THE **GLOBE** PROGRAM

20th GLOBE Annual Meeting

ESTES PARK, COLORADO, USA
16-21 JULY 2016

Celebrating
the **GLOBE** Community

#GLOBEinCO2016

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

THE GLOBE PROGRAM
20th Anniversary · 1995 – 2015

The GLOBE Program is sponsored by the National Aeronautic and Space Administration (NASA) and the National Science Foundation (NSF), and supported by the National Oceanic and Atmospheric Administration (NOAA) and the Department of State (DOS). The GLOBE Implementation Office is operated by the University Corporation for Atmospheric Research (UCAR) under NASA Cooperative Agreement NNX14AK03A.

CONTENTS

Page

ACKNOWLEDGEMENTS

A special thanks to those from the GLOBE and NASA communities who are leading sessions throughout the week. We would also like to thank the following individuals for their support and work to make this meeting possible.

International Organizing Committee Members

Organizing Committee Co-Chair and Host,
John Ristvey, UCAR Center for Science Education, GLOBE Partner, UCAR, CO
Organizing Committee Co-Chair and Host,
Deanna TeBockhorst, CloudSat Educator and GLOBE Trainer, CO
Organizing Committee Co-Chair,
Tony Murphy, Director, GLOBE Implementation Office, UCAR, CO
Sylivester Chaisamba, Meteorologist, Tanzania, Africa Region
Mullica Jaroensutasinee, GLOBE International Scientist, Asia and Pacific Region
Jen Bourgeault, U.S. Country Coordinator, North America Region
Matthijs Begheyn, Netherlands Country Coordinator, Europe and Eurasia Region
Henry Ortiz, Los Angeles Unified School District, Chair 2015 GLOBE Annual Meeting, GLOBE Partner, CA
Cornell Lewis, Data Information Systems Team Member, Raytheon Web Solutions, California, USA
Salma Al Zubi, Region Office Coordinator, Near East and North Africa Region
Monique Pool, Suriname Country Coordinator, Latin America and Caribbean Region
Dixon Butler, NASA Consultant, Washington, D.C., USA
Annie Richardson, Education and Public Outreach, NASA Jet Propulsion Lab, California, USA
Bill Meyers, GLOBE Teacher, Alexander Dawson School, Colorado, USA
John Hehr, University of Arkansas, GLOBE Partner, Arkansas, USA
Lynne Hehr, University of Arkansas, GLOBE Partner, Arkansas, USA
Melinda Merrill, Executive Director, Estes Institute, Estes Park, Colorado, USA

Logistical Support Team

Katy Lackey, Lead Administrator, GLOBE Implementation Office, UCAR, CO
Dawn Wright, Administrative Assistant/Meeting Planner, GLOBE Implementation Office, UCAR, CO
Valerie Williams, Evaluator, GLOBE Implementation Office, UCAR, CO

GLOBE Implementation Office Staff

Tony Murphy, Director
Hanne Mauriello, Deputy Director
Travis Andersen, Data Scientist, Science and Technology Liaison/Coordinator
Andrew "Roller" Angel, IT Support Specialist
Amy Barfield, GISN Support
Jan Heiderer, Communications Coordinator
Eslam Khair, IT Support Specialist
Katy Lackey, Lead Administrator
Julia Lee, Administrative Support
Russanne (Rusty) Low, E-Learning Specialist
Julie Malmberg, Education, Outreach, and Technology Specialist (GLOBE Distinguished Educator Fellowship Coordinator)
Nancy McLaughlin, Graphic Artist
Kristin Wegner, Education and NGSS Specialist
Lyn Wigbels, International Coordinator
Valerie Williams, Data Monitoring, Evaluation and Analysis Coordinator
Kristina Woodall, Communications Specialist
Dawn Wright, Administrative Assistant, Meeting Planner

Rocky Mountain National Park

Mark DeGregorio, Education Specialist

Dear GLOBE Community,

Welcome to the 20th GLOBE Annual Meeting! We are thrilled to be hosting you in one of the jewels of the United States, the beautiful Rocky Mountain National Park and the town of Estes Park, Colorado. We hope that while attending sessions you will learn and enjoy much about the ecosystems that make this place special. We have designed the program in a manner that focuses on science investigations in which GLOBE protocols can be used to consider questions and make discoveries related to the real-world science in Rocky Mountain National Park. For example, our students will be investigating different life zones within the park. There will also be four distinct sessions for adults inside the park. You will be provided with opportunities to reflect on how GLOBE is a powerful tool for a better understanding of your own home environment through a project based learning approach.

The annual meeting is a wonderful time for the GLOBE community to connect and find the time to enjoy friends new and old. With that in mind we have incorporated two new opportunities for participants at the meeting. First, in order to provide space and time for participants to gather and discuss emergent issues during the meeting or 'spontaneous' sessions with a group, we are encouraging the GLOBE Community to participate in "unconferencing" sessions. This concept has been effective in other meetings and we are curious to see how it will work for our community. Throughout the meeting let us know if you and others are interested in hosting an "unconference" and we will work to make it happen. Second, we are opening a mini-exhibit hall where participants can browse and visit with GLOBE projects, providers, and vendors. The mini-exhibit hall will be open all week. Information about the daily schedules will be shared on a community message board and during morning announcements.

Presenters for this conference have committed to bringing their best to you and we hope you will fully participate to learn and enjoy all that they have to offer. We have also posted fun evening opportunities, which are entirely voluntary. Evenings may also offer the opportunity to stroll downtown Estes Park which is within walking distance from our hotel.

The experience of planning this meeting has forged new friendships and strengthened old ones. We are especially grateful for all the assistance and support provided by a very dedicated GIO staff, to the International Organizing Committee for their time and commitment, the National Science Foundation, Rocky Mountain National Park, Estes Park Environmental Center, NASA, NOAA, and for all the offers of assistance coming from the GLOBE community. Please take a moment to thank our many volunteers that are helping to run our meeting. Our diverse GLOBE community stands strong and vibrant. In recognition of this year's meeting theme we sincerely wish you all a meeting that 'Celebrates the GLOBE Community.' Thank you for your dedication to GLOBE!

Most Sincerely,

Deanna TeBockhorst
Colorado Partner

John Ristvey
Director, UCAR Center for Science Education

GLOBE Annual Meeting Co-Chairs

THE **GLOBE** IMPLEMENTATION OFFICE

Dear Friends,

Welcome to Estes Park, Colorado, and the 20th GLOBE Annual Partner Meeting. The GLOBE Implementation Office (GIO) is delighted to be co-hosting this event with GLOBE Partners Deanna TeBockhorst and the University Corporation for Atmospheric Research (UCAR) Center for Science Education Director John Ristvey.

We are enjoying a very special location for this year's event, adjacent to Rocky Mountain National Park, one of the jewels of the U.S. National Park Service (NPS). The U.S. National Parks are celebrating their Centennial this year -- 100 years of protecting, and providing visitors access to, some of the most spectacular land in America – and we are working with Rocky Mountain National Park staff to showcase its beauty during the meeting.

U.S. Partners, Country Coordinators, teachers, scientists, academics, government officials, students and supporters from all corners of the globe… this is our time together. What a wonderful opportunity we have to reunite with old friends and to make new ones; to learn more about regional activities and GLOBE Protocols and student research; to engage in conversation that may lead to new avenues of exploration and collaboration; and (if you are lucky!) to encounter, purely by chance, something entirely unexpected. These are the experiences that I hope you will have this week, here in this beautiful valley in the Rocky Mountains of Colorado.

