LIST OF ABSTRACTS

GLOBE Annual Conference is supported by: The GLOBE Program, National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), TEREZA Association, University Corporation for Atmospheric Research (UCAR), Colorado State University (CSU), U.S.Department of State, Ministry of Education of the Czech Republic, Ministry of Environment of the Czech Republic, KPMG Czech Republic, Carolina Biological Supply Company, Barclays, CALIPSO, CloudSat, Aura, and the GLOBE Program (CCAG), Czech Agricultural University. Conference media partner Is The Czech Radio

www.globe.gov, www.globe-europe.org,www.terezanet.cz

12	Current Scientist/Teacher/Student Collaborations in Atmospheric Science	David R. Brooks, Alan Czarnetzki, Wade Geery, Kelen Panec, Richard Roettger
13	GLOBE Implementation in Preservice Education at Prince of Songkla University	Naiyana Srichai
14	Budburst observation of Acacia harmandiana Gagnep. (Mimosaceae) at Nakhon Ratchasima, Thailand	Sompong Thammathaworn & GLOBE School teachers/Students in Nakhon Ratchasima
15	Environmental Programs Unite to Do "NHEET" Things for Teachers	Jennifer L. Bourgeault, Mimi L. Becker, Russell G. Congalton
16	Androscoggin County, Maine Land Cover Change Analysis: A Successful Collaboration	Russell G. Congalton, Jennifer L. Bourgeault, Mimi L. Becker
17	GLOBE Year 10 Evaluation Results	Bill Penuel, Willow Sussex
18	GLOBE ONE Evaluation Results	Willow Sussex, Bill Penuel
19	The CloudSat Education Network - A GLOBE/NASA Worldwide Partnership	Debra Krumm and Jennifer Lockett
20	The GLOBE Alumni International Network	Martin Pentson, Tomas Tunkl
, 21	Preliminary Study of a Special GLOBE Project on Monitoring the Recovery of Coastal Invertebrate Species after the December 2004 Tsunami using GLOBE protocols by Andaman schools of Thailand	Asst.Prof.Dr. Krisanadej Jaroensutasinee, Asst.Prof.Dr. Mullica Jaroensutasinee, Chairote Yaiprasert, Watcharee Ruairuen, Kanatawan Aungsakul, Yuthana Uraichuen, Sitthichai Kulsri, Watchapong Srisang1, Assoc.Prof.Dr. Jariya Suchareekul, Suwinai Mongkolthan, Yupaporn Tipjariyaudom, Watcharee Wattanapokasin, Dr. Sarah May, Prof.Dr. Martha Conklin, Dr. Pornpun Waitayangkoon
22	Graduate Students a key component for GLOBE success in K-12 environments	Ricardo Camacho, Juan López Garriga.
23	Fire training with Pre-service Teachers	Georgia Cobbs
24	GLOBE One Soil Temperature and Moisture Data – A resource for data analysis	Jim Washburne and Martha Whitaker
25	The GLOBE Surface Ozone Protocol: Advancements and New Directions	Margaret Pippin, Linda Bush, Irene Ladd, Jack Fishman
26	Trends and Distributions of Surface Ozone Measured at Czech GLOBE Schools	Bryana Henderson, Margaret Pippin, Jack Fishman
27	Why Care about GLOBE?	Elena B. Sparrow
28	GLOBE Urban Phenology Year Project Exemplifies Local, Regional and Global Collaborative Research	Elena B. Sparrow1, Michael White, Rico Gazal and Leslie Gordon
29	GIS and GLOBE in the Elementary Classroom	Barbara Manchee, Patricia Gaborski
30	Trends in the GLOBE Japan and representative inquiry activities in junior high school.	Tomoyasu Yoshitomi, Kyosuke Nakamura, Toshihiko Higuchi
31	Coastal Invertebrate Protocol - The Reincarnation of the Marine MacroInvertebrates Protocol	S. May, M. Conklin, M. Jaroensutasinee, H. List, S. Zeeman
32	New Technological Opportunities for GLOBE	Gregory Cox, Alabama USA, Feodor Surkov,
33	CALISPSH'AIR : A French educational project based on The GLOBE program.	Danielle de STAERKE, Eric ABGRALL, Sylviane DAILLET, Thierry PHULPIN
34	GLOBE and the Alabama Mathematics, Science and Technology Education Initiative	Gregory Cox and Robin Nelson
35	A New GLOBE Partner in Sonora, Mexico	Martha P.L. Whitaker, Jim Washburne, Ty P.A. Ferré, and Bart Nijssen
36	Surface Temperature and Soil Temperature Protocols; Observations, Partnerships, Science	Kevin Czajkowski, Alison Spongberg, Teresa Benko, Timothy Ault, Jason Witter, Takelia Bragg
37	Finding and Using Free, High Quality, Digital Resources to Support GLOBE Student Investigations	Dr. Edward E. Geary
38	GLOBE ONE: Providing a Model for a Project-based Approach	Peggy LeMone, John McLaughlin, and Sharon Sikora
39	Promoting Student Use of Landsat Satellite Imagery: Tutorial for Downloading Free Imagery and Updates to MultiSpec Software	Frank Niepold and John McLaughlin
40	The Clouds Online Teaching Module	Susan Gallagher, Kirsten Meymaris, Sharon Sikora, Becca Hatheway, Shannon Spencer, and Sandra Henderson
41	The GLOBE Trainer Certification Program: A Mixed Design	Sharon Sikora, Susan Gallagher, Sandra Henderson, Kirsten Meymaris, Becca Hatheway, and Shannon Spencer

