THEGLOBEPROGRAM

Annual Review 2010

What is the GLOBE Program?

The GLOBE program is an international hands-on environmental science and education program, active in 111 countries around the world.

GLOBE's vision promotes and supports students, teachers and scientists to collaborate on inquiry-based investigations of their local environment, sharing their results over the internet. Using the students' data, GLOBE provides on-line images, maps and graphs on the state of the planet. All raw data can also be downloaded to compare and contrast local and global environments.

Organized by a network of US Partners and international Country Coordinators, there are more than 56,000 GLOBE-trained teachers representing over 24,000 schools around the world. Over 1.5 million students have participated in GLOBE since it was set up in 1995, contributing more than 22 million measurements to the GLOBE database for use in their inquiry-based science projects.

"GLOBE is the quintessentially ideal program for involving kids in science"
- Nobel laureate Dr. Leon Lederman.

The GLOBE Program Office supports the world-wide GLOBE network from offices at the University Corporation for Atmospheric Research (UCAR) in Boulder Colorado and the University of Tyler in Texas, with regional offices in Argentina, India, Lebanon, The Netherlands and South Africa. GLOBE activities are steered by the GLOBE International Advisory Committee, which brings together representatives from GLOBE countries around the world.

The GLOBE Program Office, P.O. Box 3000
Boulder, Colorado 80307 USA
T: (1) 303-497-2600
E: enquiries@globe.gov

The GLOBE Program Office is supported by:

Front cover shows GLOBE students from all regions of the world investigating their local environments.

© 2011 The GLOBE Program Office. AT/mm

The GLOBE Program in 2010

The International GLOBE network of students, teachers, scientists and partners engaged in hundreds of projects and activities during 2010. This Annual Review highlights just some of them, starting with developments at the GLOBE Program Office which impact on the GLOBE community.

During the year, progress was made on the Student Climate Research Campaign (SCRC) which is due to launch in September 2011. In October 2010, working in partnership with NOAA Earth Systems Research Lab (ESRL) located in Boulder, Colorado, the first Intensive Observing Period was piloted to engage students in exploring climate through land cover. During the week of activities students photographed local land cover sites and submitted their digital pictures, along with latitude, longitude, elevation data, and information from the GLOBE Land Cover/Biology Protocols. A new Google Earth map application was developed to visualize this data, enabling both students and scientists to compare the local land cover classification with international land cover base-layers used in climate models.

GLOBE Land Cover images are now available on Google Earth.

The GLOBE Program Office strengthened its science base with the appointment of three part-time scientists, working alongside scientists from both NASA and NOAA. The Earth System Science Projects (ESSPs) continued to develop, with new learning activities and tools for the GLOBE website. The website was also enhanced through social media links to Facebook, Twitter, Flicker, and YouTube. Towards the end of the year, an external technology review led to NASA appointing contractors to develop a brand-new website during 2011, to be finalized by Spring 2012.

The Macedonian Ministers for the Environment and for Education launch the GLOBE-Europe meeting in Ohrid, Macedonia, in June 2010.

These developments will improve our central services over the coming years, encouraging and enabling more partners, teachers and students to get involved. However it is on a world scale where GLOBE's impact is seen, and the following pages contain just a sample of these activities, providing a flavor of GLOBE and its many benefits to student learning, ranging from science and its practical applications through to international partnerships and collaborations.

The remainder of this Annual Review showcases the six GLOBE regions of the world: Africa, Asia / Pacific, Europe / Eurasia, Latin America / Caribbean, Near East / North Africa, and North America, with a central feature on World Water Day which brought together 67 GLOBE Schools from 14 different countries.

GLOBE Around the World

Africa

GLOBE Africa Region:
22 Countries; 642 Schools;
1,108 Teachers; 1,097,138 Measurements

GLOBE Africa held its fourth regional meeting in Dakar, Senegal in February 2010, bringing together 20 representatives from 13 countries to discuss joint projects and plan future activities.

GLOBE Africa's fourth regional meeting in Dakar, Senegal.

The meeting included GLOBE representatives from Benin, Cameroon, Cape Verde, Ethiopia, Kenya, Madagascar, Namibia (via Skype), Nigeria, Rwanda, Senegal, South Africa, Tanzania and Uganda. Discussions ranged from preparation for the Student Climate Research Campaign to the Africa regional Mt. Kilimanjaro Project. The meeting was followed by a GLOBE Train-the-Trainer workshop, where 30 teachers from 25 schools were trained in GLOBE Protocol activities aimed for inclusion in student inquiry projects. The newly trained teachers received equipment ready to set up their study sites to help students build inquisitive relationships with the Earth.