I would like to thank our sponsors NASA and the National Science Foundation (NSF) for their unfailing loyalty to the Program and for providing GLOBE with the means to nurture the next generation of scientists, other STEM professionals, and environmentally literate citizens. GLOBE students will be tasked with finding solutions to many environment challenges in the years ahead. The knowledge and tools they possess from their exposure to the GLOBE Program gives them a creative advantage in their attempts to find answers, locally and globally, to the demands of our stressed planet. Our sponsors recognize this and they continue to support us. We also appreciate the enduring support of the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Department of State.

To all our sponsors and supporters and to you, the GLOBE community, the many individuals who enrich GLOBE with your unique perspectives and good work, I want you to know just how much I appreciate your efforts…each and every one of you. You inspire me with your dedication and you have confirmed what has led me on my own path to GLOBE -- the recognition that we're all in this together!

Sincerely,

Dr. Tony Murphy
Director, The GLOBE Implementation Office

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

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2ND DISTRICT, COLORADO

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House of Representatives

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NATURAL RESOURCES

STEERING AND POLICY
PARLIAMENTARIAN

Dear Colleagues and Friends:

Welcome to the 20th Annual GLOBE Meeting and Student Research Experience! The next few days are a time to acknowledge your past successes and examine our current challenges in the global environment, as well as develop stronger ideas and relationships.

This will be a week dedicated to creating lasting memories with new and old friends, of inspiring each other to think and dream big, and most importantly, of uniting around the shared goal of teaching and learning environmental literacy and stewardship. You will share skills, build stronger coalitions, and conceptualize a more creative approach to the critical issues our world faces today.

Thank you all for your hard work to shape a more environmentally conscious society. I wish you all the best during this important week, and I look forward to the progress we will make throughout the years to come.

Yours Truly,

Jared Polis
Member of Congress

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

June 27, 2016

Reply to Attn of: SMD/Earth Science Division

Welcome to the 20th GLOBE Annual Meeting!

First of all, thank you for joining hands together in celebrating GLOBE's 20th anniversary. Over the past two decades, GLOBE has reached over ten million students in 117 countries, and fostered worldwide interest in Earth and environmental research, international collaboration, and cultural exchange and enrichment. In scope large and small, many of you have launched special activities in your country or region to mark the 20th anniversary. It's your dedication and hard work that has made GLOBE an essential component of education for sustainable development and an impressive network of students, teachers, and scientists working together to understand, sustain, and improve Earth's environment.

As we begin the next 20 years of worldwide implementation of GLOBE, I want to highlight a few initiatives undertaken by NASA. We have revised and updated the GLOBE Teacher's Guide and added new features to provide educators with enhanced navigation tools. A new mobile app was developed to facilitate student data reporting and enhance the GLOBE database for students' and scientists' research. GLOBE launched a new and improved website that includes simplified navigation and expanded features for collaboration within the GLOBE community. In addition, NASA is expanding the GLOBE data and information system to accept data from citizen scientists in GLOBE partner countries with a new app, GLOBE Observer. We are particularly interested in retaining GLOBE alumni after they leave school and continue in higher education and professional careers so that GLOBE is an integral part of their lifelong learning. We are excited about these new initiatives and believe that GLOBE is well poised for rapid growth with our continuing commitment to education and environmental stewardship and the expanding interest in crowdsourcing data.

I am also pleased to inform you that NASA will continue the cooperative agreement award on the GLOBE Implementation Office at the University Corporation for Atmospheric Research for another two years. Thanks to Dr. Tony Murphy for his outstanding leadership and dedication to GLOBE.

Finally, I thank Ms. Deanna TeBockhorst and Mr. John Ristvey for hosting this annual meeting in Colorado, and the entire planning committee for the fabulous program awaiting us. I wish all of you a safe and productive week here in Estes Park.

Sincerely,

Ming-Ying Wei, Ph.D.
GLOBE Program Manager

National Science Foundation
Directorate for Geosciences
July 2016

Message from the Geosciences at NSF

Dr. Brandon Jones

On behalf of the Assistant Director, Dr. Roger M. Wakimoto, it is my honor to bring greetings and best wishes from Washington, DC, to everyone attending the 20th GLOBE Annual Partners Meeting in Estes Park, CO. We hope you enjoy your visit to the gateway of the iconic Rocky Mountain National Park!

There is only one Earth. We are all here together, interacting daily with the physical and living environments that surround us. Perhaps the most critical of these environments is our social realm. Whether direct or indirect, constant interaction with other Earthlings places us in a solution-oriented mode that should focus on sharing and partnering. The constant environmental concerns impacting our planet highlight the necessity of reasoning together to ensure the existence of future generations on planet Earth.

This is the hallmark of GLOBE. By developing, improving and sustaining a 20 year platform for discovery, data sharing and partnering, GLOBE has opened the way for individuals around the world to *do* science so that knowledge advances and solutions are created. To this point, at this year's annual meeting, the GLOBE community will celebrate those who have embodied the spirit of GLOBE through demonstrated and long term commitment that has been critical to the success of the program.

To every student researcher, teacher, scientist, partner or sponsor - best wishes to you all for a successful meeting!

M. Brandon Jones

Brandon Jones
Program Director for GEO Education and Diversity

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

June 10, 2016

Message from Education at the National Oceanic and Atmospheric Administration (NOAA)

Christos Michalopoulos

On behalf of the Director of NOAA Education, Louisa Koch, I offer you both best wishes for the 20th Annual GLOBE Meeting and sincere thanks for your notable efforts to advance understanding of Earth science around the world.

We are excited about the additions and improvements made, or underway, to the capabilities of the Program. The launch of protocol eTraining fills a longstanding need to increase the reach of GLOBE by supplementing the in-person trainings. NOAA is fully committed to the field of citizen science and we are supportive of expanding GLOBE to broader audiences. We have also been very impressed by the efforts and progress coming out of the Working Groups. We offer our heartfelt thanks to all of you serving on these groups for your hard work and commitment to the Program.

We at NOAA are believers in the power of science fairs to encourage and recognize student research. We offer our congratulations to the winners of this year's expanded suite of GLOBE science fairs. We are looking forward to meeting the GLOBE students presenting their research projects this week.

We are glad to serve as a Supporting Agency working in partnership with the Sponsoring Agencies, the GLOBE Implementation Office, and you – the GLOBE Community. It is a tribute to the dedication GLOBE inspires that Dr. Jill Karsten of NSF has continued her involvement with the Program after her retirement. We are also looking forward to working with Dr. Brandon Jones in his new role at NSF. Finally, we feel a significant debt of gratitude to Dr. Ming-Ying Wei of NASA for her steadfast commitment to GLOBE. Her unwavering dedication and support is a major reason for the Program's continued success.

GLOBE activities serve as meaningful components of a number of the projects funded through NOAA's Environmental Literacy Grants and Bay-Watershed Education and Training Programs. The latter has even called out GLOBE as an area of special interest in its most recent funding opportunity for the Chesapeake Region.

We are excited for the opportunity to interact and share with you during what promises to be an outstanding meeting.

Sincerely,

Christos Michalopoulos
Deputy Director of K-12 & Informal Education

United States Department of State

Bureau of Oceans and International Environmental and Scientific Affairs

Washington, D.C. 20520

June 24, 2016

Message from the United States Department of State

Ambassador Judith G. Garber

Welcome to Colorado, and thank you for all your hard work and dedication to making the GLOBE program a success. I hope you have a great experience this week participating in the activities planned for the GLOBE Program's 20th Annual Partners Meeting.

The Department of State has been a proud supporter of the GLOBE Program from its launch in 1995. It is wonderful to see the progress made since then, with over 66,000 teachers trained and more than 10 million students in 117 countries participating in GLOBE thus far. We're excited to welcome Brazil, Mauritius, and Vietnam to the program this past year. And with the total number of data entries increasing from 120 million to over 135 million last year, we can tell that you have been busy!