42	ESPERE – Climate Information for schools	Dr. Elmar Uherek
43	Multi-regional leadership and Globe long term sustainability	Jana Ledvinová, Eng.
44	Fundraising and public relations strategies for Globe development	Jana Ledvinová, Eng.
45	Spineless Wonders or, What is that little wiggly thing anyway? A workshop on Macroinvertebrate Lives	Sarah May, Rebecca Boger, Martha Conklin
46	Young Earth Scientists at World Heritage sites: Space to learn science and gain conservation awareness among youth in developing countries	Jessica Bunning UNESCO and Teresa Kennedy GLOBE
47	GLOBE LEARNING COMMUNITIES	Dr. Teresa Kennedy, Mr. Gary Randolph, Dr. Sheila Yule
48	GLOBE Urban Phenology	Rico M. Gazal, PhD
49	GLOBE Egypt, a prospective view	Mohamed El Awadly
50	GLOBE Port Said-A case study	Mohamed El Awadly
51	GLOBE teacher, student, community cooperation	Henry Ortiz
52	Understanding GLOBE Student Data	Gary Randolph
53	Sustainability of the GLOBE program in Estonia	Ülle Kikas
54	e-LSEE project	Ülle Kikas
55	Towards a Next Generation GLOBE Web Site	Michael Turpin, Sandra Henderson, David H Brown
56	The GLOBE Program and Eco-Schools Project	Andy Tasker
57	The role of forests in global carbon cycling and global climate change	Jana Albrechtova
58	“River Watching" (Renaturisation of a little stream)	Hanspeter Meier
59	ASA- ProgramThree months of working and learning in Africa, Asia, Latin America and Southeast Europe	Silke Alsen
60	GLOBE FAMILY - STUDENT´S CONTACTS.	Hana Grundova, Iva Višova
61	GLC on Young Soil Doctor in Thailand	Assoc.Prof.Dr.Charlie Navanugraha
62	Science Projects in Los Angeles Classrooms: Implementing Air Quality Research as an Educational Tool	R. Turco, N. Enyedy, H. Ortiz, P. Lee, K. Crohn and N. Eisenberg
63	Bringing University Science to the K-12 Classroom: GLOBE in the City as a UCLA/LAUSD Collaboration	R. Turco, H. Ortiz, N. Enyedy, K. Crohn, N. Eisenberg and P. Lee
64	The new high school education standards in Germany - GLOBE can help to build up "competences"	Detlef Kaack
65	GLOBE Games in the Czech Republic – opportunity for cooperation at once in local communities and among countries	Dana Votápková, Ing
66	Globe activities in an Inuit country with a little and dispersed populations.	Ole Sivertsen
67	Establishing GLOBE as a Part of the Science Plan in a Large K-12 Urban School District: Los Angeles	H. Ortiz, R. Turco, N. Enyedy, P. Lee, K. Crohn and N. Eisenberg
68	Creating Opportunities for Synergistic Cooperation with a Large Urban Community	H. Ortiz, R. Turco, N. Enyedy, P. Lee, K. Crohn and N. Eisenberg
69	INSPIRE and GLOBE - infrastructure and capacity building in Europe	Eva Pauknerová, PhD, Senior Scientist
70	GLOBE and Art	Anikó Orgoványi
71	Marketing Strategies for the Next Generation GLOBE	Paula M. Robinson

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

1. GLOBE and Aeronomy of Ice in the Mesosphere (AIM), a unique NASA partnership: Providing opportunities for students and teachers to study Noctilucent Clouds (NLC's)

By: Dianne Q. Robinson (AIM Mission),
dianne.robinson@hamptonu.edu
Barbara H. Maggi, AIM Mission,
Phone: 757-727-5869
Email: barbara.maggi@hamptonu.edu
Teresa Kennedy, GLOBE Program
Phone: 303-497-2620
Email: tkennedy@globe.gov
Associations: AIM Mission and GLOBE Program
Paul Adams, PhD

"Aeronomy of Ice In the Mesosphere" (AIM), a NASA satellite-based research mission, recently partnered with the GLOBE program to provide students and teachers with innovative education opportunities, which incorporates remote sensing of Noctilucent Clouds (NLC's). The AIM satellite mission is dedicated to providing a scientific basis for understanding why Polar Mesospheric Clouds (PMCs) form and vary. PMCs are sometimes known as Noctilucent Clouds (NLCs) or "night shinning" clouds because of their visibility during or just before and after twilight. NLCs may well be the only true visible atmospheric phenomenon associated with global atmospheric change. These clouds that form ~ 50 above the earth, surface usually poleward of 500 latitude, have been increasing with time, becoming brighter and moving toward the equator. The visible manifestation of NLCs provides an unprecedented and unique opportunity for education and outreach. The GLOBE program, one of AIM's education partners, is collaborating with AIM to provide students with opportunities to collect and utilize NLC data images. AIM's outreach team and scientists are constructing a specific NLC measurement/protocol that will be used by the GLOBE program. The partnership of AIM and GLOBE will allow students worldwide to be involved in collecting and utilizing NLC data images. In addition, educator workshops are being developed to assist teachers with developing online projects that incorporate AIM science and NLC data. The AIM and GLOBE education programs will use the striking images of NLCs collected by participants to motivate interest, learning, and a deeper understanding of the issues surrounding changes in our atmosphere.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

2. Cruise Ships, Kids, and GLOBE

By: Dr. Lisa Pitman
Lpitman@rsmas.miami.edu
University of Miami GLOBE Partnership´
Royal Caribbean Cruise Lines
Miami-Dade County Public Schools

Meaningful hands-on educational activities will be provided for children traveling with their families aboard Royal Caribbean Cruise Lines ships in the Caribbean. As part of their "edu-tainment" activities, RCCL Environmental Officers will mentor children as they take hydrologic and atmospheric measurements, report their data to the GLOBE database, and study related environmental health science topics. RCCL staff will also familiarize traveling students, parents, and teachers with the GLOBE Program – with specific protocols related to oceans and human health.
Children traveling with their families on the RCCL *Explorer of the Seas* will have the first opportunity to use GLOBE Program scientific instruments and measurement protocols. The experience will give them a better appreciation for the investigations conducted by scientists on board. The *Explorer of the Seas* program provides for a visiting scientist to be on board with each sailing of the ship. As part of this new partnership, GLOBE teachers will also be eligible to serve as the visiting scientist and provide science lectures to the families onboard.
RCCL has agreed to purchase the required equipment for its cruise ships. In addition, GLOBE Partner University of Miami at the Rosenstiel School of Marine and Atmospheric Science has agreed to train RCCL personnel and Miami-Dade County Public Schools has agreed to provide Substitute Teacher Coverage for certified GLOBE teachers to serve as visiting scientists on board the *Explorer of the Seas*.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

3. "THE ENERGY NET"

By: Karl Torstein Hetland
country coordinator, Norway

This fall we establish a new network of schools focusing on energy issues. The model is that we have one high school and 2-5 secondary schools in each local network. In total there are 10 local networks with appr. 50 schools altogether. At least one day a year all the students from each school will have an "Energy Day". The biggest energy company in Norway, Statkraft, participate both financially and help organising the event at the local level.
In each local network we have one automatic weather station. Together with The Norwegian Radiation Protection Authority (NRPA) we will focus on UV-radiation and

together with The Norwegian University of Life Sciences (UMB) we will develop educational material on how to use data from the weather station.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

4. THE ERATOSTHENES EXPERIMENT

By: Karl Torstein Hetland
Chairman GLOBE Europe

GLOBE Europe decided at their meeting in Zebrak October 2004 that they wanted to participate in The Eratosthenes Experiment. That means to repeat a more than 2000 year old experiment and measure the circumference of the earth with shadows. Schools all over the world can participate, not only GLOBE schools. GLOBE Europe invites every GLOBE school to participate and we will present how to do the experiment and do it in practice outside. Hopefully the sun will shine in Prague. For more information you can look at GLOBE Europe home page http://www.globe-europe.org/

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

5. Integrating the GLOBE Cloud protocol in an elementary earth science unit: Clouds and The Water Cycle

By: Harold McWilliams & Gillian Puttick
Address: TERC
2067 Massachusetts Ave
Cambridge MA 02140, U.S.A.
harold_mcwilliams@terc.edu
gilly_puttick@terc.edu

The adoption of GLOBE protocols by elementary teachers can be facilitated if the protocols are embedded in a context that has obvious connections to the learning standards prescribed for particular grade bands. TERC has developed a unit for grades 3 – 5 that integrates the GLOBE Cloud Protocol into the larger context of the water cycle. The unit uses simple lab activities, direct observations of water cycle events, simple weather balloon data and satellite images to create a thorough, integrated understanding of the water cycle and its importance in the Earth system as a larger context in which to undertake the GLOBE cloud protocol. We have piloted the unit in several elementary classrooms and present data on implementation.