SPOTLIGHT ON Senegal prepare GLOBE students to become tomorrow's leaders

Lycée Seydina Limamoulaye, a GLOBE High School in Dakar, Senegal, has consistently excelled in a national student achievement test, taking first place in the number of overall students ranked for the past three years. The contest – know as 'Concours Général' - functions as a nationwide challenge for schools in the areas of biology, mathematics, chemistry, languages, history, and geography, with awards being made by His Excellence, the President of the Republic of Senegal.

According to Madame Ngossé Fall Bousso, GLOBE Senegal Country Coordinator, "The results are presented again by students on World Environment Day, celebrated on the 5th of June each year in Senegal to stimulate environmental awareness." In 2008, Birane Diouf, now a GLOBE Alumnus still involved with GLOBE activities at Lycée Seydina Limamoulaye, was placed second in Concours Général for the Earth and Life Sciences category.

GLOBE students from Lycée Seydina Limamoulaye study clouds using the GLOBE Cloud Charts.

GLOBE around the world

Asia/Pacific

GLOBE Asia / Pacific Region:
16 Countries; 2,456 Schools;
3,148 Teachers; 1,263,548 Measurements

The Regional Office for GLOBE in Asia and the Pacific conducted a myriad of activities in 2010, ranging from student climate research events, hosting school visits by NASA officials (see below), and increasing the training team for the region. Twenty representatives from the Asia/Pacific region, including GLOBE Country Coordinators, Government officials, teachers and scientists met in Dhaka, Bangladesh in April 2010, to plan future student inquiry activities in the region. Following the meeting, trainers from Bhutan, India, Nepal and Thailand attended a regional workshop in New Delhi, India, where a new regional training guide was used for the first time.

GLOBE representatives gather to plan future student inquiry activities in Asia and the Pacific.

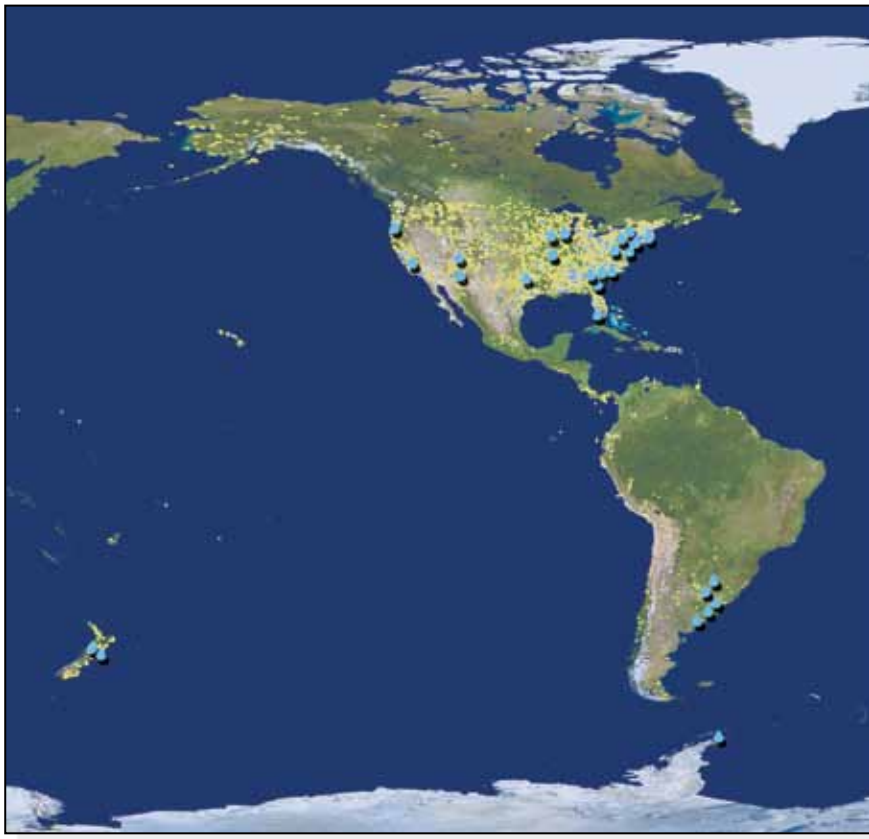
SPOTLIGHT ON GLOBE and NASA link-up in India and Nepal