The measurements and research conducted by GLOBE participants play an important role in both tracking the changes we are observing in our Earth systems, as well as training the next generation of scientists and leaders in our global responsibility for monitoring and reducing our impact on the environment. This information helps us all to better understand and address climate change, a challenge that confronts all our nations. As Secretary of State John Kerry said, "Climate change is a monumental test of global leadership. It transcends borders and economic status."

I join my colleagues from NASA and the National Science Foundation in offering my appreciation to the members of the GLOBE Implementation Office for their work on the future development in GLOBE. With such a strong legacy behind them, we look forward to seeing how GLOBE can continue to play an important role in education worldwide.

Sincerely,

Judith G. Garber
Acting Assistant Secretary

FEATURED SPEAKERS

Sunday
11:30 am – Ballroom

Vector Borne Diseases
(in Preparation for GLOBE
Mosquito Protocol Training)

Dr. Mary Hayden
NCAR Behavioral Scientist

Dr. Mary Hayden (NCAR) is a behavioral scientist with over 13 years of experience working on weather, climate and health related linkages. She received her PhD in Health and Behavioral Sciences in 2003 from the University of Colorado and is adjoint faculty at the University of Colorado School of Public Health as well as a Guest Researcher with the U.S. Centers for Disease Control and Prevention. Her primary research emphasis is on the human behavioral component of climate-sensitive health and disease issues, including community participatory research and the characterization of population vulnerability to weather and climate related health threats. Her current work focuses on improving health outcomes related to human plague in East Africa through enhanced surveillance; assessing the human behavioral role in the potential for the dengue vector mosquito *Aedes aegypti* to expand its range in the Americas; and addressing current adaptive capacity and future societal resilience to extreme heat vulnerability in North America. Mary also works on projects that are focused on better understanding the transmission dynamics of meningitis in the Sahel of Africa and malaria in Kenya.

Monday
8:00 am – Ballroom

Appreciating the Critical Role of Science as we Celebrate the National Park Service Centennial

Therese Johnson
Director
Continental Divide Research Learning Center
Rocky Mountain National Park

Therese Johnson is the Director of the Continental Divide Research Learning Center at Rocky Mountain National Park. Born and raised in Colorado, she has a passion for nature, science, and connecting science to management.

Therese earned a B.S. in Wildlife Biology in 1985 and M.S. in Rangeland Ecosystem Science in 1995, both from Colorado State University. She has worked for the National Park Service since 1983, including assignments at the Denver Service Center, Denali, Yellowstone, and Bryce Canyon.

She has had the good fortune of working on a variety of natural resource topics, including threatened and endangered species management, vegetation and wildlife monitoring, air and water quality, and ecosystem restoration. Therese came to Rocky Mountain National Park as a biologist in 1993 and spent 22 years focusing primarily on issues related to managing elk and their habitat before joining the Research Learning Center in 2015.

Wednesday
6:30 pm – Ballroom

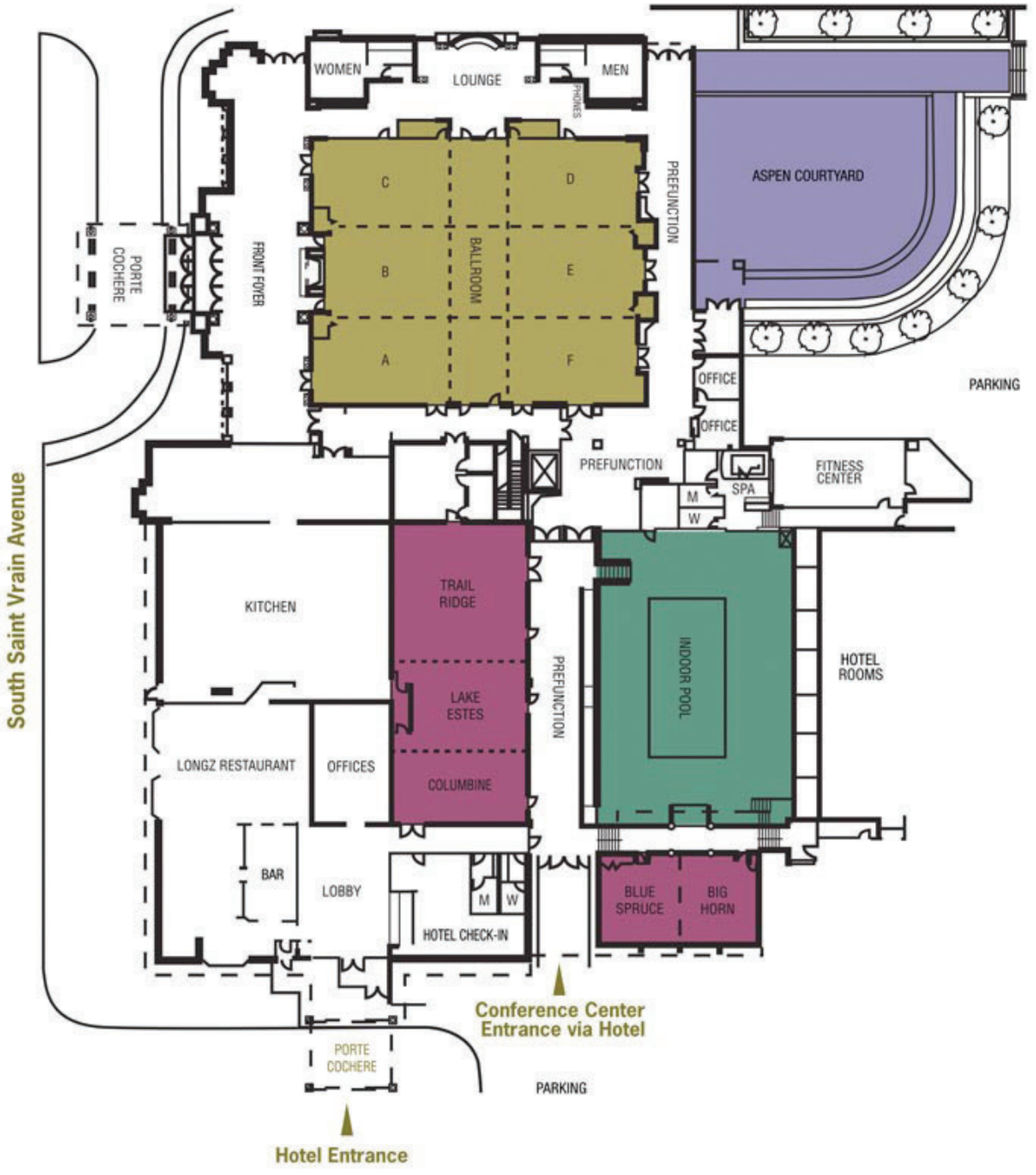
Beyond the Globe: Turning Questions Into Discovery

Allison Barto
Program Manager
James Webb Space Telescope
Ball Aerospace

Allison Barto is the Program Manager for the James Webb Space Telescope (JWST) at Ball Aerospace where she leads the team responsible for delivering the optics and electronics for the 22-foot-wide telescope. When it launches to orbit the Sun one million miles from Earth in 2018, JWST will be the most sensitive, largest aperture space telescope ever flown. It will be capable of imaging the first light in the Universe and detecting signatures of life in the atmospheres of extra-solar planets. Spanning a career of nearly 20 years' work in Civil Space, Allison has worked on Hubble Space Telescope science instruments and a large ground-based telescope under construction in Chile in addition to her over 14 years developing the Webb telescope. Before joining Ball Aerospace Allison performed research in General Relativity at NASA's Jet Propulsion Laboratory.