List of Abstracts
STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

6. The Effects of Integrating Ecosystems into an Elementary and Middle Level Science Methods Course

By: Kimberly A. Staples, Ph.D., and Emmett L. Wright, Ph.D.
Kansas State University,
Manhattan, KS, kstaples@ksu.edu and birdhunt@ksu.edu

The adoption of GLOBE protocols by elementary teachers can be facilitated if the protocols are embedded in a context that has obvious connections to the learning standards prescribed for particular grade bands. TERC has developed a unit for grades 3 – 5 that integrates the GLOBE Cloud Protocol into the larger context of the water cycle. The unit uses simple lab activities, direct observations of water cycle events, simple weather balloon data and satellite images to create a thorough, integrated understanding of the water cycle and its importance in the Earth system as a larger context in which to undertake the GLOBE cloud protocol. We have piloted the unit in several elementary classrooms and present data on implementation.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

7. When CloudSat meets Basic GAPS. An Asia / Pacific collaborative Project

By: Thagoon Kirdkao, Srida Tanta-atipanit, Jennifer Lockett, Jessica Robin and John Lockley
Association: LESA, Thailand, thagoon@kirdkao.org

In February 2005 the LESA (Learning Centre for Earth Science and Astronomy) in Kanchanaburi Thailand, held a student and teacher workshop which focused on the NASA Earth System Science Pathfinder Mission, CloudSat and the NASA Goddard Space Flight Center Basic GAPS environmental modeling program. Eighteen students and twenty two teachers from twenty schools, including teachers from Laos and Vietnam met for four days examining the strengths of environmental modeling

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

8. Thailand / New Zealand Student ExchangeAn Asia / Pacific collaborative Project

By:Srida Tanta-atipanit, Thagoon Kirdkao, John Lockley

Following the CloudSat and Basic GAPS workshop in Thailand, February 2005, a group of Thai students and teachers spent eleven days in New Zealand as part of a GLOBE educational exchange project. The teachers and students participated in an integrated workshop in the Rotorua region hosted by Rotorua Intermediate School examining the

influences of climate, land cover including human influences and soils on the management of the lakes of the area. As part of the exchange the teachers and students visited the School of Education, University of Waikato as well as the environmental research centres, the National Institute of Water and Atmospheric Research (NIWA) and Landcare Research. The culmination of the exchange is planned for January 2006 with a student environmental research conference in Thailand.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

9. Investigation on the importance of local groundwater discharge on macroinvertebrate communities

By: Sarah May
smay@ucmerced.edu
M. Conklin
mconklin@ucmerced.edu,
G. Shaw
gshaw@ucmerced.edu
P. Foletta
pfolett@telis.org
T. Newburger
tnewburger@yni.org
University of California, Merced, U.S.A.:,
Kingsburg High School, U.S.A.: Yosemite Institute, Yosemite National Park, U.S.A.:
Sierra Nevada Research Institute
University of California, Merced
Office Phone: 209-385-8584
Cell Phone: 209-205-8570
Mailing Address:
P.O. Box 2039
Merced, CA 95344
Physical Address:
4225 N. Hospital Road
Atwater, CA 95301

Ecologists are interested in what environmental factors influence community distributions and composition. Local groundwater that enters the stream ecosystem can profoundly affect the local stream environment resulting in changes in temperature, conductivity and micronutrient levels. We hypothesize that areas in streams with consistent groundwater influx should result in distinct assemblages of macroinvertebrates due to the consistency of the water quality at these sites. We have recently begun identifying locations of groundwater discharge in the Upper Merced River basin in the high western Sierra Nevada by using isotopes of radon and helium. Using these methods to confirm groundwater input locations we have found that these correlate with distinct changes in temperature and conductivity – measurements that can be and have been done by GLOBE schools. In this river basin, several schools have been collecting data on

water quality and macroinvertebrates for multiple years using GLOBE protocols. These schools include Kingsburg High School, Wawona School and the Yosemite Institute. Together these schools have been sampling on the Merced River and tributaries at least 3 times per year over the last 8 years. As a result, we've begun to work with these schools' sites to measure more water characteristics in order to determine areas with significant groundwater input. To investigate our hypothesis we are using data that students have collected, and supplementing these data with several more macroinvertebrate sites in order to provide for enough statistical power. In this paper we will address 1) identifying sites with groundwater discharge, 2) observations of macroinvertebrates from GLOBE schools and our own work and 3) our sampling plan for collecting sufficient data to test our hypothesis and provide meaning for macroinvertebrate investigations.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

10. Building Bridges for Environmental Education among Children, Parents and Local Teachers

By: Usa Klinhom, Thom Ketwongsa, Kuanroun Papong, Pornchai Uttharak, Kuekoon Pimdee, Weera Thongnert, and Prajoub Chan Muen
Faculty of Science, Mahasarakham University, Thailand

Key words environmental education, networking, participatory planning, biodiversity, Ramsar site, GLOBE learning program

Abstract: The aim of this study was to encourage the people who lived around Bung Khong Long Non-Hunting Area Ramsar Site to have a network for monitoring biodiversity of this Ramsar site. The Participatory Rural Appraisals (PRA) was carried out in several age groups of 14 villages to develop network. The people were divided into 4 groups: children, parents, the teachers and local administrators. The PARs were conducted to build up a picture of natural resources changes and monitoring planning was set up in each group. The first group was done with children. The 66 children from 14 villages was trained by using GLOBE protocol. After camping 3 days at a time, for three times, the children could encourage their parents to participate with them to survey biodiversity in Bung Khong Long Ramsar Site. During the youth camp, teachers were invited to observe. The GLOBE Learning Program was used for training 50 teachers from 20 schools. The connections of these three groups were joined together as a joint activity after 8 months. The water quality and biodiversity monitoring were planned. These activities were put into the curriculum. The report from this network will be sent to local administers for planning management.

11. Using GLOBE as a tool for engaging young teenagers outside the formal education system

By: Suzanne Welch
Warwickshire Wildlife Trust
United Kingdom
suzanne@globe.org.uk

'Wildlife Watch' is an environmental project designed for young people. Groups are run by volunteers at weekends, and aim to cater for 8-14 yr olds. However, statistics suggest that they are not attracting the 11-14yr olds. There could be many reasons but we believe one of them is that activities offered are aimed at younger children and do not have sufficient depth to hold the attention of, or enthuse, the older ages.

