues needing to be resolved;
- ◆ **created** and updated a database of template responses for messages sent to the community to respond more efficiently to inquiries;
- ◆ **provided** translation services for tickets, webpages, emails, annual survey information, protocols, data entry pages and training slides; and
- ◆ **collaborated** with GIO staff on technical issues through regular meetings across the organization to resolve them.

CST engaged in these efforts to ensure that the community could “walk” their way through all that the GLOBE website has to offer and to ensure that the “work” of GLOBE is a smooth journey toward resource richness!



GLOBE-trained Davis Weather Station owners can send their data directly to GLOBE (Photo courtesy Davis Instruments, GLOBE weather station vendor).

### Enhancing Data Sharing: Davis Weather Stations

The GLOBE Program’s Data and Information Systems (DIS) team has completed work that will allow all GLOBE-trained Davis Weather Station owners to send their data to GLOBE. If you can get your data to the Davis (<https://www.weatherlink.com/>) website, you can send your data to GLOBE! Community members requested this new capability when Davis discontinued the ability of users with new stations to share data. Until now, only older equipment could share their data with GLOBE via Davis. Detailed instructions on how to set up new stations can now be found on the GLOBE website.

### Facilitating Accessibility: Community Input

In 2022-2023, GLOBE’s Accessibility Technology Solution Sub-Committee began seeking input from the GLOBE community regarding work designed to enhance ease of use related to the GLOBE website and technology. The special committee is charged by GLOBE’s Working Group Chairs to explore ways in which technology and other tools can potentially facilitate greater levels of accessibility for everyone in relation to GLOBE tools and resources. The goal of this effort is to reduce and, where possible, remove impediments to maximum levels of participation in GLOBE. A special survey was created to establish a baseline, and to determine the needs of community members who are visually impaired. The deadline for survey input was December 2023.





### Informing: Worldwide News and Events

A daily goal of GIO is to inform, educate, inspire and engage GLOBE community members. To achieve this, GIO scours the globe for what's new, what's happening (and when, where, and why it's happening), as well as all other pertinent information about what other community members are up to – then works to announce this “news” to the community. In alignment with GLOBE’s Strategic Plan, the goal of these efforts is to improve communication pathways among the GLOBE community; improve communication of GLOBE events, activities, and national and international achievements; and increase the promotion of GLOBE to new audiences.

On a regular basis, GIO invites community members, sponsors, partners, and collaborating organizations and programs to provide the content necessary to ensure that the website is constantly being updated with vital information regarding GLOBE-related news and events. In 2022-2023, more than 1,000 GLOBE-related news and events were posted to the website!

In addition to “printed” news and events listings on the website (as well as those shared in the monthly News Brief and mass mailings), GIO created and produced a number of vital, informative, and personalized video presentations to help ensure that all community members realize their invaluable significance to the enduring and expanding success of The GLOBE Program.



After exploring the Zika Bus, a mobile classroom that travels to remote communities in Paraná, Brazil, visitors are encouraged to participate in mosquito surveillance and mitigation using the Mosquito Habitat Mapper tool on the GLOBE Observer app.

### Sharing: Social Media

Reaching out to community members around the world through social media outlets continues to be a central, and critical, way GLOBE works to keep people up-to-date on news, events, trainings, meetings, science symposia, and all GLOBE-related activities and opportunities.

In 2022-2023, GLOBE continued to grow its social media presence through regular posts on Facebook, Twitter, Instagram and YouTube (which includes posts by the new GLOBE Student Vloggers). Posting fresh and timely content across platforms, including Instagram posts and Reels, engaged a range of audiences. GLOBE social media accounts reached nearly one million people!

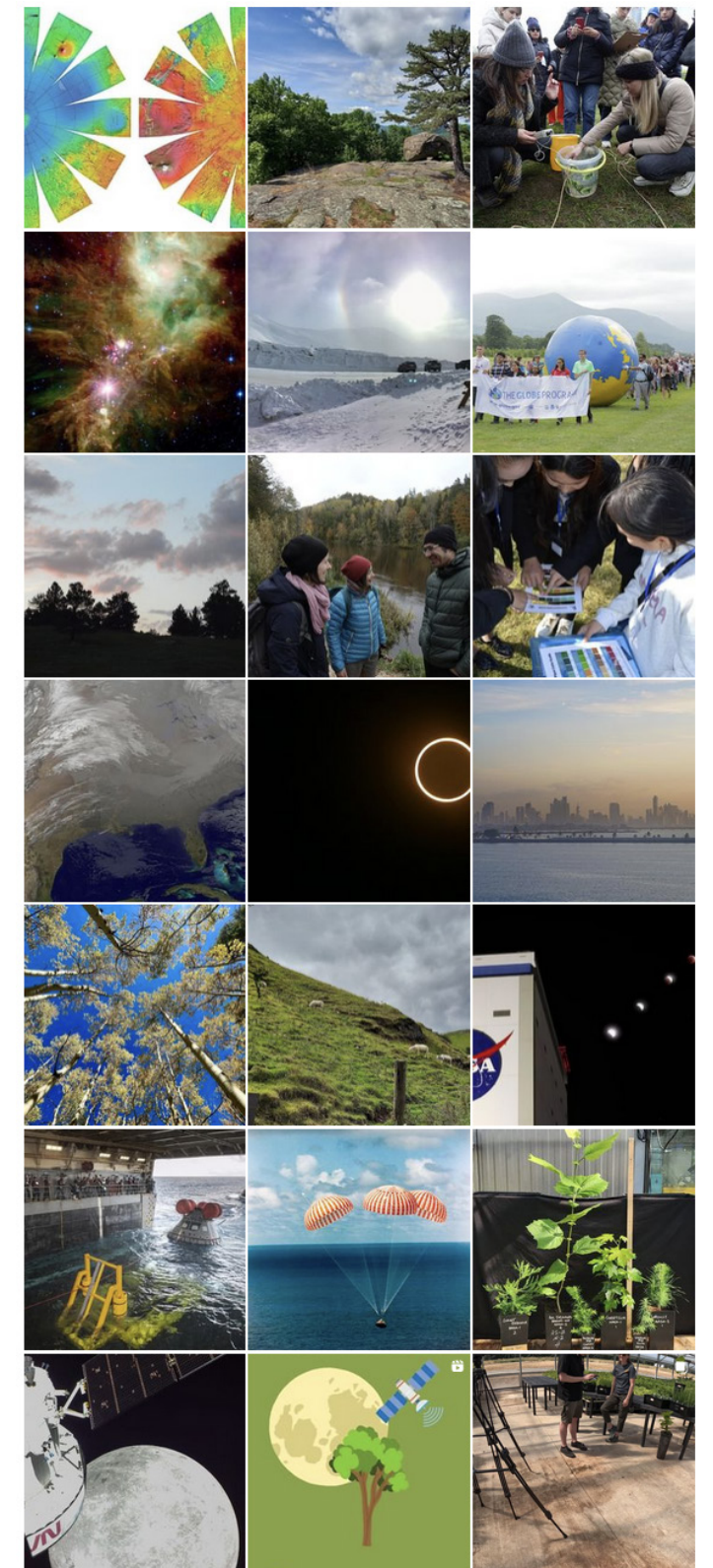
GLOBE’s efforts on Facebook continue to promote greater interaction with the program, cultural sharing, and professional and citizen science across the world. As of early 2023, the GLOBE Facebook account gained nearly 1,500 new followers. Thanks to an enhanced strategy of sharing and posting four times per day, GLOBE, on average, reached nearly 400,000 people and “engaged” nearly 15,000 people.

**GLOBE uploaded over 150 videos and reached nearly 300,000 people.**

GLOBE’s efforts on Twitter strive to keep the community up-to-date (up-to-the-minute) on GLOBE’s activities. The team shared a combination of program-related, community-related, science-related and sponsor-related content. By early 2023, GLOBE had nearly 10,000 followers! The team tweeted four tweets per week, with additional retweeting on any given day (in relation to news, updates, challenges, etc.), and “impressed” over 500,000 people.

GLOBE’s efforts on Instagram continue to promote upcoming events and opportunities, social media focuses (clouds, mosquitoes, etc.), and intriguing aspects of our planet. In addition to posts and stories, GLOBE released weekly “Reels.” These short (taking a minute or less) vertical-format videos cover a variety of topics and have the potential for greater reach than other forms of content currently on the platform. GLOBE Instagram efforts reached over 90,000 people.