When not building the next generation of space telescopes Allison is actively involved promoting her passions in education, inquiry based learning, STEM, and educational equity and opportunity. She is currently Past President on the Board of Directors of the YWCA of Boulder County, which strives to eliminate racism and empower women and girls. During her time with the YWCA she has been especially committed to growing the organization's education initiatives including the Latina Achievement Support program, which provides at-risk Latina girls support to allow them to finish high school and pursue post-secondary education, and the Reading to End Racism program, which introduces topics of racism and inclusion through reading and discussions with K-8 children in the Boulder Valley School District. In addition to her YWCA work, Allison is a past board member of Boulder Valley Gifted & Talented, has participated as a panelist in programs related to creativity and inquiry based learning, and frequently shares space science and engineering through lectures and hands-on workshops for participants ranging in age from 5-85.

Conference Center



SUMMARY PROGRAM

Saturday, 16 July	Sunday, 17 July	Monday, 18 July
REGISTRATION OPEN **8:00 am – 8:00 pm** WORKING GROUP MEETINGS **9:00 am – 4:30 pm**	**8:30 am** Plenary Session: Welcome and Opening of the Meeting; Remarks from Partner Hosts; GIO Director; Sponsors	**8:00 am** Plenary Session: Announcements, Informal Meeting Topics and Locations, Welcome from City and Park Officials **8:30 am** Student Orientation **8:45 am** Plenary Session: What's New with Technology, eTraining, Undergrad Research Project Findings
	AM BREAK 10:10-10:30	**AM BREAK 10:00-10:30**
	10:30 am Plenary Session: GLOBE Working Groups Reports; Students Set Up Poster Presentations **11:30 am** Keynote Address	**10:30 am** Concurrent Sessions: Country Coordinator Meeting, US Partner Meeting
	LUNCH 12:15-1:00	**LUNCH 12:00-1:00**
	12:15 pm Exhibits Open **1:30 pm** Concurrent Sessions: Collaborating Satellite Missions & Campaigns, Share-a-Thon with Elementary GLOBE, Results of the 2015-2016 GLOBE Teacher Survey	**1:00 pm** Student Orientation Continues **1:30 pm** Concurrent Sessions: Integrating GLOBE and NASA Resources, GLOBE Science Fairs, Implementing GLOBE in Your Classroom
	PM BREAK 3:00-3:30	**PM BREAK 3:00-3:30**
	3:30 pm Concurrent Sessions: Protocol Demonstrations, SciGirls and GLOBE, Implementing Elementary GLOBE Aerosols	**3:15 pm** Student: GLOBE Data Activity **3:30 pm** Concurrent Sessions: eTraining, GLOBE in Your Country, Equity and STEM
6:30 pm Opening Networking Event	**6:30 pm** 4th Student Research Exhibition and GLOBE Community Poster Presentations	**5:00 pm** Free Evening Time to Network and Explore Local Sites **6:30 pm** Optional Activities

Tuesday, 19 July	Wednesday, 20 July	Thursday, 21 July
8:00 am Students depart for RMNP*; Plenary Session: Announcements, Informal Meeting Topics, Protocol Training RMNP*	**8:00 am** Plenary Session: Announcements, Informal Meeting Topics, Protocol Training RMNP*	**8:00 am** Plenary Session: Announcements
8:30 am Concurrent Sessions: Equity and STEM, GLOBE Science School in the Netherlands	**8:30 am** Concurrent Sessions: Alternative Funding, Phenology Campaign	**8:30 am** Student Presentations
AM BREAK 10:00-10:30	**AM BREAK 10:00-10:30**	**AM BREAK 10:00-10:30**
10:30 am Concurrent Sessions: African Expeditions, Implementing GLOBE in Your Classroom, What's New on the GLOBE Website	**10:30 am** Concurrent Sessions: GLOBE Data Explorations, Reflections on Protocol Training Experience	**10:30 am** Plenary Session: The Year Ahead with GLOBE.
LUNCH 12:00-1:00	**LUNCH 12:00-1:00** (Video @ 12:30)	**LUNCH/DEPART 12:00**
1:00 pm Protocol Training RMNP*	**1:00 pm** Protocol Training RMNP*	**1:00 pm** Working Group Meetings Continue
1:30 pm Concurrent Sessions: NASA Web Resources, GLOBE Data Explorations, GLOBE in Universities/Community College Setting, GISN*	**1:30 pm** Concurrent Sessions: Citizen Science Panel, My NASA Data, Reflections on Protocol Training Experience	**1:30 pm** Optional Guided Tour through Rocky Mountain National Park ($$)
	PM BREAK 3:00-3:30	
3:00 pm Free Afternoon **3:30 pm** Optional Guided Tour through Rocky Mountain National Park ($$)	**3:30 pm** Concurrent Sessions: GLOBE Observer, Online Training Panel, New GLOBE Protocol Matching Satellite Data	
5:00 pm Free Evening Time to Network and Explore Local Sites **6:30 pm** Optional Activities	**6:00 pm** Group Photo **6:30 pm** Closing Networking Event and Keynote Address	*RMNP Rocky Mountain National Park *GISN GLOBE International STEM Network

Youth
Learning
As
Citizen
Environmental
Scientists

Technology Drawing

Do you have the GLOBE Data Entry App or the GLOBE Observer App on your phone or tablet? To encourage installing and using these new apps, Youth Learning as Citizen Environmental Scientists (**YLACES**) is sponsoring a drawing! There are three ways to get your name in for the drawing:

1. Download the GLOBE Data Entry App
2. Download the GLOBE Observer App
3. Make a cloud observation via the GLOBE Observer App

Once you have installed the apps or made a cloud observation, bring your mobile device to the Tech Support room (Ballroom A) and show it to one of the GLOBE Implementation Office technology team (Julie, Travis, Roller, or Eslam). Each attendee of the GLOBE Annual Meeting will receive up to three tickets for the drawing entries.

Winners will be drawn at the banquet on Wednesday night, so make sure to get your name in before 5:00 pm on Wednesday. Each winner will receive one Infrared Thermometer and one Digital Max/Min Air and Soil Thermometer.

Thank you to **YLACES** for generously providing the equipment.

GLOBE Student and Community Poster Session Abstracts

1A:

St. Francis Xavier Catholic School, Gettysburg, Pennsylvania
Presentation Title: The Effect of Land Use on Water Quality
Teacher: Amy Woods
Student: Madison Sieg

How does land usage affect the water quality of Rock Creek? The effect of land usage on the health of the stream was tested. The independent variable is the stream testing location. The dependent variables measured are dissolved oxygen, nitrates, pH, water temperature, conductivity, and water transparency over a period of five weeks. The controls are the day and time of testing, and how samples are collected and tested. Results were analyzed and compared to land use using FieldScope 5.0. The results support the hypothesis stating if the testing site is changed from rural upstream, upstream wastewater treatment plant, downstream wastewater treatment plant, and downstream rural that passed through town, then the chemical parameters that indicate stream health, would be in the healthiest range upstream rural because as the water is moving downstream into the city the stream may pick up more waste and pollutants from the land use and other merging streams as it travels through the town. A future experiment involves extending the testing process to determine the track patterns in changes of season and specifically involving weather events and resulting land use, tracking rainfall, blasting, wastewater discharge, alkalinity, and evaluating stream and watershed geology. *(Poster and Power Point Presentation)*

1B:

Roswell Kent Middle School
Presentation Title: How Does Asphalt Affect Soil Temperature
Teacher: Steven Frantz
Student: Suzanna Patia Vang