GLOBE-UK has put together a pack especially for these older children, using a number of GLOBE protocols and some of the GLOBE-UK Sustainable Development activities. There are 12 sections, one for each month, and each month has a theme. All the information required, templates and student friendly instructions are included. We hope that these activities will expand GLOBE's influence, by providing creative and age appropriate materials that can be used with minimum supervision

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

12. Current Scientist/Teacher/Student Collaborations in Atmospheric Science:

By: David R. Brooks
Department of Mechanical Engineering and Mechanics
Drexel University, Philadelphia, Pennsylvania, USA
brooksdr@drexel.edu
Alan Czarnetzki,
Professor of Meteorology
University of Northern Iowa, Cedar Falls, Iowa, USA
alan.czarnetzki@uni.edu
Wade Geery
Norfork Elementary School, Norfork, Arkansas, USA
wade@geery.com
Kelen Panec
Waterloo Central School, Waterloo, Iowa, USA
paneck@waterloo.k12.ia.us
Richard Roettger,
Ramey School, Ramey, Puerto Rico, USA
Richard.Roettger@am.dodea.edu

This presentation summarizes three ongoing collaborations in atmospheric science. They include:

List of Abstracts

1. Calibration of GLOBE water vapor instruments
2. Comparisons of two GLOBE sun photometers
3. Solar insolation monitoring in support of GLOBE ONE

Although their science objectives are each different, these projects share some common attributes:

1. A single dedicated teacher has taken responsibility for data collection.
Despite the apparently common-sense belief that GLOBE generally works better in a school where there are multiple teachers, these collaborations have not worked that way.

2. The science PI has personally met the teacher in person and remains in regular e-mail contact.
One interesting question for the collaborations is: "How important was the original personal contact to the success of the collaboration?"

3. The pedagogical value to participating students is not clear.
In some cases, the degree of student participation is not even clear. Is this still a valuable collaboration?

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

13. GLOBE Implementation in Preservice Education at Prince of Songkla University

By: Naiyana Srichai
Faculty of Science and Technology, Prince of Songkla University, Pattani, Thailand. snaiyana@bunga.pn.psu.ac.th

Preservice science education majors at Prince of Songkla University (PSU) utilized GLOBE's landcover and soil protocols to conduct senior research projects. As one of the selected sites is a sand dune forest in a school they involved school students in data collection in a non-classroom setting. They promoted GLOBE as an extra-curricular science activity to school students who learned from their overlooked school ground. GLOBE protocols allow preservice students to learn science outdoor and acquaint them with their local natural resources. Translated GLOBE manuals encourage students to be more independent, self-guided and lend the opportunity to students and their advisor to work effectively together in a more inquiry-based manner. Final course evaluation was based on their 3 oral presentations, research reports as well as scientific posters. GLOBE implementation at PSU is a practical instructional model for a teacher training to refine their abilities to do student research and develop communication skills

14. Budburst observation of Acacia harmandiana Gagnep. (Mimosaceae) at Nakhon Ratchasima, Thailand

By: Sompong Thammathaworn & GLOBE School teachers/Students in Nakhon Ratchasima

Institute of Science, Suranaree
University of Technology, Nakhon Ratchasima
Thailand
sompong@ccs.sut.ac.th

Budburst is tiny leaves emerging from inside the bud, an example of the phenological cycle. The timing of budburst is influenced by temperature. Its detection can be used to examine regional and global vegetation patterns and vegetation responses to climmate change. Heat island effect from urban areas tend to have warmer temperature than those of the rural areas. Plant development (Budburst) response to seasons and climatic changes (temperature). This research project aims to observe budburst periond of the selected native deciduous tree (*Acacia harmandiana* Gagnep.) at the selected site in urban area of Nakhon Ratchasima province from November 2004 to Febuary 2005. Methodology of this research followed budburst protocol of the GUPY project, comprise of species selection, site selection, tree identification/labeling, tree location (GPS), budburst measurements (Record the date when budburst occurs in 3 separate branches on the tree), workout on data worksheet, and web/internet data entry. *Acacia harmandiana* Gagnep. is a tropical deciduous tree species of Leguminosae(Mimosaceae) family. They start to shed their leaves at the end of October 2004. The period of dormant bud was November 2004 to the beginning of December 2004. The air temperature of dormant bud period was 22^{o}C. – 28^{o}C. The period of budburst occurred during 17 December 2004 to 16 February 2005 (60 days). The temperature of budburst period was 27^{o}C. – 32^{o}C.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

15. Environmental Programs Unite to Do "NHEET" Things for Teachers

By: Jennifer L. Bourgeault, Mimi L. Becker, Russell G. Congalton
GLOBE Land Cover/Biology Team and University of New Hampshire
GLOBE Partnership, Durham, NH, USA, jen.bourgeault@unh.edu

NHEET, or New Hampshire Education and Environment Team, started as a meeting in December 2002 between the New Hampshire coordinators of the top national environmental education programs, along with the internationally known GLOBE Program. Instead of competing for teachers for each program workshop, NHEET decided to offer some joint workshops and information. NHEET includes coordinators of NH Fish and Game's Projects WILD and HOME, Project Learning Tree, Project WET and representatives from the USDA Forest Service, and the GLOBE Program. In the past two and a half years, this group has trained teachers in all their programs during an

annual week-long Summer Institute, provided local colleges and universities with a PowerPoint to share in pre-service teacher methods courses, and sent out an administrators brochure to help principals see how these programs can meet the No Child Left Behind requirements. Coming this fall, the group created and will teach a college course called "Earth as a System for Educators" where teachers will be trained in the GLOBE protocols, learn the background for applying them, use the other programs' activities to prepare their students, and implement their enhanced knowledge in the classroom.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

16. Androscoggin County, Maine Land Cover Change Analysis: A Successful Collaboration

By: Russell G. Congalton, Jennifer L. Bourgeault, Mimi L. Becker
GLOBE Land Cover/Biology Team
215 James Hall, 56 College Rd
University of New Hampshire
Durham, NH, USA 03824
russ.congalton@unh.edu

The GLOBE Land Cover Investigation Team at the University of New Hampshire partnered with all the 7th grade teachers and students in Androscoggin County, Maine to produce a very successful land cover change analysis of the city of Auburn, Maine. In all over 500 students were trained in the GLOBE Land Cover Protocols and collected data. Training was initially provided by the UNH Land Cover Team including significant support for the first large data collection effort, Muc-a-thon. Subsequent Muc-a-thons have been conducted by the teachers with the support from the Auburn Land Lab and local GIS experts in the community. The results of this successful collaboration include a detailed land cover/vegetation change detection analysis from Landsat Thematic Mapper imagery acquired in 1993 and 2000. The students have used these results to aid the community in planning a recreation trail within the county.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

17. GLOBE Year 10 Evaluation Results

By: Bill Penuel, Willow Sussex
SRI International (GLOBE Evaluator), Menlo Park California, USA.
william.penuel@sri.com and willow.sussex@sri.com

We will present results from SRI International's Year 10 evaluation of the GLOBE Program. We will focus on results from a student achievement study conducted in the U.S. Midwest involving nearly 50 classrooms. In addition, we will present analyses from

a large scale teacher survey administered in the U.S. aimed at identifying critical aspects of GLOBE professional development associated with higher implementation levels in GLOBE. Third, we will present recommendations based on findings for the future of GLOBE.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

18. GLOBE ONE Evaluation Results

By: Willow Sussex, Bill Penuel
SRI International (GLOBE Evaluator), Menlo Park California, USA.
willow.sussex@sri.com and william.penuel@sri.com