The GLOBE Asia/Pacific Regional Office in India welcomed Dr. Michael Freilich, NASA Earth Science Division Director in August 2010. Dr. Desh Bandhu, GLOBE Regional Office Director, described the activities of GLOBE in the region and Mr. Rajinder Mehta, GLOBE India Country Coordinator, discussed the role of the Ministry of Environment and Forests in implementing the GLOBE Program in India itself. The NASA team then called in on a GLOBE School - Ahlcon International School – where Dr. Freilich joined GLOBE students collecting data from their weather station. He went on to give a speech emphasizing the value of the Earth, encouraging students to love and care for their planet in their everyday lives, ending with a question and answer session for students to find out more. This event demonstrates a unique attribute of the GLOBE Program: a platform for students and teachers to interact with real scientists face to face.

In October 2010, NASA Administrator Charles F. Bolden, Jr. visited Yasodhara Baudha Secondary School in Kathmandu, Nepal. Mr. Bolden talked to students and teachers about his experiences as a NASA astronaut, presented books to the teachers, and spoke about the importance of working hard in school to achieve personal and professional goals. He encouraged students not to be afraid of failure and to seek answers to their questions through research and international scientific collaborations. Both visits were an honor for the schools and the GLOBE Asia/Pacific Region.

Trainers discuss implementation methods as they are refreshed on GLOBE Protocols.

Students from OPF College in Pakistan celebrate World Water Day 2010.



GLOBE Around the World - each yellow dot represents one GLOBE school

GLOBE around the world

Students get their hands wet for World Water Day 2010

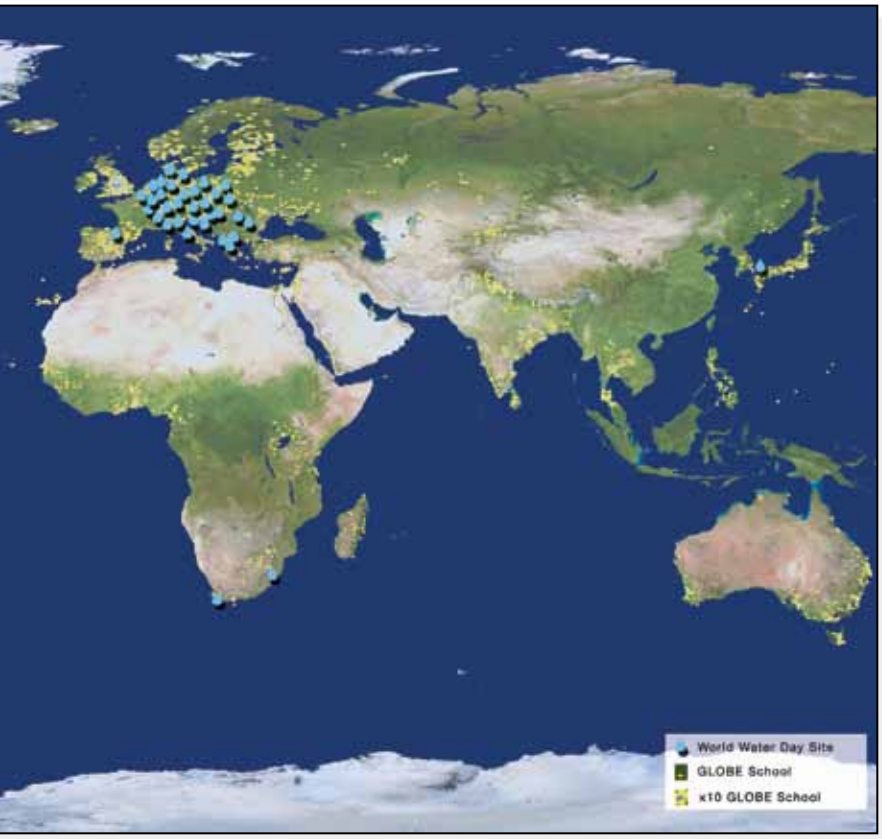
GLOBE students from 67 schools in 14 countries participated in the U.N. sponsored World Water Day on March 2010. Students took part in learning activities and used GLOBE Water Protocols to gather data for research projects. Students collected water quality data on five continents during the day. "It is so exciting to see students have the opportunity to be a part of something bigger than just their school," said Dr. Donna Charlevoix, Director of the Science and Education Division for the GLOBE Program Office.