The purpose of this project was to find out if a surface with a high albedo (the amount of light energy that is reflected) such as asphalt affected surrounding short-grass soil temperature. The hypothesis was the closer the soil is to the asphalt the warmer the short-grass soil temperature will be. The GLOBE Program protocol for collecting soil temperature was followed using a Taylor 2" Bithermal Dial soil thermometer, spike, and Garmin eTrex Venture GPS unit. Four data collection points were identified at the site, which was at the teacher's parking lot, at the edge of the asphalt, five meters and ten meters away from the asphalt into the short-grass. The data was also collected 5 centimeters and 10 centimeters into the short-grass soil, at each site. The data supported the hypothesis 12 out of the 12 days data was collected. The data was collected for 12 consecutive days, during the month of November. Several factors during the 12 days affecting the data were snow, ice, and rain. The data, however, showed there was minimal affect snow, ice, or rain had overall. Other relevant research can be done in the future such

as extending planting seasons in close proximity to asphalt areas, further understanding the transfer of heat from asphalt areas to surrounding short-grass areas, or coloring asphalt a lighter color in an attempt to minimize this phenomenon.

2A:

Princess Chulabhorn Nakornsrithammarat
Presentation Title: Seasons and Climatic Factors Affecting Dengue Cases in Muang Nakhon Si Thammarat, Thailand
Teachers: Kanokrat Singnui and Mr. Sutep Nusen
Students: Phuwadon Noradin, Thiranai Keatpimol, Thanayot Muangkeaw

This study investigated climatic factors affecting dengue cases and house index in Nakhon Si Thammarat, Thailand. We randomly selected 32 households, and collected mosquito larvae from indoor and outdoor water containers. We identified Aedes aegypti, and Ae. albopictus larvae up to species level under microscope. We compared dengue cases between wet and dry seasons during 2011-2015. The results showed that dengue cases in the wet season were higher than in the dry season. Relative humidity was positively correlated with dengue cases in this area. From the mosquito larva data collected in March 2016, Muang Nakhon Si Thammarat had house index of 59.38% for Ae. aegypti larvae and 62.50% for Ae. albopictus larvae. This indicated that Muang Nakhon Si Thammarat is the dengue high risk area according to the WHO standard for dengue risk area. *(Power Point Presentation)*

2B:

Prirodoslovna i Graficka Skola
Presentation Title: Determining the Presence of Heavy Metals in the Air by Using GLOBE Protocols for Aerosols, Conductivity and pH
Teachers: Marina Pavlić, Irena Sabo
Students: Dino Bešić, Sarah Butigan

Aerosols are solid or liquid particles or both, suspended in air with diameters between about 0.002 µm to about 100 µm. Aerosol particles vary greatly in size, source and chemical composition. Some of the components are heavy metals, which can be measured by GLOBE protocols. We used the method of moist sedimentation to acquire a sample of air in Bakar, and then analyzed it with GLOBE protocols. We were inspired to use this method when the citizens of Bakar invited us to see the big black blot in the middle of The Bakar Bay and the black particles in their homes. As we collaborated with them investigating the sea, soil and the bottom of the sea in our previous projects, we determined that the pollution was coming from the air. We decided to investigate the quantity of suspended particles (aerosols) in the air and determine their chemical composition. Analyzing the samples we concluded that the sample with heavy metals had higher pH and conductivity levels than normal. By tracking the aerosols, air temperature and rainfall, our data showed that the aerosols are highest when temperature and rainfall levels were low. This method could help more GLOBE researchers to study heavy metals in air.

3A:

Bowling Green State University
Presentation Title: Soil Moisture-From Within & Above Bowling Green State University
Teacher: Dr. Jodi Haney
Students: Bonnie Altstaetter, Logan Bretz, Emma Constance, Janelle Mangen, Kim Wheatley, Beth Zeno

In the environment, soil moisture influences multiple parts of the atmosphere. Understanding soil moisture in specific locations allows predictions for floods, droughts, weather forecasts, carbon cycles, and crop productivity. Soil moisture is different everywhere; therefore, it is important to understand that these variations can result in different weather events, such as floods and droughts. The NASA Soil Moisture Active Passive (SMAP) Satellite, launched in January of 2015, measures global soil moisture from the top 5 cm of soil from space and GLOBE schools measure soil moisture from the ground, providing important validation data to NASA. This study investigated three primary research questions: How did soil moisture differ across nine testing sites located on or around the Bowling Green State University (BGSU) campus? How did The GLOBE Program soil moisture "bucket drying" method data compare to the standard oven drying method? How did the GLOBE soil moisture data compare to the NASA SMAP satellite data? Measurements were collected over an eight-week period across nine testing sites located on or around the BGSU campus. The GLOBE Program SMAP protocol was followed to determine the volumetric soil moistures. The "bucket" method of drying soil involved putting the collected cans of soil in a five-gallon bucket with a 250-watt heat lamp attached overhead. Both the "bucket" and oven drying methods reached a constant 75ºC and were baked at this temperature for a one-week period. Based on this data, it was concluded that irrigated land had roughly double the soil moisture of natural land. Perhaps BGSU could save money and other resources by decreasing their irrigation practices. There were no significant differences between the oven and bucket method soil moisture data. Therefore, if a school did not have the resources to use a soil oven, using the bucket method would be just as effective. Finally, the BGSU GLOBE soil moisture data was on average .04 ml/ml or 4% higher than the data that was collected by the NASA SMAP satellite, but the GLOBE and SMAP data followed a common trend over the entire eight-week time period. It appears that GLOBE data and the NASA SMAP data are well correlated. Further investigation would include data collection over a larger geographic region as well as collecting data on the same days as the SMAP satellite overpass.

3B:

Nanzan Girls' High School
Presentation Title: Prediction of Budburst Timing of *Quercus variabilis*
Teacher: Hayakawa Yoko
Students: Asanuma Asuka, Ude Harune, Ohsawa Rie, Ando Miki

Nanzan girls' high school is located in Nagoya City, the home of TOYOTA cars. There is a pond called Hayato-ike near our school. In our school, we have observed phenology

of the trees around us, such as Abemaki (*Quercus variabiris*) since 2009. Phenology is basically the study of plant and animal life and how it is influenced by seasonal climate change. We observe the Green-up and Green-down patterns of plants in our school grounds. We have examined the day of budding based on five years of observation.

4A:

National Taichung Girl's Senior High School
Presentation Title: The Monitoring of Soil Microorganisms
Teacher: Yu-Shan Chen
Students: Mei-Hsiang Yu, Yul-Chen Shih

Soil microorganisms are indispensable decomposers on Earth. To understand the effects of seasonal *change* in *soil microbial populations*, we monitored the growth of soil microorganisms in two nearby areas. The relationship between *populations* of soil microorganisms and environmental factors such as soil temperature, soil pH and soil moisture were demonstrated in this study. We use the temperature in soil and the rainfall data recorded from the GLOBE station in our school. By culturing soil microorganisms, *the predominant fungal* and *bacterial species* were determined. We show here that the same dominant species such as *Microsphaeropsis arundinis* and *Bacillus mycoides* were found in two nearby areas. In addition, both beneficial and harmful soil microorganisms were discovered at the same time. According to the scatter plots of microorganism *numbers* versus soil temperature, pH or rainfall, we found a significant *positive correlation* between microorganism *numbers and* soil pH. These findings provide valuable insights into understanding how seasonal *change* affects *populations* of soil microorganisms in Taiwan. *(Poster and Power Point Presentation)*

4B:

National Taichung Girl's Senior High School
Presentation Title: The Study About the Lasting Time of Contrails in the Air Affected by Atmospheric Environmental Factors of High Level
Teacher: Cheng-Chueh Liu
Students: Wei-Tung Hung, Tzu-Yung Yang

Contrails are traces forming when heat from airplanes is mixed with cold air in the flight altitude. Research shows that linear contrails have potential influences on climate. In this research, by analyzing the relationship between relative humidity, temperature and the time they remain in the air, we hope to obtain reference materials that can be used in the future meteorological research, which enables data to be more complete and accurate.