We will present results from our case study of GLOBE ONE as an example of (a) a multidisciplinary, integrated environmental field campaign that includes students and community groups as data collectors and, (b) an emerging GLOBE Learning Community. We will focus primarily on the case study methodologies used in the evaluation study and give preliminary results of the GLOBE ONE field campaign evaluation.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

19. The CloudSat Education Network - A GLOBE/NASA Worldwide Partnership

By: Debra Krumm and Jennifer Lockett
NASA CloudSat Mission and GLOBE Program
Colorado State University, Fort Collins, Colorado, USA,
dkrumm@atmos.colostate.edu, jlockett@bellsouth.net

CloudSat, a NASA satellite mission, will launch into orbit the world's most advanced weather radar designed to measure properties of clouds that are essential for accurate understanding of Earth's weather and climate processes. Providing the first vertical profiles of global measurements of cloud thickness, height, water and ice content and a wide range of precipitation data linked to cloud development, CloudSat measurements will fill a critical gap in understanding how clouds affect climate (<http://cloudsat.atmos.colostate.edu/> http://cloudsat.atmos.colostate.edu/). Any mission of this nature requires extensive ground-based reference data. The CloudSat Education Network provides the opportunity for a subset of interested GLOBE schools around the world to partner with CloudSat scientists to provide atmospheric data. In return, the Network will link together scientists, students, teachers, and their communities to give students meaningful, authentic and contemporary high quality educational experiences. Student activities and learning outcomes designed within the program have been chosen to meet both general education outcomes and specific standards or objectives from local school curricula. The main focus of the knowledge development component of the

project is to help students better understand long-term climate change and the climatic processes that maintain the Earth's Energy balance. Scientists will receive research-quality data in support of the mission and in return interact with students, teachers and their students to promote interest in science. Launch of the CloudSat satellite is anticipated for mid 2005. Participation in the network throughout the duration of the project will be monitored and schools will be asked to maintain certain levels of participation. The data requested will include cloud cover, cloud type, temperature, and/or precipitation collected according to GLOBE specifications, along with additional data specific to the CloudSat mission requested by CloudSat scientists. The CloudSat Education Network when fully complete will contain 100-150 mostly GLOBE schools from target sites around the world. Thailand and South East Asia, New Zealand and Australia, West Africa, Europe and Brazil have been identified as target sites for the Network and most already have participating schools.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

20. The GLOBE Alumni International Network

By: Martin Pentson,
The GLOBE Alumni Estonia,
project manager/chairman on board, Estonia

Tomas Tunkl,
Tereza; the GLOBE Alumni Czech,
project manager, Czech Republic

GLOBE (Global Learning and Observations to Benefit the Environment) is a worldwide hands-on, primary and secondary school-based education and science program. Estonia and Czech Republic have been involved with the GLOBE Program since 1995 and are one of the most successful program countries in the world.

Many people, who have been involved with the GLOBE program, have already graduated schools or will graduate within a year or two. Since GLOBE is directed mainly to primary and secondary school pupils, university students and other graduated persons are automatically switched off from the program. Lots of students get switched off also because of changing school, e.g. after GLOBE primary school.

A group of students in Estonia and Czech Republic, who were involved with the GLOBE program in the past, have gathered to form a non-governmental organization (NGO) for GLOBE Alumnus.

The sign is that NGO for International GLOBE program Alumnus is needed. The national coordinators are pretty much involved with their work, so they are not able to promote GLOBE to new partners and propagate the program outside of regular GLOBE schools. It is important to emphasize that GLOBE program in many countries, for example in Estonia is represented by the Ministry of Education that limits the possibilities for applying additional resources for outreach and extension of the GLOBE work to other youth groups.

It has turned out that the GLOBE veterans, nowadays students mostly in universities who have been switched off from the regular activities of GLOBE, are still willing to continue in the GLOBE

program, they have enormous enthusiasm and energy to create a successful and working NGO for Estonian GLOBE. It can be proved by two massive projects already initiated from Estonian and Czech GLOBE Alumnus:

For example, The Embassy of US in Tallinn is financing an 18month-long project called **"The Outreach of GLOBE",** where Estonian GLOBE Alumni is organizing trainings for children of non-GLOBE schools all around Estonia. During these days full of fun, excitement, nature and science, children and their teachers are being shown what the GLOBE Program is all about – the traditional GLOBE learning expeditions will be carried out.

Another cross-boarder project that has been successfully finished by now is an international youth-exchange called **"EEYYCCC: Environmental Education from Youth to Youth: Concepts, Connections and Cooperation"**. During the European YOUTH financed youth exchange students from Estonia, Poland, Italy, Slovenia and Czech Republic, all interested in environmental issues, joined for 6 days in Estonia, to discuss and to develop different methods, approaches, integration of different subjects and possibilities to rise public awareness through environmental education to children. The program includes different workshops, discussions, plenaries, practical field trips and expeditions and also differences in cultures and national curriculums.

One part of the youth-exchange was the "GLOBE on tour" - a two-day excursion around non-GLOBE schools who are interested in joining the GLOBE program. GLOBE delegations met local students and teachers for a background research: foreign delegations are more focused on possible cooperation and finding new contacts among schools, while Estonian people try to research possible market for planned training activities (what people want and need). This helped us successfully to start groundwork for international cooperation which in long-term perspectives should lead to international network of GLOBE Alumnus.

So, the very first concrete steps towards these rather ambitious objectives, raised about a year ago, have been taken. Although during the discussions and projects it has become clear that NGO is needed, there is still lot of work to be done regarding the activities, projects and international cooperation. To keep a non-governmental organization alive and successfully running, it needs to have perspectives for projects, different activities and, of course, overall objectives. Since one of the main objectives of the GLOBE NGO will obviously be the promotion of GLOBE program, it's essential to have contacts with other schools, environmental organizations and other institutions around the world. To start successful projects there is always need to different partners from the host country of the NGO and also behind the state borders. The international cooperation is in the world of globalization and in the new European Union the key-word.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

21. Preliminary Study of a Special GLOBE Project on Monitoring the Recovery of Coastal Invertebrate Species after the December 2004 Tsunami using GLOBE protocols by Andaman schools of Thailand

By: Asst.Prof.Dr. Krisanadej Jaroensutasinee[1]
Asst.Prof.Dr. Mullica Jaroensutasinee[1]
Chairote Yaiprasert, Watcharee Ruairuen
Kanatawan Aungsakul, Yuthana Uraichuen
Sitthichai Kulsri, Watchapong Srisang, Watcharee Wattanapokasin

GLOBE Southern Center, Complex System Research Unit,
Institute of Science, Walailak University
222 Tasala, NakhonSiThammarat, 80160, Thailand,
Phone: (66) 7567-2005-6, Fax: (66) 7567-2004
Email: cxresearch@gmail.com

Assoc.Prof.Dr. Jariya Suchareekul, Suwinai Mongkolthan
Yupaporn Tipjariyaudom, Dr. Pornpun Waitayangkoon
The GLOBE Program
The Institute for the Promotion of Teaching Science and Technology
924 Sukhumvit Rd., Klong Toei, Bangkok, 10110 Thailand,
Phone: (66) 2392-4021 Fax: (66) 2382-3239