GLOBE’s YouTube account continued to promote The GLOBE Program through videos on a variety of subjects. GLOBE uploaded over 150 videos on the channel, and reached nearly 300,000 people.



Facebook posts from GLOBE participants around the world.



### Impacting: Agents of Change Videos

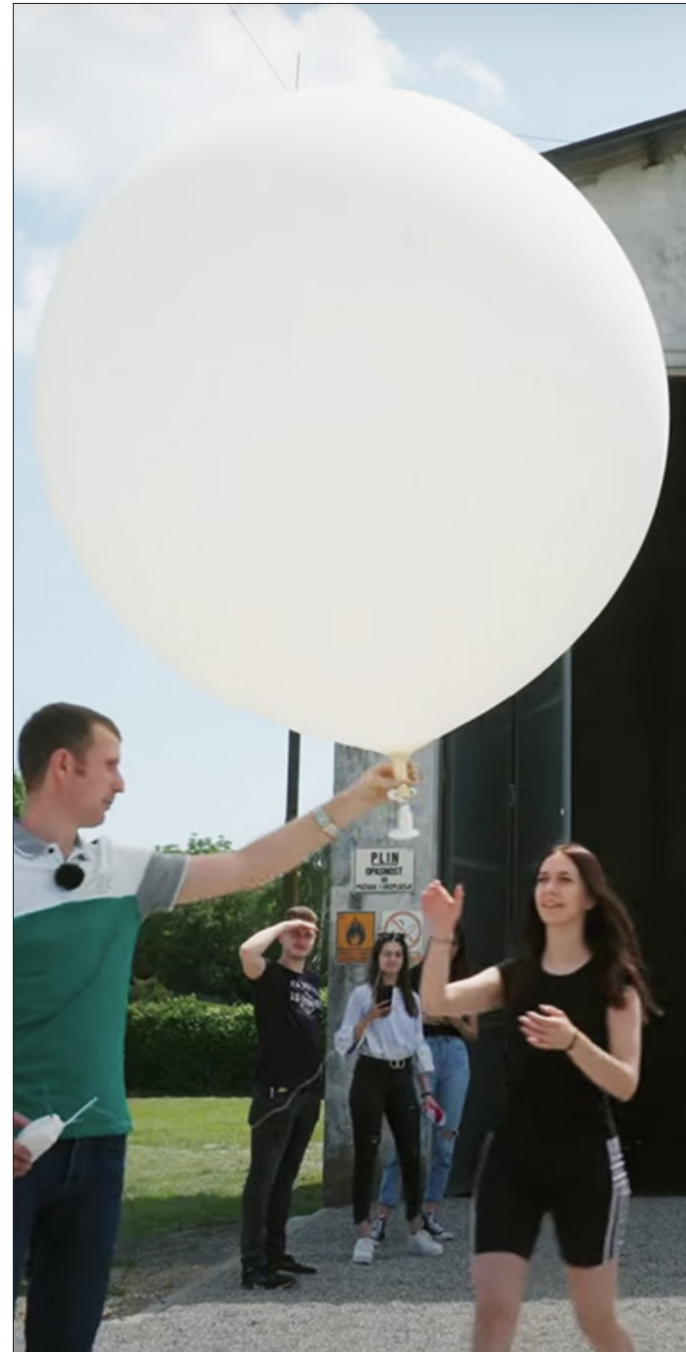
GLOBE believes that the all-encompassing story of The GLOBE Program, can often be told best by narrowing the lens to focus on an individual or individuals who exemplify the best efforts of the community. These are the people whose dedication and good work make an impact on a community, “multipliers,” who spread the work of GLOBE and encourage others to have an impact.

In 2022-2023, with continued funding from GLOBE’s program sponsor, NASA; story guidance and series coordination from the GIO; logistical support from GLOBE community members; a talented crew; and the delightful participation of the “stars” of these films, GIO embarked on Phase Two of the “Agents of Change” documentary series. This video series is designed to create a video portrait of The GLOBE Program throughout all six regions.

**Efforts during this Phase 2 included:**

- ◆ **Episode 4: GLOBE in Near East and North Africa:** Students in Oman attempt to find a solution to an issue affecting local farmers: low water levels and soil salinity.
- ◆ **Episode 5: GLOBE in Asia and Pacific:** GLOBE students and teachers from Bhutan, India, Nepal, Philippines, Taiwan, Thailand and the United States participate in the Nepal Lake Pokhara Expedition to learn about the most essential resource to life on Earth: water.
- ◆ **Episode 6: Europe and Eurasia:** This episode provides an understanding of the origin of The GLOBE Program in the United States, as well as its proliferation in the Europe and Eurasian Region.

The GLOBE Program would like to, once again, thank everyone involved with the development and production of these videos!



Scene from the filming of the *Agents of Change: GLOBE in Europe and Eurasia* video in Croatia.



On Earth Day in 2023, a second group of GLOBE Student Vloggers joined the program, including seven new students and five mentors from the previous year.

### Inspiring: GLOBE Student Vloggers

The GLOBE Student Vlogger (GSV) project, leaving behind a highly successful and video-filled pilot year, entered its second year on Earth Day 2023, with two students from each GLOBE region chosen through a competitive selection process. These GSVs (or “video bloggers”) are creatively crafting “selfie-style” videos designed to invite the community into their unique culture and local environment – into what they are doing, learning and discovering.

In line with GLOBE’s Strategic Plan efforts related to communications, these vlogs are vibrantly crafted in a manner designed to increase the use of new communication networks among different GLOBE community groups; to increase the awareness of the achievements of GLOBE community members; and to increase the promotion of The GLOBE Program to new audiences.

In 2022-2023, the 12 student vloggers provided self-made videos for social media demonstrating their enthusiasm for GLOBE. Five GSVs from the first year remained involved as advisors (or “mentors”) to the incoming GSVs. Each year, GSVs are required to complete four regular videos assignments – in addition to engaging in several special assignments – resulting in approximately 60 videos per year. The videos are used for multiple purposes, a primary focus on providing a “student” point of view in relation to participation in The GLOBE Program.



A mentoring GLOBE Student Vlogger being filmed in Malta.



Students and educators from Nepal, India, Bhutan, Philippines, Taiwan, Thailand, and the United States participated in the 2022 Lake Pokhara Water Expedition in Pokhara, Nepal.



## Communicating Collaboratively: The 2022 Annual Meeting

Throughout the year, there are meetings – and then, once a year – there is one very special meeting: The GLOBE Annual Meeting. The 2022 GLOBE Annual Meeting brought the community together with a focus on reconnecting and revitalizing. The theme of the meeting, which took place from 25-28 July, was “Communicating GLOBE in Changing Times.” The meeting had 291 participants from 58 GLOBE countries across all six regions!

“This has been a challenging period and one which many thought would be easier as we seem to emerge from the pandemic. And that expectation is not the reality... however, the GLOBE Annual Meeting showed,

other community members for their help.

I would like to thank the Working Groups, the Regional Coordination Offices, the Data Information System team, the GLOBE Observer teams, the sponsors for their dedication to ensure the program continues and thrives, and especially the GIO staff – those who put in endless hours prior to the meeting, as well as during the event, to make sure it ran smoothly, and those who worked primarily in the office over the week, thank you for keeping that humming. And, finally, a thank you to all of you for staying up late at night or getting up in the wee hours of the morning to join us ‘live’ – Thank You!

As I said above, The GLOBE Program is often one of the few things in my life where reality not alone meets the expectations that we have set, but blows them out of the water! And this is because of ALL of YOU and because of the great work that you do for the program and for each other as part of this community... as members of this GLOBE family.”



For the third year, GLOBE’s Annual Meeting went virtual and this year there seems to be a new spirit in the community

Dr. Tony Murphy  
GLOBE Implementation Office  
Director of Community Engagement and Program Strategy

yet again, that this program (and the people it attracts) can, and does in many cases, go beyond expectations,” Dr. Tony Murphy, Director of Community Engagement and Program Strategy, said.

“For the third year, GLOBE’s Annual Meeting went virtual and this year there seems to be a new spirit in the community, a spirit that points to the emergence from the pandemic and a return to some type of normality, even though it may be a new normal. Part of that is the many events and meetings returning to in-person or hybrid formats.

Tony Murphy said, “This year’s meeting was a wonderful meeting, and I would like to thank all the presenters – many, many of them from the community sharing their good work.

I’d also like to thank the keynote speakers, the students on the panels, students and teachers, the Country Coordinators, the U.S. Partners, the IOC, and numerous



Belize joins GLOBE! Signing ceremony, 8 September 2022.