We use the everyday data recorded from the GLOBE station in our school, and also setting up a time lapse camera to capture the images of contrails. With the data of the temperature and the relative humidity by analyzing Skew-T, scatter charts are drawn to help analyze the relationship between our data.

In our research, we find that the temperature and the humidity have some impact on the time contrails stay in the air. When the temperature is below -40°C, lower temperature leads to longer time that contrails stay in the air. However, when the temperature is above -40 °C, the contrails will last a longer time as temperature increases. As for the relative humidity, higher relative humidity will result in longer lasting time of contrails. *(Poster and Power Point Presentation)*

5A:

Ida Middle School
Presentation Title: Got Moles? What Type of Soil Do They Live In?
Teacher: Lanna Harmon
Student: Timothy Czajkowski

Moles are a problem in the area where I live. The purpose of this project is to figure out what type of soil moles like to live in the best. I looked at soil type and soil moisture. I thought that moist clay and silty soils would have the most moles. I surveyed friends of my family to see if moles were a problem in their yards. I collected soil samples for each yard and analyze them for SMAP soil moisture and soil texture. I found that the soils with more sand had the most moles.

5B:

Garfield High School
Presentation Title: The Effects of Climate Change on Bird Population
Teacher: Mrs. Binkely and Mr. Frantz
Student: Leah Stanevich

The question of how climate change has been affecting bird populations is often asked by scientists. In this study, two globally common species populations, Mute Swan (Cygnus Olor) and Mallard (Anas Platyrhynchos), were studied and compared to temperatures from the United States and Ukraine. (Population data was also taken in these regions, North America and Ukraine.) The hypothesis for this study was if the temperatures have increased from the year 1985-2015 in both the United States and Ukraine, then there will be an impact on the population of mute swan and mallard in both regions. After collecting temperature data and bird population data in both the Ukraine and North American, there was a clear increase in temperatures, mallard and mute swan population in both of the regions. This was found to be due to the warming temperatures causing an increased precipitation level which is providing more natural habitat for these species to live. The results of this research study have supported the hypothesis. By doing more research, it was found that due to warming temperatures causing increased precipitation, habitats for the waterfowl are known to grow, thus populations grow. By collecting long term data and comparing more species population should confirm the validity of this project.

6A:

Um Hani School
Presentation Title: Investigating the Effect of Treated Wastewater on Soil Comparing to the Effect of Other Water Resources in Samail
Teacher: T. Nawar Mohammed Al Rawahi
Students: Maryam Yahya Al Sarmi, Bara'ah Rabeil Al Dughaishi, Sara Saif Al Selemi

The purpose of this study was to investigate the effect of treated wastewater on soil comparing with other water resources in Samail. So need to answer the following research questions: 1. What is the effect of treated wastewater on soil? 2. What is the difference between the effect of treated wastewater and the other water resources on soil in Samail?

Samples of water (treated wastewater, falajs, wells and desalinated water) and soil, which were irrigated with these types of water, were taken. Then, water protocol was applied to these samples to measure transparency, electrical conductivity, salinity and the pH in order to compare them. Soil protocol was also applied to measure conductivity, salinity and pH of different soil resources to find out the differences between soil samples.

The findings show that the recorded values of transparency, conductivity, salinity, and pH for treated wastewater are similar to those of other water resources. Moreover, the results show that the effect of treated wastewater on soil does not differ very significantly from the effect of other water resources.

6B:

Hafsa bint Sereen School, Alkhawarzme School
Presentation Title: Study the Water Quality and Validity in Tankers in Buraimi State
Teachers: T. Fatma Ali Ahmed Alkindi, T. Ibraheem Habeeb Albuloshi
Students: Meetha Salem Ali Alghaithi, Mariam Mohammed Rashid Alnaimi

This study aims to determine the Water quality and validity in tankers in Buraimi state. The research questions are what is the extent of Water artesian wells quality before bottling tankers, what is the extent of the water quality after bottling tanks and water quality after the arrival of the tanks of houses and suitability for drinking. It will be through interviews and taking measurements of salinity and conductivity, transparency, temperature and acidity as well as the proportion of chlorine in different locations these are (artesian wells, reservoir Synthesis, distributional reservoir, water tankers and tanks homes) in cooperation with the Public Authority for Electricity and Water staff. We reached the following results: the values of conductivity close to all the samples but the values of transparency more than 120 which means that the water is very transparent and the pH value range between seven and eight. While in some of the homes reservoirs reached nine a proportion that is drinkable. The proportion of chlorine in the range recommended by the Omani specifications which is (0.2- 0.5 mg / L). The recommendations of the research are: The Public Authority for electricity and water educate consumers and students in schools need to inspect the reservoirs at home and ensure safety and lack of pollution, and educate consumers to check the network inside their houses which could be too old or dilapidated and could change water quality.

7A:

Roswell Kent Middle School
Presentation Title: A Comparative Study of Surface and Air Temperature in Short Grass
Teacher: Steve Frantz
Student: Zack Shumway

The purpose of my project is to find the relationship of air and surface temperature by comparing and sharing data. If the air temperature has a direct weather affect to the surface temperature in one area then in that area we can better understand the climate.

All of the tools that were used in my experiments. including the Fluke 63 infrared Reading Thermometer and the Air Temperature Air Thermometer protocols can be found in the GLOBE Program website.

For my results from the graphs that were made after comparing the data that was collected the hypothesis was correct by saying that that the air temperature has a direct relationship with the surface temperature. All the air and surface temperatures averages were about two degrees apart. So all the data that was taken supports the hypothesis.

For the conclusion this is what was found out by doing the experiments. The hypothesis was correct saying that the air temperature has a direct relationship with the surface temperature in my hypothesis. After taking a week's worth of data you can very well see that the air temperature is very similar to the surface temperature averages. But the hypothesis was not correct by saying the ground absorbs heat because depending on the season is what affects the way the air affects the surface temperature. So, because all of the data were in the months of November, December, and January. This is why the air temperature was so cold. If data was compared in the summertime the air temperature would be warmer than the surface temperature.

7B:

Irving STEAM Magnet, Los Angeles Unified School District
Presentation Title: Do Satellites Provide Accurate Measurements
Teacher: Maria Mancia Instructional Support: Henry Ortiz
Students: Eghosasere Michael Asemota, Asenat Pantoja Martinez

As 6th grade students at Irving STEAM Magnet Middle School, we recently discovered the GLOBE website which revealed the measurements of the Soil Moisture Active Passive (SMAP) satellite. We were amazed by the data we saw, particularly that there is a lot more moisture than we actually imagined there would be given California's current drought crisis. Since this area of Los Angeles contains so much underground moisture, we wondered how much moisture might exist in the topsoil at our school's site in the northeastern region of the city. We decided to compare and contrast our calculations of soil moisture to that of the SMAP satellite readings. We gathered soil samples from the center of the school's campus at a rate of three days per week for five weeks. We placed

Delmhorst soil moisture sensors in the ground in the same location on campus as the collection site to calibrate our readings of the soil we collected with the soil in its natural habitat. Initially, we analyzed the collected soil samples using the SMAP soil moisture protocol. Once we developed our calibration curve, we used the Delmhorst sensors in lieu of SMAP protocol to facilitate data collection. To determine the water weight within the soil, we weighed the soil using an electric scale. We measured the weight of our samples upon initial collection of the soil, and continued to periodically weigh the sample as it dried over 48 hours. This allowed us to identify the weight of the water that naturally exists in the soil by subtracting the dry soil data and weight of the container from the initial soil sample measurements. Finally, to test the consistency and validity of the SMAP data, we compared our soil moisture data to SMAP's data. The online Excel program facilitated our work by showing the relationship between the calculations.