Dr. Sarah May, Prof.Dr. Martha Conklin
School of Engineering, University of California, Merced
P.O. Box 2039 Merced, CA 95344,
Phone: (209) 724-4349, Email: mconklin@ucmerced.edu

The December 2004 tsunami created great impacts on Andaman Coast of Thailand. The impacts are physical, biological, ecological and social. In addition, these impacts are spatially distributed. GLOBE provides one of the very suitable means to study these impacts integratedly. This project is collaboration between GLOBE country coordinator, GLOBE center for Southern Thailand and schools that are situated along effected areas by the tsunami. Coastal changes are obvious from many satellite imageries such as Landsat and Spot. Many estuaries were altered and also the marine ecosystems were affected. Suitable schools near the Andaman Sea were selected according to their willingness of joining the project. The teachers and students will receive continuous trainings, equipment supports and grants to join specially designed activities such as workshops and conferences. We conduct our overall activities with Mathematics, Science, English Language and Information Technology curricula to best benefit students and teachers.

Schools are grouped so that some of them were affected by the tsunami and some of them were not affected by the tsunami. These schools will be monitoring environmental conditions near the coast twice a month for the next twelve months and then monthly for the four years after that using GLOBE protocols. Scientific accuracy of these data and data evaluation will be checked every two months by scientists from Walailak University and the Institute for the Promotion of Teaching Science and Technology when the onsite trainings are also taking place. These data will be submitted to the GLOBE database and a specially created Coastal Invertebrates database developed by Walailak University and

will be accessible to the research community and schools for analysis. In this presentation preliminary results of the project will be discussed.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

22. Graduate Students a key component for GLOBE success in K-12 environments

By: Ricardo Camacho
Juan López Garriga
University of Puerto Rico
Mayagüez Campus rcamacho@sonw.uprm.edu

The University of Puerto Rico Mayaguez (UPRM) Campus GLOBE Partner is based on an expository philosophy which entails training K-12 teachers on protocols together with graduate and undergraduate students during summer workshops. The integrative training is essential to the bonding process among participants. The activity helps achieve success during follow-up activities throughout the academic year. Once teachers become certified, graduate and undergraduate students provide mayor follow-up on the integration of the curricular activities learned and become first hand educational resources for K-12 schools.
During summer, 2004, GLOBE PR provided two workshops for a total of 61 new K-12 teachers became certified in basic GLOBE protocols. After this activity and for the past 12 months (August 04 through August 05) the program performed visits to more than 143 teachers including follow-up to previously certified teachers. During these visits, graduate and undergraduate students from UPRM presented a wide variety of protocols, including methodologies to analyze environmental data using Calculator Based Laboratory equipped with probes and sensors. Data analyzed through these probes included measurements of pH, dissolved oxygen, and temperature, among others. This team-work approach using university students for program implementation and role models for K-12 students met the goal to provide hands-on, inquiry-based training to 1,146 K-12 students (636 females and 510 males) through 95 visits to schools representing each of the ten Puerto Rico educational districts. For the past four years GLOBE has been able to perform more than 752 follow-up visits to 902 teachers from 216 schools, directly training at least 7,696 K-12 students in protocols and CBL technology.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

23. Fire training with Pre-service Teachers

By: Georgia Cobbs
GLOBE Director, The University of Montana
georgia.cobbs@mso.umt.edu

Pre-service teachers from The University of Montana received GLOBE training, including the Fire Protocol, during the Fall of 2004. Dr. Georgia Cobbs, of The University of Montana, began the GLOBE training with an overview and the atmosphere protocol. Dr. Bob Keane, author of the Fire Protocol, and Duncan Lutes, of Systems for Environmental Management, introduced the Fire Protocol. Pattee Canyon, a short drive from campus, provided the "fuels" for training. Students learned of the protocol first hand from these experts. Feedback from those involved will be shared.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

24. GLOBE One Soil Temperature and Moisture Data – A resource for data analysis

By: Jim Washburne and Martha Whitaker
The University of Arizona, Department of Hydrology and Water Resources,
jwash@hwr.arizona.edu

The GLOBE One field campaign began during the spring of 2004 and is located in Black Hawk County, Iowa, USA. The overarching research question this collaborative project addresses is: ***For corn and soybeans, what are the environmental impacts associated with different frequencies and intensities of soil tillage farming, and with different amounts of crop residue left after planting as compared to prairie and urban sites?*** Tilling and plowing can be considered the same thing – tuning the soil over at the end of the growing season. A major component of this effort are 10 fixed meteorological sites distributed as follows: 4 represent tilled sites, 4 represent un-tilled sites and 2 represent native prairie sites. Air temperature, precipitation, soil temperature and moisture are among the measurements that are made every 15 minutes (35,000 data points per variable per year). While this amount of data presents some challenges for most users, the annual data set is rich with applications to soil physics, statistics, environmental science and research methods. The purpose of this presentation is to introduce the rich variety of questions that might be addressed using this data set and to encourage others to help us "mine" this data set for new understandings of soils and analysis.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

25. The GLOBE Surface Ozone Protocol: Advancements and New Directions

By: Margaret Pippin
NASA Langley Research Center, Hampton, VA, USA
m.pippin@nasa.gov
Linda Bush
NASA Langley Research Center, Hampton, VA, USA
lcbush@gmail.com

Irene Ladd
NASA Langley Research Center, Hampton, VA, USA
i.h.ladd@larc.nasa.gov
Jack Fishman
NASA Langley Research Center, Hampton, VA, USA
Jack.Fishman@nasa.gov

The Surface Ozone Protocol has been a part the GLOBE Program since 1998. We report the status of school participation, instrument improvements, and the implementation of ozone bio-indicator gardens. Through our partnership with the Tereza Association, we have realized the highly successful implementation and continuation of the surface ozone protocol within the Czech schools. The commitment of the schools and the dedication of the students have resulted in multiyear datasets, with several schools reporting over 1400 ozone measurements since the year 2001. To ensure quality data, we continue to seek further improvements in the measurement system. Manufacturing updates have been made in the preparation and application of the chemical reagent to the test cards, resulting in a more uniform color response. The observation of ozone induced injury to plants is a natural extension to measuring the ambient surface ozone concentrations. Schools can augment their measurement site with a garden of ozone sensitive plants. We are currently developing the protocols and training tools necessary for establishing a bio-indicator garden and recognizing and reporting ozone induced foliar injury to the cut-leaf coneflower and common milkweed.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

26. Trends and Distributions of Surface Ozone Measured at Czech GLOBE Schools

By: Bryana Henderson
LARSS, NASA Langley Research Center, Hampton, VA, USA
Margaret Pippin
NASA Langley Research Center, Hampton, VA, USA
m.pippin@nasa.gov
Jack Fishman
NASA Langley Research Center, Hampton, VA, USA
Jack.Fishman@nasa.gov

The Czech schools are active participates in the GLOBE surface ozone protocol and have been consistently reporting data since 2001. The students have routinely made daily ozone measurements resulting in multiyear data records at sites located throughout the country, encompassing various geographic regions. We present an analysis of the data from each individual school showing seasonal variations and correlations with the concomitant metadata. We then discuss any geographic trends in ozone as indicated by the school data and compare with country network ozone data.