Examples of student participation from around the world included GLOBE school Escuela Provincial No. 38 Julio A Roca in **Argentina**. Here students measured water pH in the Argentine Base Esperanza, located on an island off the northern tip of the Antarctic Peninsula. Base Esperanza is in the middle of an Adélie Penguin rookery, containing roughly 100,000 pairs of resident penguins. The contribution of GLOBE data from this location expands the inforation for students, educators, and scientists learning about water quality in different parts of the world.

Students at Cape Hatteras Secondary School in Cape Hatteras, **North Carolina, USA**, celebrated World Water Day with activities throughout the week. Each middle school and high school student found one fact about water and they posted their facts throughout the school premises. Students also created posters about the importance of conserving the limited amounts of usable freshwater available on Earth. Many students were surprised to learn that not everyone in the world possesses the same access to water as they do.

Cape Hatteras Students collect GLOBE Hydrology data in honor of World Water Day.

At the GLOBE School Overseas Pakistanis Foundation Girls College in Islamabad, **Pakistan**, students gave presentations on water conservation and conveyed the importance of access to clean water through beautiful art pieces that were then exhibited at the college. Dr. Khushi, a renowned scientist and teacher, delivered a lecture



and the blue drops show those taking part in World Water Day 2010.

emphasizing water quality. Students then went on a GLOBE Water Walk at Lake View Park and ended the day using GLOBE Protocols to collect hydrological data from the Rawal Lake and Chattar Park.

GLOBE school Bandarawatta Parakrama Maha Vidyalaya in Gampaha, **Sri Lanka,** commemorated World Water Day with a Hydrology workshop for students and teachers. GLOBE Country Coordinator Damayanthi Balasuriya and GLOBE Trainer Shanthi Siriwardhana collaborated with the Ministry of Education and the Gampaha Zonal Education Office to host the event. Sixth and seventh grade students from WP/Gm/ Parakrama Maha Vidyalaya participated along with GLOBE students and teachers from WP/Gm/ Dompe Siyane Vidyalaya and WP/Gm/ Kuruwamulla Maha Vidyalaya. Students discussed the water crisis, and the relevance of GLOBE Protocols for gathering data to use in research projects.

GLOBE Students in Antarctica participate in World Water Day.

The George community in **South Africa** is familiar with effects of the water crisis as they are experiencing the worst drought in 100 years in the Western Cape of Africa. For World Water Day, GLOBE schools in George, Western Cape and Indwe, Eastern Cape, concentrated on the problem of water accessibility with a full week of activities. Students created awareness posters to express the harmful reality of water limitations and water audits were integrated into math classes to demonstrate the importance of preservation.

Forty-four schools from Europe and Eurasia participated in World Water Day, including eight schools from the **Czech Republic**. Students from Gymnazium Kadan, collected and removed garbage around an important spring and stream in a nearby village. They then carried out botanical surveys to learn about local water sources. At ZS Trebic School, older students taught younger students about the value of water sources, how to protect them and how to analyze the quality of water using GLOBE Hydrology Protocols. High school students at Integrovana Stredni Skola, Valasske Mezirici, analyzed water quality and demonstrated tools that could be used within the GLOBE Hydrology Investigations for future research projects.

Dr. Teresa Kennedy, Director of the International Division for the GLOBE Program Office and GLOBE U.S. Country Coordinator, said: "It is phenomenal to see data received from all over the world for a common purpose. These simultaneous analyses by so many students in differing environments build useful knowledge about Earth's water supply and provide baseline data for future studies."

GLOBE around the world

Europe/Eurasia

GLOBE Europe / Eurasia Region:
40 Countries; 3,505 Schools;
5,625 Teachers; 11,701,988 Measurements

In June 2010 over 40 representatives from 21 European countries met in Ohrid, Macedonia, to discuss regional governance, update one another on national implementation activities, begin preparation for GLOBE's upcoming climate research events and hold elections of for the new Board (pictured). Countries present at the meeting were Belgium, Croatia, Cyprus, the Czech Republic, Estonia, Finland, France, Hungary, Israel, Italy, Latvia, Liechtenstein, Macedonia, Malta, Netherlands, Poland, Russia, Switzerland, the United Kingdom and Ukraine. The meeting was opened by Mr. Nedzati Jakupi, Minister of Environment-Physical Planning, Mr. Nikola Todorov, Minister of Education and Science, Mr. H.E. Philip T. Reeker, U.S. Ambassador in the Republic of Macedonia, and Mr. Aleksandar Petreski, the Mayor of Ohrid.