## Welcoming A New GLOBE Country: Belize

In 2022, the U.S. Embassy Chargé d’Affaires, Leyla Moses-Ones, on behalf of the U.S. National Aeronautics and Space Administration (NASA), and Minister of Belize’s Ministry of Education, Culture, Science, and Technology Hon. Francis Fonseca signed an agreement to implement a Belize-based program that supports educational activities in STEM.

Dr. Tony Murphy, Director of Community Engagement and Program Strategy, stated, “I am sure that participation in The GLOBE Program will bring added value to STEM education in the country of Belize -- engaging students and teachers in learning about the environment and involving citizen scientists too in the collection, analysis, and use of Earth-science data. We are extremely excited to welcome Belize as our 127th GLOBE country.”

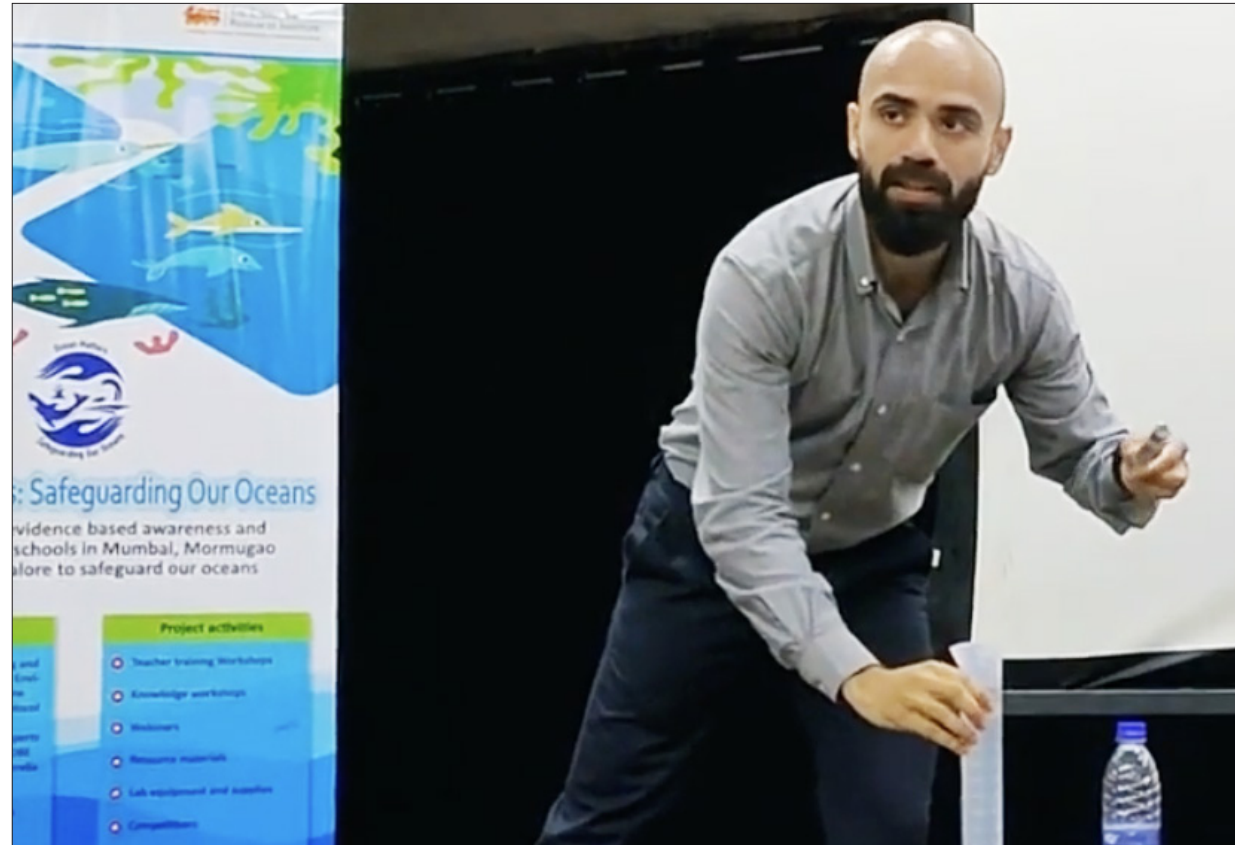
Dr. Allison Leidner, former GLOBE Program Manager at NASA Headquarters in Washington D.C., USA, said, “NASA is honored to sponsor The GLOBE Program and pleased to welcome Belize. We look forward to working with Belizean students as they learn about their environment and contribute that knowledge to the worldwide GLOBE community.”

We look forward to working with Belizean students as they learn about their environment and contribute that knowledge to the worldwide GLOBE community

Dr. Allison Leidner  
Former GLOBE Program Manager







### Nurturing Collaboration: International Efforts

Collaborations with the U.S. Department of State and U.S. embassies, space agencies, and other partners during this period created many opportunities to promote the GLOBE Program internationally, facilitate U.S. government dialogue with potential new countries, and provide support for implementing the program in current GLOBE countries.

GLOBE's ongoing collaborative efforts continue to focus on expanding and enhancing the work of the program. In 2022-2023, collaborative efforts included:

- ◆ **Peace Corps:** Since 1995, GLOBE and Peace Corps have shared a common commitment to the environment, education, youth development and empowerment, capacity building, and cultural understanding. In 2022-2023, GIO met with the new head of World Wise Schools. GIO provided updates on GLOBE and invited Peace Corps points of contact to the 2023 GLOBE Annual Meeting.



GLOBE supported the U.S. Consulate General public outreach program, *Ocean Matters* in Chennai, India.



GLOBE and UNEP share a common commitment to understanding the environment, and landscapes like this, through data collection, research, and communicating results.

#### ◆ **United Nations Environmental Programme (UNEP):**

GLOBE and UNEP share a common commitment to the environment, capacity building, and cultural understanding. Through this partnership, GLOBE and UNEP cooperate on environmental education and training, citizen science, and the collection and distribution of environmental data. In 2022-2023, GIO submitted a proposal to organize a panel for the 77th UN General Assembly Science Summit entitled: *The GLOBE Program—An International Science and Education Program that Fosters the Next Generation of STEM Professionals and Environmental Science Diplomacy*. The proposal was accepted, and GIO assembled a panel of Country Coordinators and a template for the presentation. Panelists informed summit participants about GLOBE, its alignment with Sustainable Development Goals (SDGs) and strategies that help in SDG implementation. One panelist from each of the six GLOBE regions presented the story of GLOBE in their countries, its implementation, and how the program was helping to meet their country's SDGs. They cited specific case studies to illustrate this work and any results from these efforts.

- ◆ **Ocean Matters:** GIO continued to support the U.S. Consulate General (USCG) Chennai's (India) public outreach program, "Ocean Matters," which uses GLOBE protocols. Over 100 teachers were engaged and received training on water temperature and salinity. At the beginning of the initiative, GIO sent messages introducing USCG Chennai to the African and Diaspora Young Leaders Forum.

- ◆ **Global Education Symposium:** GIO and NASA attended the U.S. Department of State Global Education Resource Fair, which is part of the Fulbright Teachers for Global Classroom Program's 2023 Global Education Symposium. More than 60 teachers and 50 administrators from across the U.S. attended this in-person event in February 2023.

In addition to these activities, GIO responded to requests from the U.S. Department of State for program information for State Department officials' visits and meetings, for briefings for incoming U.S. ambassadors, for U.S. embassies, and for other department meetings and events.



The GLOBE Program encourages collaboration among students.



Images like this, used by GLOBE Country Coordinators presenting at the 77th UN General Assembly Science Summit, remind us that, ultimately, we are doing this work for the international nature of our community and program.





The April 2023 Africa Regional Meeting took place in Cape Town, South Africa.

# Africa

## 2023 Regional Meeting

In April, the 2023 Africa Regional Meeting took place in Cape Town, South Africa. The meeting was attended by Country Coordinators, Deputy Country Coordinators, teachers, students, and scientists from 21 countries. The primary topics of discussion included: regional participation, cooperation and collaboration focused on achieving the maximum contribution to the data pool, IVSS project submissions and relevant local projects/events. During the meeting, participants discussed/explored an introduction to capacity-building products designed to enhance innovation; the IVSS “Guide for Africa” (focusing on unique challenges that exist in the region); the piloting of Invasive Alien Plant Species (IAPS) Protocol (as an activity that could be self-sustaining, given that all countries have eradication budgets); and engagement in a hydrology learning activity (which took water science to a socioeconomic level where schools, hospitals and other users are challenged to conduct a survey to identify the usage/cost associated with it and to then develop a plan). Participants could also include education in the wider community.