27. Why Care about GLOBE?

By: Elena B. Sparrow
University of Alaska Fairbanks, AK, USA
ffebs@uaf.edu

GLOBE after ten years, with its many facets and faces, continues to grow, play an important role in education reform, and offer many benefits in spite of the challenges that have arisen. These are based on results of independent assessment/.evaluation of the GLOBE program through SRI, and quantitative/qualitative data from other sources. GLOBE's focus on environmental/Earth system changes based on studies that engage students worldwide, remains to have a local and global appeal to many peoples. It provides a common language for open communication and collaborative work among different peoples, that transcends country borders and cultures. GLOBE promotes better understanding among peoples of various nations. It has jumpstarted a lot of education outreach programs in Alaska and elsewhere. It offers a means of meeting curricular needs in K-12 classrooms through hands-on/minds-on activities that actively engage students in learning science, integrates well with mathematics, use of technology, social studies language, and arts. It provides the opportunity for all students in a class to be involved not just a select few, to conduct their class or individual inquiries. For scientists, GLOBE provides spatial and temporal data that would impossible to get without the teams of young research assistants in schools distributed around the world. It is a proven method for science research programs to meet the broader impacts merit criterion required by funding agencies such as the National Science Foundation (NSF) and the National Aeronautics Administration (NASA). GLOBE provides a model for non-GLOBE scientists in translating their research results and methods for public consumption, through involvement of school children, their parents and other community members. The availability, long-term website systems support and infrastructure for data entry, data archiving and data retrieval in many forms helps make the GLOBE program sustainable. The infrastructure of teams of scientists and educators at the GLOBE headquarters, on the GLOBE areas of investigation level, the GLOBE Help Desk and the numerous Partnerships also provide stability and longevity to the program. GLOBE evokes a strong feeling of belonging to and being a contributing member of a global family.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

28. GLOBE Urban Phenology Year Project Exemplifies Local, Regional and Global Collaborative Research

By: Elena B. Sparrow
University of Alaska Fairbanks, AK, USA
ffebs@uaf.edu
Michael White, Rico Gazal
Utah State University, UT, USA
mikew@cc.usu.edu; rgazal@cc.usu.edu

List of Abstracts

Leslie Gordon
Gordon Consulting, OR, USA
leslie@oregoncoast.com

The GLOBE Urban Phenology Year **(**GUPY) research project is studying the effects of urbanization on vegetation phenology focusing on timing of tree budburst of the same species in a particular area of the world that grows in urban to more rural sites. The timing of budburst, an example of a recurring phenological event, is influenced by temperature and/or moisture. Its detection can be used to examine regional and global vegetation patterns, interannual variation, and vegetation responses to climate change. The GUPY project mobilized schools locally in Fairbanks, Alaska but also in other parts of Alaska e.g. Wasilla, Shageluk; in New York, NY, USA, and other parts of the world. The Alaskan and Finland schools represent high latitude areas; New York, Japan, Jordan and Kyrgystan, mid-latitudes; and Philippines, Thailand and Senegal, low latitudes. The GUPY worldwide sites represent different kinds of biomes. In Alaska, GUPY elicited enthusiasm and cooperation of community members i.e a returning teacher, a junior high student, and the families and students of a home school and that set up more than 10 study sites in various sites in Fairbanks. These efforts were in addition to those of the regular schools in the Fairbanks North Star Borough School District i.e. Ann Wien, Barnette, Joy, Ladd, North Pole and Woodriver Elementary Schools; North Pole Middle School, Randy Smith Middle School, the Lighthouse Community Christian School and the Catholic Schools of Fairbanks. Students in Alaska and other parts of the world are grateful for the opportunity to participate in GUPY, a collaborative local research project that connects globally, and will contribute to much needed spatial ground data in climate change research. Some preliminary Alaska results will be presented.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

29. GIS and GLOBE in the Elementary Classroom

By:Barbara Manchee
Jefferson Road Elementary School, New York, USA,
Barb_Manchee@pittsford.monroe.edu,
Patricia Gaborski
Pittsford Central Schools, Pittsford, New York, USA,
Patricia_Gaborski@pittsford.monroe.edu

The use of GIS and GLOBE can inspire students, through experiential-learning, to think, reason, and use technology effectively. First grade through fifth grade students at Jefferson Road School are involved in collecting daily atmospheric measurements. A group of fifth grade students meets before school two days a week and has taken hydrology, phenology, and landcover measurements. Elementary students use GPS units to identify GLOBE study sites near the school. Students then explore the use of GIS for displaying and analyzing data geographically on the computer. In this session, objectives, activities and lessons used with different grade levels will be described. These activities and lessons are centered around math applications such as problem solving,

measurement, geometry, data analysis, statistics, graphing and mapping, pattern classification, use of formulas, understanding percent, and use of decimals. The capacity for students to access and analyze real-world data develops independent inquiry-based learning associated with mathematical thinking. The activities of GLOBE and GIS present students with real-life interdisciplinary applications, expanding their knowledge in areas such as geography, science, mathematics, social studies, language arts, and computer technology.

Barb Manchee
Jefferson Road Elementary School
15 School Lane
Pittsford, NY 14534
585-267-3351
Barb_Manchee@pittsford.monroe.edu

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

30. Title: Trends in the GLOBE Japan and representative inquiry activitiies in junior high school.

By: Tomoyasu Yoshitomi*, Kyosuke Nakamura**, Toshihiko Higuchi*
Association(s), country, and e-mail address (es):
Tokyo Gakugei University, Japan
****Junior High School Affiliated with Kumamoto University, Japan***
E-mail: t-ystm@u-gakugei.ac.jp (Tomoyasu Yoshitomi)

Abstract body:
This session will present recent trends in Japan related to the GLOBE program. The presenters will cover highlights of the student conference that
was held last year in Tokyo as well as describe a model case of the successful application of the type of inquiry approach activities that has been spreading gradually in Japan, focusing on activities at the environmental studies program at a junior high school affiliated with Kumamoto University in Kyushu, southern Japan.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

31. Coastal Invertebrate Protocol - The Reincarnation of the Marine MacroInvertebrates Protocol

By: S. May
University of California, Merced, U.S.A.
smay@ucmerced.edu

List of Abstracts

M. Conklin
mconklin@ucmerced.edu
M. Jaroensutasinee
Walailak University, Thailand
M_Jaroensutasinee@hotmail.com
H. List
University of Maine, U.S.A.
hlist@umaine.edu
S. Zeeman
szeeman@umaine.edu

Coastal areas are dynamic ecosystems. They are at the interface between the land and ocean. So changes to either of those systems, whether catastrophic, such as the tsunami last winter or slow, such as reduced sand migration due to coastal structures, can cause major changes to these systems. These systems also have unique characteristics, in the intertidal and splash zones live a large diversity of organisms with unique adaptations to both water and air environments. Coastal areas are also increasingly threatened by human development and global climate changes resulting in rising sea levels. GLOBE provides the perfect scientific venue for documenting changes in coastal areas around the world. In this paper, we will reintroduce the revised Coastal Marine Invertebrate Protocol, ways to present the data, and example research questions and associated monitoring plans.