The board of GLOBE-Europe held their regional meeting in Ohrid, Macedonia.

SPOTLIGHT ON GLOBE Alumni in Estonia lead 13th GLOBE Games and Expedition

In August 2010, the 13th Annual GLOBE Games and Expedition was held in Estonia, at the same time as the international Annual Partner Meeting in Calgary, Alberta, Canada. GLOBE Estonia Country Coordinator Dr. Kaido Reivelt and Estonian GLOBE Alumni Janno Jõgeva and Laura Altin spoke to the meeting via a video link to talk about the Games, taking place in Jäneda, a small village in Northern Estonia rich with nature and diverse scenery.

Students learn new measurement and observation techniques at 13th GLOBE Games in Estonia.

The primary goal of the Estonia GLOBE Games and Expedition is to connect students, teachers and scientists from different fields in order to learn new skills, share experiences, and study local environments. The expedition also raised awareness of environmental issues in the local community and in families of GLOBE students.

This year, 27 GLOBE Schools, 120 GLOBE Students, 30 GLOBE Teachers, and more than 10 scientists from universities in Estonia as well as abroad were in attendance. Other guests included United States Ambassador Michael Polt, representatives from the U.S. Embassy in Tallinn, Estonia, local community leaders, and guests from France and Germany. During the event, students conducted GLOBE Protocols and worked with scientists to learn new measurement and observation techniques. Teachers engaged in refresher courses to improve their knowledge of GLOBE Protocols and began new measurement campaigns, including the measurement of aerosols and black carbons.

GLOBE around the world

Latin America/Caribbean

GLOBE Latin America / Caribbean Region:
18 Countries; 574 Schools;
939 Teachers; 580,179 Measurements

The Latin America/Caribbean region met during the 14th GLOBE Annual Meeting in Calgary, Canada, to discuss progress within the region and focus on planning and implementing the Student Climate Research Campaign. Ms. Amalia Aubone, the Latin America and the Caribbean Regional Desk Officer, presented current Regional Office activities, highlighting the publication of GLOBE Stars describing activities of the region. An important development was the ratification of an agreement with each GLOBE country in the region to promote the development of the Seasons and Biomes Project. The Latin America/Caribbean Regional Office plans to implement a Scientific Regional Council to evaluate the research conducted in each country. This council will highlight the country most involved in the 2013 GLOBE Learning Expedition, which will focus on climate research. The whole world joined in expressing sadness that Maria del Carmen Galloni, GLOBE Regional Office Representative for Latin America and the Caribbean and Country Coordinator for Argentina, passed away peacefully on 3 December, 2010.

Representatives of the Latin America/Caribbean Region at the GLOBE Meeting in Calgary, Canada.

SPOTLIGHT ON Pujato Community makes global impact at International Book Fair

GLOBE was represented at the 36th Buenos Aires International Book Fair, which took place from 22 April-10 May 2010 at La Rural Exhibition Center in Buenos Aires, Argentina. The fair is considered one of the most important cultural events in Latin America and is one of the largest expositions in the Spanish-speaking world. This event serves as a place for both entertainment and exchange of knowledge between authors, scientists, students, and various other international and local intellectuals. The Book Fair is open to the public for a small fee and hosts lectures and activities of interest to all ages. This year activities included a book reading marathon, the International Poetry Festival, and free courses and workshops for patrons of all kinds.

Pujato students share GLOBE research with local intellectuals at the 36th Buenos Aires International Book Fair.

In an area designated for younger guests entitled, "Youth Space 2010-Caring for Our Planet," GLOBE was represented in Buenos Aires by students from two schools of Pujato: Our Lady of Carmen Primary School and John F. Kennedy Secondary School. These GLOBE schools have extensive research underway, and students presented current projects to their peers. GLOBE Professor Claudia Romagnoli said: "Although the students in Pujato (Santa Fe) participate in multiple science fairs in Argentina, being a part of the International Book Fair is an important accomplishment. Students were able to present their work on climate change and reforestation, thus giving exposure to the GLOBE program and educating both children and adults about the environment."