## Topical Highlights from the Region

As always, the Regional Coordination Office (RCO) encouraged, supported and hosted numerous events (meetings, training, activities, field studies and research efforts) during 2022-2023. The items listed below are only to serve as “highlights” of the region’s ongoing dedicated efforts.

### Science

A variety of science activities, meetings and events occurred in various forms throughout the region, including:

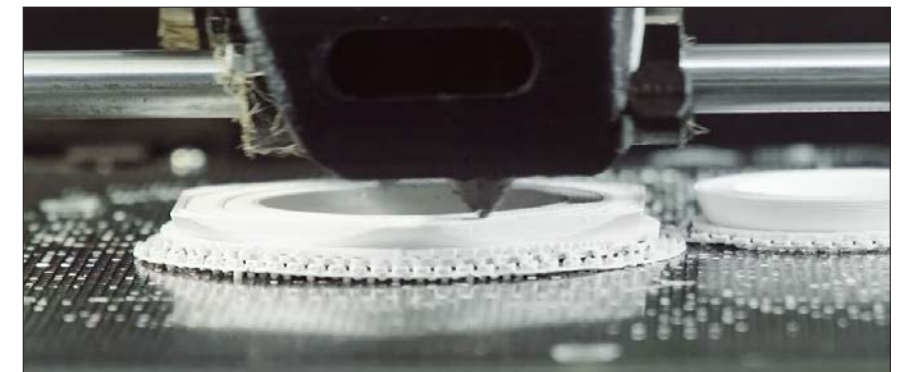
- ◆ **Annual Nigeria Virtual Science Symposium (GLOBE Nigeria):** In October 2022, a GLOBE workshop and the second year of the Annual Virtual Science Symposium took place. Forty-eight people participated in the event.
- ◆ **Earth Rise Workshop (GLOBE Togo):** In September 2022, an Earth Rise Workshop took place. Nineteen teachers participated in the event.

A variety of science activities, meetings and events occurred in various forms throughout the region, including the 2023 Water Bodies IOP (which took place in April-May 2023). This event included data collection, community participation related to indigenous knowledge systems and cross-regional collaboration. Africa Region countries participated by taking pictures of their water bodies, measuring hydrology parameters, and telling stories about the water bodies, including gathering input from the elders in the communities. The RCO also supplied rain gauges to Benin, Kenya, Madagascar and Uganda with the aim to increase submission of precipitation data.

### Education

A variety of education activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **GLOBE Research Exhibition (Africa Region):** An exhibit focusing on GLOBE research and creating awareness of The GLOBE Program took place in Madagascar. Twenty schools from the region attended the exhibition.
- ◆ **Teacher Training Workshop (GLOBE Cameroon):** In August 2022, a workshop for teachers and pedagogic inspectors took place. Thirty-seven teachers participated in the event.
- ◆ **Teacher Training Workshop (GLOBE Ghana):** In October 2022, a “West Africa Reintroduction” training took place. Twenty-nine teachers, including alumni at the University of Conakry, participated in the event.
- ◆ **Infection and Immunity Webinar Series (GLOBE Ghana):** A virtual webinar series took place covering action and research to reduce the burden of Malaria. Forty-one people participated in the event.
- ◆ **Teacher Training Workshop (GLOBE Kenya):** In February 2023, a teacher training focusing on GLOBE research and protocols took place. Nineteen people participated in the event.
- ◆ **GLOBE Teacher Refresher Workshop (GLOBE South Africa):** In September 2022, a workshop took place that focused on “refreshing” the knowledge/experience of teachers in relation to The GLOBE Program. Twenty-three teachers participated in the event.



Creative GLOBE students in Ortum, Kenya, collecting environmental data using home-made weather instruments, find themselves the beneficiaries of a new 3D printed weather station, in these scenes from the filming of *Agents of Change: GLOBE in Africa* video.





Students and educator, Victor Ogal, of Ortum, Kenya, during a scene for the filming of *Agents of Change: GLOBE in Africa*.

## Community

A variety of community activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **GLOBE “Introductory” Training Workshop (Africa Region):** In May of 2022, a workshop covering basic website administration/use took place. Twenty-two people from five countries participated in the event.
- ◆ **Reintroduction of Cape Verde (Africa Region):** The RCO hosted a meeting between the U.S. Embassy in Cape Verde and the Director of Secondary Education. Five people participated in the call.
- ◆ **Reintroduction of Guinea (Africa Region):** The RCO hosted a teacher training workshop. Forty teachers and alumni participated in the event.
- ◆ **PlanetWalk (Africa Region):** During the Regional Meeting, participants from countries within the region worked in collaboration during Dr. John Francis’s walk through Africa, where he visited countries, distributed science equipment, and trained teachers.
- ◆ **GLOBE Educators:** Organized training on protocols for GLOBE educators to become trainers and mentors.



Mark and Rogeline Brettenny, Africa RCOs, welcome Dr. John Francis (center) of PlanetWalk to the 2023 Africa Regional Meeting in Cape Town, South Africa.



Participants at the 2023 Asia and Pacific Regional Meeting in Hanoi, Vietnam.

# Asia and Pacific

## 2023 Regional Meeting

In March, the 2023 Asia and Pacific Regional Meeting took place in Hanoi, Vietnam. The meeting was attended by Country Coordinators, Deputy Country Coordinators, teachers, students, and scientists from 12 countries. The primary topics of discussion included: GLOBE activities within the region and best practices to promote GLOBE during the pandemic and beyond. All-day sessions, with keynote speakers, took place to promote the exchange of information and ideas. The theme for the event was “GLOBE for All – Connecting Community.”

The 2023 GLOBE Asia and Pacific Country Coordinator’s Meeting also took place during the event. Country Coordinators presented reports on how their community is learning, engaging and promoting The GLOBE Program during the pandemic. This was followed by open discussion on future GLOBE activities and collaborations. The Asia and Pacific regional representatives from the GLOBE Education, Evaluation, and Technology Working Groups also gave presentations covering 2023 achievements. The Technology Working Group conducted a short survey on understanding how Country Coordinators disseminate GLOBE data within the region.

## Topical Highlights from the Region

As always, the Regional Coordination Office (RCO) encouraged, supported and hosted numerous events (meetings, training, activities, field studies and research efforts) during 2022-2023. The items listed below are only to serve as “highlights” of the region’s ongoing dedicated efforts.





During a 2023 webinar, Dr. Victoria Metcalf (Country Coordinator GLOBE New Zealand), shared her Antarctica experiences.

## Science

A variety of science activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **Soil in Schools (Asia and Pacific Region):** In May 2022, the RCO hosted a webinar for Country Coordinators, GLOBE trainers, teachers and students. The goal was to encourage participants to develop skills in using the GLOBE Soil Protocol. Ninety-eight people from nine countries participated in the event.
- ◆ **Visit to Antarctica (Asia and Pacific Region):** In March 2023, the RCO organized a webinar with Dr. Victoria Metcalf (Country Coordinator GLOBE New Zealand). During the event, Dr. Metcalf shared her experiences of working in and researching Antarctica and her recent visit as a lecturer aboard the expedition ship to Antarctica.

## Education

A variety of educational activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **Trainer and Mentor Trainer (Asia and Pacific Region):** In October-December 2022, the RCO, in collaboration with GIO and in association with the Ugyen Wangchuck Institute for Conservation and Environment Research, organized training on protocols for GLOBE teachers to become trainers and mentors.
- ◆ **Regional Working Group Member Webinar (Asia and Pacific Region):** In August 2022, the RCO hosted a webinar giving new Working Group members the opportunity to meet the community and to develop working relationships. Twenty-one people from seven countries participated in the event.
- ◆ **Publication of the Asia and Pacific Region Journal of Environmental Research (Asia and Pacific Region):** The RCO and GLOBE Philippines worked to publish the journal, and to promote environmental research and science education that use GLOBE protocols or GLOBE data. The journal offers GLOBE students and teachers the opportunity to have original research papers, case studies and articles in the relevant field of environmental science published in a peer reviewed scholarly journal.