8A:

H2yOu Project, University of Toledo
Presentation Title: Surviving Antarctic Extremes: Inspiring Students to Collect GLOBE Data and Share GLOBE Water Stories on the H2yOu Project
Students: 5th and 6th Graders at Wildwood Environmental Academy
Community Presenters: Laura Schetter, Kevin Czajkowski, Janet Struble, Sara Mierzwiak

What extreme measures would you go to for collecting GLOBE data? Laura Schetter went to the bottom of the earth to collect data from Antarctica! She submitted the data into GLOBE and also collected water stories for the H2yOu Project. She created the H2yOu Project, using the power of storytelling to connect people from all over the world to water and each other. Students can share their stories about what water is like where they live, after collecting GLOBE water data! Student story-telling adds a literacy layer to students' scientific research. What's your water story?
H2yOu: connecting water to you!

8B:

Institute for Earth Observations at Palmyra Cove
Presentation Title: GOES-R Global Weather Watchers: An Earth SySTEM Project
Community Presenter: John Moore, Project PI, 2015 GLOBE Distinguished Educator Fellow, GISN

Weather is a subject that every individual in every nation faces each day. The Global Weather Watchers project will add another collaborative project to the GLOBE Classroom, a chance to develop content, collaborate in data collection, conduct joint investigations, and learn from each other the variations of weather around the world. The GOES-R satellite, scheduled for launch in November 2016, will be the first geostationary satellite introduced within the GLOBE collaborating satellite missions. The project will create pathways for teachers and students to engage a more in-depth study and investigation into satellites and remote sensing and the "SEES" Model.

9A:

The Nigerian Space Agency Center for Goedesy an Geodynamis, Nigeria
Presentation Title: Bringing GLOBE Satellite Mission Partnerships to Students in a Traditional Nigerian City
Community Presenter: Oluwafemi Olawale and Oluwafemi Olasoji

Since Nigeria signed the GLOBE Agreement on July 15th 2002, none of it research centers has introduced GLOBE protocols as training procedures to University students that are on internships (Industrial Training). The Nigerian Space Agency Centre for Geodesy and Geodynamics, Toro, Bauchi, Nigeria trained three Geophysics students from the Abubakar Tafawa Balewa, Univerisity, Bauchi, that are on six month internships on Soil Moisture Active Passive (SMAP) and Global Precipitation Measurement (GPM). Omega Academic Grammar Schools were also involved in the Surface Temperature Field Campaign and Cloud observations. The hands on training inspired the students.

9B:

The GLOBE Science Working Group

The GLOBE Science Working Group was developed to support scientific activities of the GLOBE Program and help guide the GLOBE program from a scientific perspective offering input to the GLOBE Implementation Office (GIO) and NASA. The scope includes the GLOBE measurement protocols including reviewing proposed protocols such as the mosquito protocol this past year. The science working group also reviews instrumentation for scientific robustness (the aerosol sensors) and promote field campaigns (GPM, El Nino, SMAP, surface temperature and aerosols). The Science Working Group also helps with student research campaigns, engagement of scientists with GLOBE, and student research project competitions such as the Virtual Science Fair, etc. It has eight members representing all the GLOBE regions.

10A:

NASA Langley Research Center
Presentation Title: Statistical analysis of historical GLOBE aerosol optical thickness data
Community Presenters: Robert Bujosa, Dr. Margaret Pippin

The GLOBE Aerosol Protocol requires that students make an observation of sky color and visibility along with an aerosol optical thickness (AOT) measurement. According to the protocol, there is a relationship between AOT and sky conditions in a discrete range, although it is stated as an approximate and varied by local conditions. Using historical GLOBE aerosol data from 22 sites in five geographic regions, a statistical analysis was performed to determine an AOT range predicted from observed sky color and visibility. Based on the historical GLOBE data, inferring an AOT value with any confidence from sky conditions alone is not possible. However, there were distinct differences between geographic regions that can potentially be addressed in further studies.


GLOBE Countries
Africa
Asia and Pacific
Europe and Eurasia
Latin America and Caribbean
Near East and North Africa
North America

Our GLOBE Community

Special Recognition

GLOBE Distinguished Educator Fellows

2016: Dan Orobi, Homa Bay High School, Homa Bay, Kenya
Gary Popiolkowski, Chartiers-Houston Jr./Sr. High School, Pennsylvania, USA
2015: John Moore, Palmyra Cove Nature Park, New Jersey, USA

GLOBE International Virtual Science Fair

Judges:

Travis Andersen, GLOBE Implementation Office, Boulder, Colorado, USA
Sunita Bal, India
Dixon Butler, Dixon M. Butler Consulting, Silver Spring, Maryland, USA
Sylivester Chaisamba, Tanzania Meteorological Agency, Dar es Salaam, Tanzania
Sirilak Chumkiew, Walailak University, Thasala, Nakhon Si Thammarat, Thailand
Kevin Czajkowski, University of Toledo, Toledo, Ohio, USA
Lachezar Filchev, Space Research and Technology Institute, the Bulgarian Academy of Sciences (SRTI-BAS), Sofia, Bulgaria
Dorian Janney, NASA GPM Communications, Greenbelt, Maryland, USA
Krisanadej Jaroensutasinee, Walailak University, Thasala, Nakhon Si Thammarat, Thailand
Mullica Jaroensutasinee, Walailak University, Thasala, Nakhon Si Thammarat, Thailand
Ülle Kikas, University of Tartu, Institute of Environmental Physics, Tartu, Estonia
Ylliass Destin Lawani, Alumni Coordinator, Africa, Cocotomey, Benin
Julie Malmberg, GLOBE Implementation Office, Boulder, Colorado, USA
Peder Nelson, Oregon State University, Corvallis, Oregon, USA
Olawale Oluwafemi, Nigerian Space Agency's Centre for Geodesy and Geodynamics, Bauchi, Nigeria
Hannah Palmer, GLOBE Implementation Office, Boulder, Colorado, USA
Ana Beatriz Prieto, National University of Comahue, Buenos Aires, Argentina
Waleska Aldana Segura, Guatemala
Matt Silberglitt, WestEd, Berkeley, California, USA
Danielle de Staerke, Centre National d'Etudes Spatiales (CNES), Paris, France
Přemysl Štych, Charles University, Prague, Czech Republic
Hameed Sulaiman, Sultan Qaboos University, Muscat, Oman
Jessica Taylor, NASA Langley Research Center, Hampton, Virginia, USA
Nada Zikova, Charles University, Prague, Czech Republic

Drawing Winners:

U.S.