GLOBE around the world

Near East/North Africa

GLOBE Near East / North Africa Region:
13 Countries; 318 Schools;
571 Teachers; 610,761 Measurements

Representatives from 9 Countries in the Near East / North Africa Region met in April 2010 in Beirut, Lebanon, to discuss GLOBE student research activities in the region and to build national training teams. Countries present at the regional meeting and protocol training event included Bahrain, Lebanon, Mauritania, Oman, Pakistan, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates. Discussions at the regional meeting included the importance of continuing the regional Ocean for Life (OFL) project in 2011 and beyond. A follow-up training session was attended by 34 GLOBE representatives from across the region, focusing on student inquiry activities.

GLOBE Near East/North Africa representatives meet in Beirut, Lebanon.

SPOTLIGHT ON GLOBE students explore the future of water in 6th Annual Bahrain Scientist Fair

Also in April 2010, the 6th Annual Scientist Fair in the Kingdom of Bahrain explored one of the most serious challenges facing Arab Countries this century, the increasing demand for water combined with the decline of adequate resources. Goals of the Scientist's Fair included raising students' awareness, talents, and abilities; encouraging innovation; promoting creative research and collaborative team work. Held under the patronage of Dr. Majed Bin Ali Al Noami, Minister of the Ministry of Education, the fair at Shaikh Khalifa Institute for Technology, involved more than 60 students from 18 schools. Assisted by 20 scientists who helped make the fair a great success, students worked from October until March to complete and submit their research projects.

GLOBE Students promote collaborative scientific research as they share their findings at the 6th annual Bahrain Scientist Fair.

Schools focused on both traditional and unusual water sources to support this year's theme of "Water Future" in Bahrain and the Gulf. The science projects made full use of GLOBE GPS Measurement and Hydrology Protocols and the top scoring team was from GLOBE School Shaikh A. Aziz Boys Secondary School, winning laptops for their project on the impact of a landfill water desalination plant to reduce the proportion of salinity in sea water.

GLOBE around the world

North America

GLOBE North America Region:
2 Countries; 16,689 Schools;
44,949 Teachers; 7,143,606 Measurements

Continuing a tradition started in 2006, the GLOBE Canadian and U.S. Partners met during the National Science Teachers Association (NSTA) annual meeting in March 2010 with over 30 representatives from the North America region, including Canada, U.S. Partners from 17 states, as well as the North America Alumni and Parent Council representatives. Priorities focused on sharing experiences working with teachers and students on GLOBE inquiry projects and activities, and discussing collaborations aimed at strengthening GLOBE implementation in North America. In order to ensure that the entire U.S. Partner network could participate in the meeting, many presentations via Skype were included and streaming video allowed Partners from across the U.S. to connect live to the meeting. Over 100 viewers joined the meeting virtually this year.

GLOBE North America representatives meet at the National Science Teacher Association.

SPOTLIGHT ON GLOBE students make a splash in the Big Apple and visit the White House

Science Cluster teacher Fran Bosi took a leap and jumped in to discover what lurked under the water in a local pond. Employing the GLOBE Freshwater Macroinvertebrate protocol, two fifth grade classes from the Alexander Graham Bell School in Bayside Queens carried out an investigation of the pond life of Alley Pond Park. Classes visited the pond throughout the fall, winter, and spring, keeping a detailed inventory of their findings each trip. The project was part of an Environmental Protection Agency (EPA) funded project, led by GLOBE NY Metro, that equipped teachers to train students to use GLOBE protocols to enhance their research efforts.

GLOBE students investigate water quality at Alley Pond Park, New York.

In October, three GLOBE students and their teacher, Melody Tsapranis, from Woodward High School in Toledo, Ohio, were invited to attend the White House Science Fair in Washington DC, hosted by President Obama. Tiffine Guindon and Tazhianna Dean from Woodward High School, and Alexandria Carey, currently a student at Rossford High School, were nominated by Dr. Kevin Czajkowski, Associate Professor, Department of Geography and Planning, University of Toledo, to represent the GLOBE Program at the Fair. The students' project analyzed data from Fairbanks, Alaska on frost depth and temperature, showing that permafrost in Fairbanks has warmed nearly three degrees Celsius, leading to the release of additional carbon dioxide and methane gases into the atmosphere.

Thanks to our GLOBE Partners around the world ...

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

... and thanks to our global supporters!