## Community

A variety of community activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **Lake Pokhara Expedition (Asia and Pacific Region):** In September-October 2022, the RCO hosted the expedition in Nepal. Participants conducted work in Atmosphere, Biosphere, Hydrosphere and Pedosphere protocols. They also worked to collect and submit data via the GO app/Mosquito Habitat Mapper Tool. Participants shared their research in their home country, with the goal of leading discussion on best practices and future collaboration efforts. Forty-three people from eight countries participated in the event.
- ◆ **GLOBE Asia and Pacific Virtual Wetland Symposium (Asia and Pacific Region):** In December 2022 and February 2023, the RCO (in an effort to promote the Water Bodies IOP), hosted a two-part virtual symposium. This effort provided students the opportunity to share research, discuss that research with their peers, and earn participation certificates. The symposium focused on the theme “wetland restoration” with the aim of raising awareness about the vital role of wetlands for people and the planet.
- ◆ **Capacity Building Training (Asia and Pacific Region):** In February (virtual, with 32 participants from nine countries) and March (in person, with 38 participants from nine countries) 2023, the RCO hosted training focusing on capacity building within the region. The RCO created a dedicated webpage for all information on capacity building.
- ◆ **Planting a Million Trees (GLOBE Philippines):** In December 2022, GLOBE Philippines continued the effort to plant a million trees in the Bicol region. During this effort, teachers took part in a training at the Hanawan National High School, which consisted of an orientation about The GLOBE Program, instruction on GLOBE protocols (and how these can be integrated into STEM curriculum), and the use of the program’s app, GLOBE Observer.



Scenes from the filming of the *Agents of Change: GLOBE in Asia and Pacific* video during the Lake Pokhara Expedition (Asia and Pacific region).





Participants of the 2022 Europe and Eurasia Regional Meeting in Omiš, Croatia.

# Europe and Eurasia

## 2022 Regional Meeting

In October, the 2022 Europe and Eurasia Regional Meeting took place in Omiš, Croatia. The meeting was attended by Country Coordinators, Deputy Country Coordinators, students, trainers, and scientists from 23 countries. The primary topics of discussion included: “success” stories from Country Coordinators; how the RCO organizes GLOBE trainings (with a poster and discussion session to showcase the diversity on how trainings and other formats of teacher professional development are conducted); a “GLOBE Market” for students, teachers and coordinators to exchange ideas and interact; workshops (covering such topics as data literacy; how to communicate GLOBE, climate change education, and GLOBE impacts in local communities); training in Atmosphere, Biosphere, Hydrosphere and Pedosphere protocols; and a GLOBE technology “field practice” session.

A portion of the event was dedicated to a meeting for Country Coordinators; however, the remaining three days were open to any member of the GLOBE community – attracting teachers, trainers, scientists, U.S. Embassy representatives and other members. Altogether, 78 participants attended the event representing 23 countries (including the United States).

## Topical Highlights from the Region

As always, the Regional Coordination Office (RCO) encouraged, supported and hosted numerous events (meetings, training, activities, field studies and research efforts) during 2022-2023. The items listed below are only to serve as “highlights” of the region’s ongoing dedicated efforts.

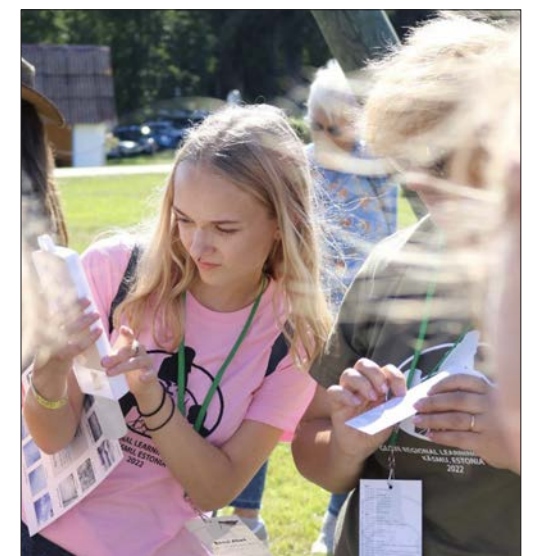


The 2022 GLOBE Regional Learning Expedition brought together 170 students, alumni, teachers and researchers from several countries for GLOBE activities and discussions in Käsma, Estonia.

## Science

A variety of science activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **Science Learning Expedition (GLOBE Italy-Slovenia):** In April 2023, the Science Learning Expedition Gorizia-Nova Gorica (SLE-GO) took place at the Italian/Slovenian border region of Gorizia-Nova Gorica. Over 200 students participated in the event.
- ◆ **2022-2023 European Phenology Campaign, Tree Observations (Europe and Eurasia Region):** In spring 2023, students recorded budburst dates to understand the changing patterns of spring season. Schools around the region agreed on observing certain tree species so that they can share and compare data from different countries and locations. Over 2,700 students (from 190 schools in 21 countries) participated in the event.
- ◆ **25th GLOBE Regional Learning Expedition (GRLE) (GLOBE Estonia):** In August 2022, the GRLE brought together 160 students, teachers and researchers from nine countries to Lahemaa National Park for the regional expedition.
- ◆ **How Cool is Your School?! (GLOBE Ireland, GLOBE Israel and GLOBE Malta):** In March 2023, students measured surface temperature readings of different surfaces around their schools. Initially, students met virtually (five Maltese, six Irish and six Israeli student groups). Then, as a follow up, all participating schools met to share their progress. As a result, each school presented a *Cool School* proposal on the topic of urban heat islands and climate change.
- ◆ **Rainfall and Flooding Patterns Monitoring (GLOBE Ireland):** In January, students from 20 schools across the country took part in a pilot project to measure rainfall, map flood risk, and make flood-resilient school plan proposals. Students discussed their observations and their “call to action” on how their communities can improve the rainwater harvesting or prevent flooding.





## Education

A variety of educational activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **Capacity Building Project (Europe and Eurasia Region):** In March 2022, the RCO hosted a GLOBE trainers session that took place in Prague. Nineteen people from 12 countries participated in the event.
- ◆ **GLOBE Training (GLOBE North Macedonia):** In 2022, GLOBE North Macedonia organized an in-depth, three-day, training covering theoretical and practical lab experiments and field work. Sixty people from 20 schools participated in the event.
- ◆ **Soil Explorers Field Sessions (GLOBE Malta):** From January-March 2022, the “GLOBE Soil Explorers” initiative brought together 18 primary schools to conduct research of soil and tree planting. In all, 864 students and 75 educators from 18 primary schools participated in the outdoor learning sessions.
- ◆ **Aerosol Training (GLOBE Slovak Republic):** In 2022, the Elementary GLOBE book (and associated activities) on aerosols was translated into Slovak language and made available to teachers by the GLOBE Slovak Republic team via an e-version.
- ◆ **Online Student Conference (GLOBE Slovak Republic):** In June 2022, to celebrate their second year in the program, GLOBE Country Coordinators organized an online Students’ Conference. During the event, 17 GLOBE teams presented their activities, discussed their observations with scientists, and experienced the diversity of GLOBE activities.



Students collecting weather and soil data during the 2022 GLOBE Regional Learning Expedition in Käsmu, Estonia; and adult participants, including Diana Garašić (GLOBE Croatia Country Coordinator) during the 2022 GLOBE Europe and Eurasia Regional Meeting in Omiš, Croatia.



More than 2,000 participants visited the World Water Day event along the Gonzaga lakefront in Lombardy, Italy (March 2022).

## Community

A variety of community activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **2023 Water Bodies Challenge (Europe and Eurasia Region):** From March through May 2023, 50 student teams from 10 countries participated in this event designed to have them visit and observe a local lake, river, stream, spring or seashore to learn more about water quality and the importance of water resources for the community.
- ◆ **Autumn Climate Challenge (GLOBE Czech Republic):** In September 2022, a challenge designed to raise awareness about our changing climate among GLOBE students and teachers and to provide them with meaningful tools and activities for exploring the issue took place. Over 168 people participated in the event.
- ◆ **World Water Day (GLOBE Italy):** On World Water Day 2023 (22 March), GLOBE Italy hosted the “Rivers in Spring: World Water Day” celebration. The in-person event involved 49 stations located along the Gonzaga lakefront, and involved numerous schools, science institutions, local authorities and environmental agencies. The event was visited by more than 2,000 participants and received large media coverage



Students from the Secondary School Mate Blažine; Labin, Croatia, collecting data at a local water body.





Participants of the 2022 Latin America and Caribbean Regional Meeting in Bogota, Colombia.

# Latin America and Caribbean

## 2022 Regional Meeting

In November, the 2022 Latin America and Caribbean (LAC) Regional Meeting took place in Bogota, Colombia. The meeting was attended by Country Coordinators, Deputy Country Coordinators, teachers, students, trainers, and scientists from 15 countries. The primary topics of discussion included: the GLOBE Strategic Plan; translation of eTraining modules; the GLOBE Teacher Toolkit (a LAC-created resource which contains 75 new learning activities); updates to the GLOBE website; and training on the program's app, GLOBE Observer, and data entry.