Title: **The Effect of Land Use on Water Quality**
School: St. Francis Xavier Catholic School
Location: Gettysburg, Pennsylvania
Teacher: Amy Woods

Title: **How Does Asphalt Affect Soil Temperature**
School: Roswell Kent Middle School
Location: Akron, Ohio
Teacher: Steve Frantz

International

Title: **Seasons and Climatic Factors Affecting Dengue Cases in Muang Nakhon Si Thammarat, Thailand**
School: Princess Chulabhorn Nakornsrithammarat
Location: Nakon, Srithammarat, Thailand
Teacher: Kanokrat Singnui

Title: **Determining the Presence of Heavy Metals in the Air by Using GLOBE Protocols for Aerosols, Conductivity and pH**
School: Prirodoslovna i graficka skola
Location: Rijeka, Croatia
Teachers: Marina Pavlić and Irena Sabo

GLOBE Working Groups 2016

Education (Representative/Country/Region)

B.C. Sabata, India, Asia and Pacific
Francis Wasswa N. Nsubuga, Uganda, Africa
Farid Hamdan, Israel, Europe and Eurasia
Martha Kinglsand, Argentina, Latin America and Caribbean
Henry Saunders, Trinidad and Tobago, Latin America and Caribbean
Audra Edwards, USA, North America
Yaquoub Yousuf Ali AL-Balushi, Oman, Near East and North America
Jessica Taylor, USA, North America
Tony Murphy, GIO Liaison and Chair

Evaluation (Representative/Country/Region)

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WM Tuder Senarathne, Sri Lanka, Asia and Pacific
Nektaria Adaktilou, Greece, Europe and Eurasia, Chair
Andrea Ventoso, Uruguay, Latin America and Caribbean
Siham Salman, Lebanon, Near East and North Africa
Tina Cartwright, USA, North America
Svetlana Darche, USA, North America
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Kristin Wegner, GIO Liaison

Science (Representative/Country/Region)

Sylvester Chaisamba, Tanzania, Africa
Olawale Ayodeji Oluwafemi, Nigeria, Africa
Mullica Jaroensutasinee, Thailand, Asia and Pacific
Danielle de Staerke, France, Europe and Eurasia
Claudia Caro, Peru, Latin America and Caribbean
Mohammed Benbouida, Morocco, Near East and North Africa
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Margaret Pippin, USA. North America
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Elzbieta Woloszynska-Wisniewska, Poland, Europe and Eurasia
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Maria Auxiliadora Portuguez Campos, Costa Rica, Latin America and Caribbean
Nadhirah Alharthy, Oman, Near East and North Africa
Scott Graves, USA, North America, Chair
Julie Malmberg, GIO Liaison

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(Representative/State/US Region)

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Steve Smith, Indiana, Midwest
Michael Griffin, Pennsylvania, Northeast and Mid-Atlantic
Anne Lewis, South Dakota, Northwest
Lynne Hehr, Arkansas, Southeast
Sherry Herron, Mississippi, Southeast
Angela Lodge, Florida, Southeast
Janelle Johnson, Colorado, Southwest

International Regional Coordination Officers

(Representative/Region)

Mark Brettenny, Africa
Desh Bandhu, Asia and Pacific
Bara Semerakova, Europe and Eurasia
Julio Cesar Durand, Latin America and Caribbean
Salma Al Zubi, Near East and North Africa

Estes Park Merchants

GLOBE wishes to thank the following Estes Park Merchants who contributed door prizes to the Annual Meeting.

Caramel Corn 144 E. Elkhorn Avenue
Estes Park Mountain Shop 2050 Big Thompson Avenue
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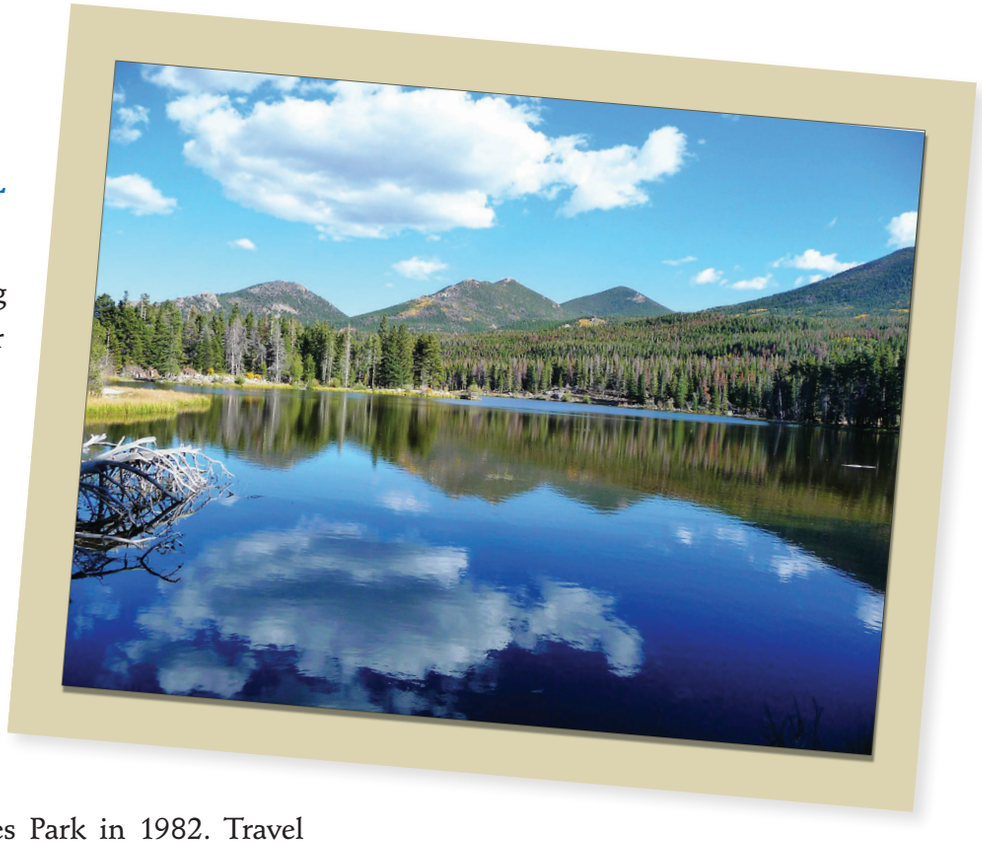
Golden Leaf Gallery, Inc. 145 E. Elkhorn Avenue
Rocky Mountain Tops 101 E. Elkhorn Avenue
Rustic Mountain Charm 135 E. Elkhorn Avenue

If you are downtown, stop by and say hello.

TOUR OF ROCKY MOUNTAIN NATIONAL PARK



Estes Park Shuttle is offering two opportunities to tour Rocky Mountain National Park during the week of the 20th GLOBE Annual Meeting. These four-hour informative tours of the Estes Valley and Rocky Mountain National Park will take you to the Lawn Lake Alluvial Fan to learn about the famous flood that damaged most of the downtown Estes Park in 1982. Travel through the Park will also take you on a tour of the Hidden Valley Ski area site, Many Parks Curve, Rainbow Curve, Forest Canyon Overlook, Rock Cut, and The Alpine Visitor Center. The tour will stop several times to allow for picture-taking opportunities.

Each van holds 14 passengers. (Additional vans may be added depending upon availability and interest.) The cost is $59USD per person and is payable at the time of booking. The vans will load at Rocky Mountain Park Inn (RMPI), the conference hotel.

Call now to reserve a seat. Estes Park Shuttle Tours contact information: +1-970-586-5151 or send email to estesparkshuttle@aol.com. Mention "GLOBE" to be included in this special tour for GLOBE Annual Meeting Participants.

Estes Park Shuttle Tour dates/times: Tuesday 19 July 2016 depart Rocky Mountain Park Inn (RMPI) at 3:30 pm; return to RMPI at 7:30 pm, $59USD Per Person. Thursday 21 July 2016 depart RMPI at 1:30 pm; return to RMPI at 5:30 pm, $59USD Per Person

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Bermuda

El Salvador

Japan

Micronesia

Poland

Tunisia

Bolivia

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