During the meeting, training on Biosphere and Pedosphere protocols was presented. Participants carried out data entry and analysis, as well as chemical analysis of soil samples and worked in groups on their research reports. On the last day of the meeting, teams presented research reports. The RCO presented plans for 2023, including the initiative to carry out the campaign "Trees within LAC" – as well as efforts associated with observation of the total solar eclipse that occurred on 14 October 2023.

## Topical Highlights from the Region

As always, the Regional Coordination Office (RCO) encouraged, supported and hosted numerous events (meetings, training, activities, field studies and research efforts) during 2022-2023. The items listed below are only to serve as "highlights" of the region's ongoing dedicated efforts.

## Science

A variety of science activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **"Trees within LAC" Campaign (Latin America and Caribbean Region):** This campaign began in February 2023 (and will run through December 2023). The main objective of the "Trees within LAC" campaign is to recognize the most important tree species in the region, describing their phenophases and identifying the environmental variables involved in their development. In relation to the campaign, the RCO hosted a virtual meeting; 289 people from 12 countries participated in the event.
- ◆ **Virtual Science Fair (Latin America and Caribbean Region):** On 11-12 May, the second year of the Virtual Science Fair was held. During the two-day event, students and teachers presented their research work for the 2023 IVSS. Ninety-five people from ten countries participated.
- ◆ **Brazilian Space Agency Research Efforts (GLOBE Brazil):** From May 2022 to May 2023, more than 100 teachers were trained throughout the country. As a result, two projects were submitted to the 2023 IVSS.
- ◆ **Data Collection (GLOBE Brazil):** In September 2022, a field activity focusing on data collection related to GLOBE's Pedosphere protocol took place in Óbidos – Pará. Forty people participated in the event.
- ◆ **Volunteer Training (GLOBE Paraguay):** In October 2022, (through the Benjamin Franklin Science Corner) volunteers learned to measure temperature and the name of the clouds using the GO app. Twelve people participated in the event.



Participants at the 2022 LAC Regional Meeting in Bogata, Colombia; and one of 12 Benjamin Franklin Science Corner volunteers who learned GLOBE protocols during a training in Asuncion, Paraguay.



## Education

A variety of educational activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **GLOBE Workshop (Latin America and Caribbean Region):** From September through November 2022, the RCO hosted an introductory GLOBE workshop. Four-hundred and twenty people participated in the event; thirty-five teachers were certified in GLOBE.
- ◆ **Promotion of the “Trees within LAC” Campaign (GLOBE Argentina):** In addition to learning more about GLOBE and the tree campaign, students worked with GLOBE Atmosphere and Biosphere protocols. Thirty students participated in the event.
- ◆ **Temperature Contour Training (GLOBE Bahamas):** In October 2022, a cloud training took place; the effort focused on manual cloud identification and a review of scientific methodologies. Eleven people participated in the event.
- ◆ **GLOBE Workshop (GLOBE Brazil):** In August, training efforts took place, focusing on GLOBE protocols and the use of the program’s app, GLOBE Observer. Fifty-one people participated in the event.
- ◆ **Soil Workshop (GLOBE Chile):** In June 2022, GLOBE Chile conducted a workshop focusing on soil (soil characterization and contamination). Thirty-five students participated in the event.
- ◆ **Teacher Training Workshop (GLOBE Colombia):** In November 2022, GLOBE Colombia, with the assistance of the RCO, conducted a workshop focusing on GLOBE Biosphere and Pedosphere protocols. Twenty people participated in the event.
- ◆ **GLOBE Introduction Workshop (GLOBE Panama):** In December 2022, GLOBE Panama hosted a workshop focusing on GLOBE protocols. Fourteen teachers participated in the event.
- ◆ **Building a Thermometer Experience (GLOBE Paraguay):** In April 2022, students learned how to build a thermometer using a GLOBE guide. Sixty students participated in the event.
- ◆ **GLOBE Workshops (GLOBE Peru):** From June through December 2022, teachers, administrative staff and students came together to learn more about GLOBE, and how to implement GLOBE in the area. More than 200 students participated in the event.

## Community

A variety of community activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **Drawing Contest (Latin America and Caribbean Region):** In April 2023, the RCO hosted a contest designed to create a logo for the regional “Trees within LAC” campaign. More than 400 people from fourteen countries participated in the event.
- ◆ **Virtual Science Talk (GLOBE Argentina):** In February 2023, students learned about The GLOBE Program; they also collected field data using GLOBE protocols. More than 40 students participated in the event.
- ◆ **Project GLOBE and Permanent STEAM (GLOBE Brazil):** In January 2023, teachers and students were trained in GLOBE protocols via a workshop held in Sao Luis, capital of Maranhão State; thirty-nine



During the She Camp (July 2022) in Asuncion, Paraguay, 100 girls ages 15 to 18 learned how to use the GLOBE Observer Mosquito Habitat Mapper tool.

teachers and students were trained on the use of GO. In all, over 1,000 people participated in this event.

- ◆ **She Camp (GLOBE Paraguay):** In July 2022, a workshop identifying mosquito habitats using the GO app took place, with girls between the ages of 15 and 18 attending. Over 100 people participated in the event.
- ◆ **GLOBE Program “Environmental Hour” (GLOBE Peru):** In November 2022, a program hosted by the Ministry of Education and the Ministry of the Environment took place; the objective of the event was to provide specialized information to the educational community and citizens about environmental education spaces and The GLOBE Program. More than 3,000 people viewed the show.
- ◆ **Summer Vacation and GLOBE (GLOBE Suriname):** In August and September 2022, the Green Heritage Foundation Suriname organized summer vacation activities for children in the coastal districts Nickerie and Coronie and the indigenous village Galibi. The activity consisted of three sessions, during which the students learned more about GLOBE. More than 100 students participated in the event.



Participants of the 2022 Near East and North Africa Meeting at the Dead Sea, Jordan.

# Near East and North Africa

## 2022 Regional Meeting

In November, the 2022 Near East and North Africa Regional Meeting took place at the Dead Sea, Jordan. The meeting was attended by Country Coordinators, Deputy Country Coordinators, teachers, students, trainers, and scientists from 11 countries. Primary topics of discussion included: teacher training on GLOBE protocols; students research and investigation through field trips to different locations in Jordan; presentations by Country Coordinators on their current work with GLOBE; and presentations on teacher efforts to develop innovative learning activities for the capacity building project.

During the meeting, there was a field visit to the “Al Chouf School” in an effort to introduce participants to Jordan schools. Participants experienced GLOBE Games, which were designed to inspire them regarding GLOBE program efforts and activities.

## Topical Highlights from the Region

As always, the Regional Coordination Office (RCO) encouraged, supported and hosted numerous events (meetings, training, activities, field studies and research efforts) during 2022-2023. The items listed below are only to serve as “highlights” of the region’s ongoing dedicated efforts.





Scene during the filming of the *Agents of Change: GLOBE in Near East and North Africa* video at the Um Hani School, Sultanate of Oman.



Dr. Tony Murphy visiting an elementary school in Amman, Jordan.

## Science

A variety of science activities, meetings and events occurred in various forms throughout the region, including:

- ◆ **2023 IVSS Participation (Near East and North Africa Region):** The RCO promoted student research efforts associated with the IVSS, with Country Coordinators in the region encouraging the community to participate. Students were encouraged to be part of this initiative to give them an expanded opportunity for collaboration and to present their studies using GLOBE protocols.
- ◆ **GLOBE Materials Integration (Near East and North Africa Region):** GLOBE teachers throughout the region were encouraged to integrate GLOBE materials into their classrooms.
- ◆ **RCO Efforts (Near East and North Africa Region):** The RCO encouraged and provided support to teachers in the region to expand GLOBE activities and projects. This included: assisting Qatar and Egypt Country Coordinators to present an overview of GLOBE protocols and activities to the decision makers in their countries, with the goal of having the countries adopt GLOBE through their ministries and educational entities; assisting Kuwait Country Coordinators to engage new private elementary schools, to organize teacher training on GLOBE protocol and activities, and support teachers in collecting and uploading data; assisting teachers and students from Al Chouf School in Jordan (with King Abdallah) to develop GLOBE Games designed to help student learn through having fun, which included working to integrate these activities within current academic subjects in order to make working with GLOBE easier and more desirable; and assisting Qatar and United Arab Emirates Country Coordinators (via virtual meetings) with training on the GLOBE website, eTraining modules, and protocols.

## Community

A variety of community activities, meetings and events occurred in various forms throughout the region, including Earth Day 2023 celebrations. For this celebration of the Earth, countries in the region were requested to provide their records and photos about their scheduled Earth Day activities. A number of countries provided videos and photos to document their celebration, including:

- ◆ **Bahrain:** Celebrating through the “GREEN March”.
- ◆ **Jordan:** Celebrating through GLOBE Games.
- ◆ **Kuwait:** Celebrating through the engagement of new elementary schools in GLOBE protocols.
- ◆ **Lebanon:** Celebrating through the engagement of new middle school students in presenting GLOBE research on earthquakes and the tectonic plates.
- ◆ **Oman:** Celebrating through “GLOBE Open Day,” where teachers and students from GLOBE schools engage in data collection and research.
- ◆ **United Arab Emirates:** Celebrating through the implementation of GLOBE training workshops.





The 2022 GLOBE North American Regional Meeting (NARM) was a new hybrid model of virtual and in-person meetings that took place in Oakland, CA (above), Toledo, Ohio, and Reading, Pennsylvania, USA, as well as online.

# North America

## 2022 Regional Meeting

In November, the 2022 North American Regional Meeting (NARM) took place both virtually (02–04 November) and at three in-person professional development workshops (07–08 November).

This new hybrid model of virtual and in-person options was chosen to reach the widest North American GLOBE community audience, while still in the midst of the COVID pandemic. GLOBE community members from Canada and the United States participated in the event.



In Toledo, Ohio, USA, *From Midwestern Prairies to City Centers: GLOBE Student Research to Better our Region's Environment* was the NARM theme for in-person professional development workshops organized by University of Toledo, GLOBE Mission Earth, Wayne RESA, and Xcite Learning/Bowling Green State University/Toledo Zoo.

Seventy-eight GLOBE Partners and educators registered for the virtual portion of the meeting.

Each day's schedule was two-and-a-half hours of themed lightning talks and discussions, program updates, videos highlighting GLOBE Partnership activities, and more.

The three in-person NARM professional development workshops were well-attended (from 16 to 30 participants) and focused on different aspects of GLOBE and related programs.

In Oakland, California, USA, the theme was "Hydrosphere Protocols and Microplastics Training" (organized by WestEd/UC Berkeley and Science Action Club).

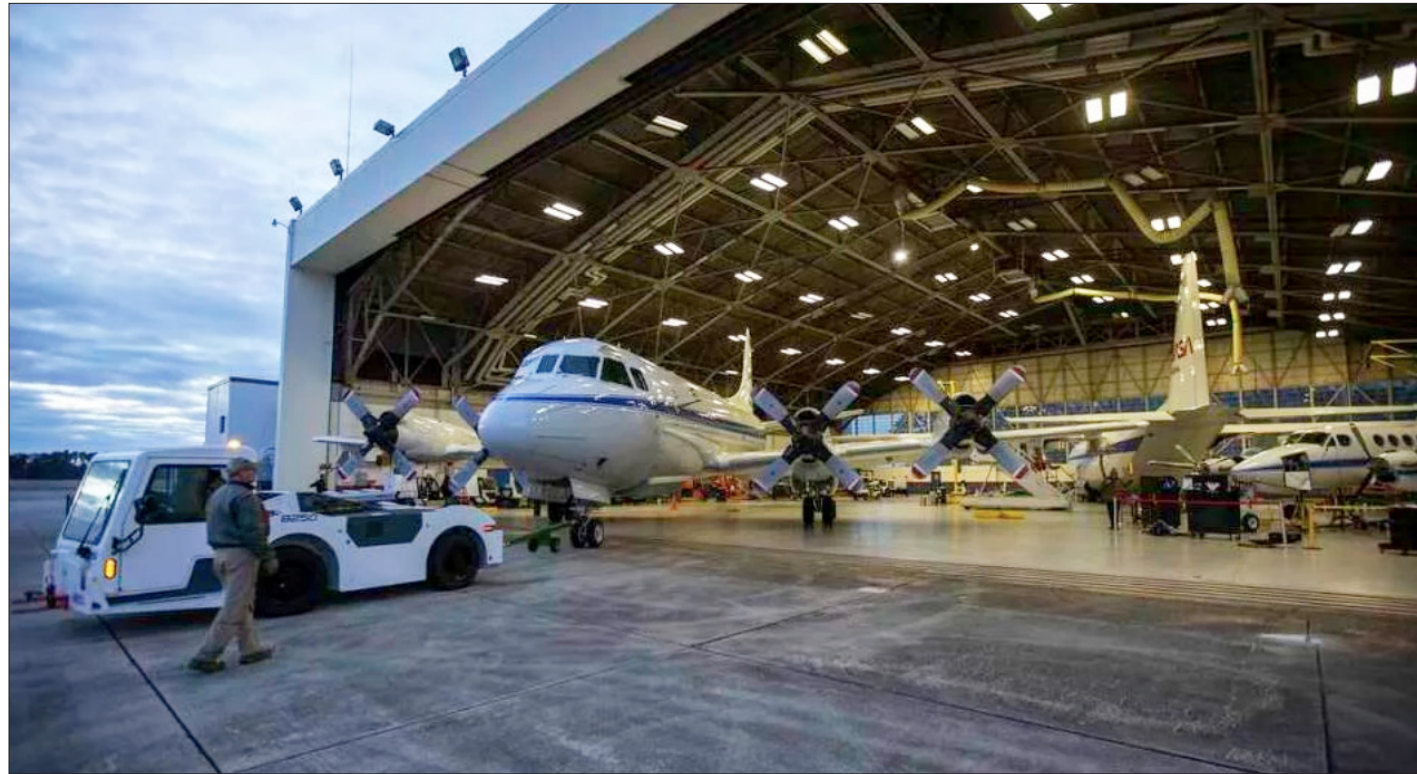
In Toledo, Ohio, USA, the theme was "From Midwestern Prairies to City Centers: GLOBE Student Research to Better Our Region's Environment" (organized by University of Toledo, GLOBE Mission Earth, Wayne RESA, and Xcite Learning/Bowling Green State University/Toledo Zoo).

In Reading, Pennsylvania, USA, the theme was "Citizen Scientists: Engaging the Community" (organized by Berks Nature).



*Citizen Scientists: Engaging the Community* was the theme for in-person NARM participants at The Berks Nature at the Nature Place in Reading, Pennsylvania, USA.





### Topical Highlights from the Region

As always, the United States Coordination Office encouraged, supported and hosted numerous events (meetings, training, activities, field studies and research efforts) during 2022-2023. The items listed below are only to serve as “highlights” of the region’s ongoing dedicated efforts.

### Science

A variety of science activities, meetings, and events occurred in various forms throughout the region, including efforts associated with the new U.S. SnowGLOBE Campaign. The GLOBE U.S. Coordination Office invited educators and students across the United States to participate in Mission SnowGLOBE, an IOP, working in partnership with the NASA Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS) field campaign.

During this IOP, students collected measurements during snow events and uploaded the data to the GLOBE website. Support for educators and students included two initial webinars on how to participate and the science behind the mission, blog posts, emails and text reminders before each snow event, a resource list, and information on how to connect with pilots and scientists in coordination with the NASA Airborne Science Program Communications.



Educators and students in the United States and Canada participated in Mission SnowGLOBE, a GLOBE Intensive Observation Period in support of the NASA IMPACTS mission to fly planes into snowstorms to study snowfall.

### Education

A variety of educational activities, meetings and events occurred in various forms throughout the region, including:

- 🔗 **U.S. Student Research Symposia (SRS) Efforts:**  
 In 2022, the decision was made to cancel the in-person regional SRS. However, with support from NASA (Grant no. 80NSSC18K0135) and Youth Learning As Citizen Environmental Scientists (YLACES), the GLOBE U.S. Coordination Office supported seven in-person local Student Research Symposia (SRS). Over 200 students presented 68 GLOBE research projects. Students presented their investigations to peers and STEM professionals.
- 🔗 **U.S. SRS Efforts:** The 2023 SRS took place in five locations across the United States in April and May 2023. These events, made possible with support from NASA (Grant no. 80NSSC18K0135) and Youth Learning As Citizen Environmental Scientists (YLACES), provide students with an opportunity to present their GLOBE research to peers and STEM professionals. New accessibility and equity initiatives based on feedback from previous years were implemented, including translations of registration materials and polo shirts (funded by YLACES) for all youth presenters.
- 🔗 **STEM Enhancement in Earth Science (SEES) Summer High School Intern Program:** Each year, the GLOBE U.S. Coordination Office accepts applications for a GLOBE intern at the SEES Summer High School Intern Program. This opportunity is open to Sophomores and Juniors who are GLOBE students. Selected interns will learn how to interpret NASA satellite data and work with scientists and engineers at the University of Texas at Austin Center for Space Research.



GLOBE 2022 North America activities included the U.S. GLOBE Watercoolers virtual learning opportunities; the 2022 NASA Goddard GLOBE Goes to Camp project; and the NASA GLOBE Cloud Gaze initiative.

### Community

A variety of community activities, meetings and events occurred in various forms throughout the region, including:

- 🔗 **Interactions and Collaboration: U.S. GLOBE Watercoolers.** These Watercoolers (virtual learning and networking opportunities for GLOBE teachers and partners) continued throughout 2022 and 2023. As of March 2022, the GLOBE U.S. Coordination Office has hosted 18 Watercoolers with 89 unique attendees representing GLOBE Partners, teachers, students and community members. Topics included GLOBE Eclipse, Mission SnowGLOBE, the Student Research Symposia, GLOBE in the middle school classroom, Telling our Tree Stories, and Artificial Intelligence.



# Thanks to our GLOBE Partners around the world.

## AFRICA

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

-  Mongolia
-  Nepal
-  New Zealand
-  Palau
-  Philippines
-  Republic of Korea
-  Sri Lanka
-  Taiwan Partnership
-  Thailand
-  Vietnam

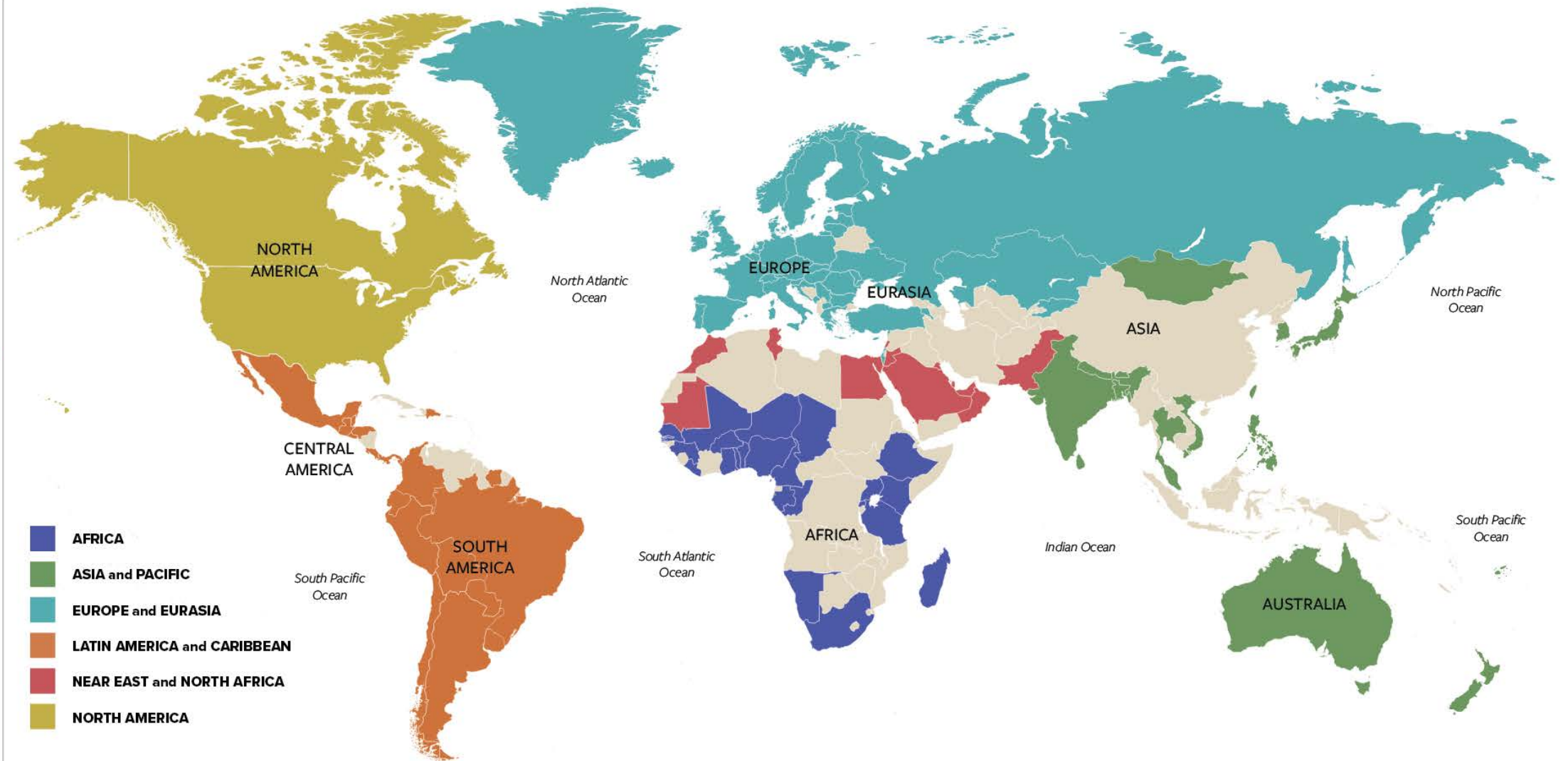
## EUROPE AND EURASIA

-  Armenia
-  Austria
-  Belgium
-  Bulgaria
-  Croatia
-  Cyprus
-  Czech Republic
-  Denmark
-  Estonia
-  Finland
-  France
-  Georgia

-  Germany
-  Greece
-  Hungary
-  Iceland
-  Ireland
-  Israel
-  Italy
-  Kazakhstan
-  Kyrgyz Republic
-  Latvia
-  Liechtenstein
-  Lithuania
-  Luxembourg

## ASIA AND PACIFIC

-  Australia
-  Bangladesh
-  Bhutan
-  Fiji
-  India
-  Japan
-  Maldives
-  Marshall Islands
-  Micronesia



-  **AFRICA**
-  **ASIA and PACIFIC**
-  **EUROPE and EURASIA**
-  **LATIN AMERICA and CARIBBEAN**
-  **NEAR EAST and NORTH AFRICA**
-  **NORTH AMERICA**

-  Macedonia
-  Malta
-  Moldova
-  Monaco
-  Montenegro
-  Netherlands
-  Norway
-  Poland
-  Portugal
-  Romania
-  Russia
-  Serbia

-  Slovakia
-  Slovenia
-  Spain
-  Sweden
-  Switzerland
-  Turkey
-  Ukraine
-  United Kingdom

## LATIN AMERICA AND CARIBBEAN

-  Argentina
-  Bahamas

-  Belize
-  Bermuda
-  Bolivia
-  Brazil
-  Chile
-  Colombia
-  Costa Rica
-  Dominican Republic
-  Ecuador
-  El Salvador
-  Guatemala
-  Honduras

-  Mexico
-  Panama
-  Paraguay
-  Peru
-  Suriname
-  Trinidad and Tobago
-  Uruguay

## NEAR EAST AND NORTH AFRICA

-  Bahrain
-  Egypt

-  Jordan
-  Kuwait
-  Lebanon
-  Mauritania
-  Morocco
-  Oman
-  Pakistan
-  Qatar
-  Saudi Arabia
-  Tunisia
-  United Arab Emirates

## NORTH AMERICA

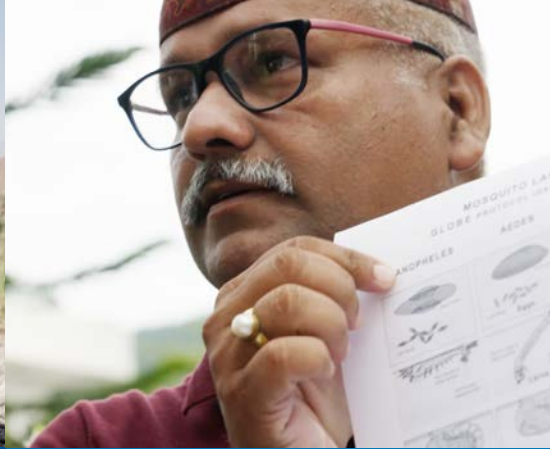
-  Canada
-  United States of America







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