We have recently piloted a revised Coastal Marine Invertebrates Protocol (formerly Marine MacroInvertebrates Protocol) in Thailand for the GLOBE International Marine Hydrology Symposium. The attendees of the symposium included a wide variety of Thai and international participants which included physicists, engineers, marine ecologists, marine scientists, limnologist and educational specialists. They tested the protocols in a different habitats. The results from some of the sampling will be presented.

This talk will discuss the current state of the protocol and its applications and implementation strategies. We will discuss the measurements useful for a marine ecosystem and monitoring coastal invertebrates. As different monitoring strategies are required for different research aims, we will present two sample research questions and hypotheses and possible monitoring plans to collect the data to test the hypothesis.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

32. New Technological Opportunities for GLOBE

By: Gregory Cox
Alabama USA
cox@nsstc.uah.edu
Feodor Surkov
Rostov-on-Don, Russia
sur@gis.rsu.ru

Ten years ago, when the GLOBE Program started, the possibility to make real environmental measurements and to send this data to some huge database by Internet was undoubtedly the "New High Tech" opportunity for students all over the world. Until recently Internet connectivity has not been the norm for many of schools. One of the most important impacts of the GLOBE Program on the participating GLOBE schools, teachers and students was its introduction to and their involvement in its high-level information technology earth science applications.

After ten years some new technologies in measurements appeared. For instance, instead of the mercury based - liquid max/min thermometer, we now use a multi-day recording digital one. New protocols to support these advancements have appeared too. The GLOBE Program must continue to change in connection with changes in technology and its applications. This is especially true since the speed of information technology occurs much faster than in other areas of technology.

For example, if you go to the GLOBE website, you can open the list of GLOBE schools. We can see the description of the school on the screen, and can find the school address. Let's look at one US GLOBE School – Bob Jones High School, in Madison, Alabama. Its address is 650 Hughes Road, Madison, AL 35758-8737. Now let's go to the new Internet map search engine www.maps.google.com and paste this address to the search window. After zooming the satellite image that appears on the screen, we will see the roof of the school (http://maps.google.com/).

Now let's open another Internet map search engine – www.terrasrerver.com and open the satellite image of Madison, Alabama. This engine gives us very precise coordinates of the point on the image. So, we can see with the help of these two Internet search engines if the reported coordinates of Bob Jones High School are true or false!

To make the GLOBE program more attractive to students, these new Internet information applications should be included in the GLOBE materials. The most exciting future for the GLOBE Program should focus more on its integration with other IT based applications that the Internet offers. Reporting data to GLOBE is no longer the primary interest for students as it was in GLOBE's formative years.

Another new issue to be taken into account by GLOBE is the notion of its direct applications to the issues of sustainable development. The United Nations announced that 2005-2015 is the decade for the involvement of education in the concepts of sustainable development. Ten years ago environmental awareness was perhaps the most important aspect of GLOBE. Across the world sustainable development is seen as a way to improve life on our Earth. Its environmental problems however are only part of the problems that should be solved. On the site www.gapminder.org there is an excellent presentation – "Human Development Trends" which can be downloaded free. It gives a visual understanding of our world and the differences between countries. Some countries have already begun discussions on how the sustainable development concepts fit into the GLOBE protocols. Perhaps it should be discussed more clearly with respect to GLOBE's potential to contribute to this important issue.

A third area that could be addressed in the GLOBE program is the modeling of the Earth's environment systems. There are a number of simple modeling software packages (e.g. STELLA, ISEE Systems) that allow students to see how measurements are used for scientific applications. Using these simple models of population dynamics, water quality management and others, students can focus on analyzing the GLOBE data instead of merely collecting it. We are trying such an approach in the comparison of the environmental conditions of Taganrog Bay in Southern Russia with Mobile Bay in Alabama. We believe that this logical extension of the GLOBE Program will enable our students to better work at the cutting edge of Earth systems science.

33. CALISPSH'AIR : A French educational project based on The GLOBE program.

By: Danielle de STAERKE (CNES*), Eric ABGRALL (IUFM Midi Pyrénées**), Sylviane DAILLET (CNES*), Thierry PHULPIN (CNES*)
CNES, Toulouse, FRANCE ***danielle.destaerke@cnes.fr***
eric.abgrall@ac-toulouse.fr

France, represented by CNES, has recently joined GLOBE.
To start with, GLOBE France is focusing on atmosphere and climate, one of the five main Earth science investigation areas proposed by GLOBE. Thus, CALISPH'Air (name of the French GLOBE project) unites students, teachers and scientists in study and research about the dynamics of the Earth's environment in connection with the PARASOL (***P****olarization and* ***A****nisotropy of* ***R****eflectances for* ***A****tmospheric* ***S****cience coupled with* ***O****bservation from a* ***L****idar*) and CALIPSO (***C****loud-****A****erosol* ***L****idar and* ***I****nfrared* ***P****athfinder* ***S****atellite* ***O****bservation*) satellites missions. CALISPH'Air provides the opportunity to learn by taking scientifically valid measurements, reporting results into GLOBE database and then using their data, and data from other schools to build a pedagogic project in agreement with the curriculum. Moreover, the students will be able to use satellite data to validate the ground measurements.

The project is starting this year with the teachers who have attended the first GLOBE training workshop in France. We should rapidly expand this program in France in the coming years.

* CNES: Centre National d'Etudes Spatiales
** IUFM : Institut Universitaire de Formation des Maîtres

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

34. GLOBE and the Alabama Mathematics, Science and Technology Education Initiative

By: Gregory Cox and Robin Nelson, GLOBE in Alabama

Established in 1997, **the GLOBE in Alabama (GIA)** partnership has trained teachers in almost 500 schools – over 25% of the total number of K-12 schools in Alabama. Over the past seven years, GIA has worked to achieve the recognition for GLOBE to serve as the "glue" to Alabama's new education program, the **Alabama Mathematics, Science and Technology Initiative (AMSTI)**. In the summer of 2005, GIA will train over 1,100 AMSTI teachers at three AMSTI hub sites in Alabama. In the summer of 2004, over 800 teachers were trained in GLOBE as part of the initial startup of AMSTI.

A key component of AMSTI is a mentoring program conducted by math and science specialists – classroom educators loaned to the AMSTI hub sites by the school systems each hub site serves.

The AMSTI mentoring program mirrors the GIA mentoring model begun in 1999 that originally funded regional GLOBE master teachers to provide technical assistance, feedback, and coaching for other GLOBE teachers. In schools where GIA mentor teachers were working, nearly a 100% increase in GLOBE student data reporting was noted. The GIA mentors now work within the hub site framework to ensure implementation of GLOBE as an integrated part of AMSTI. With the continued support of the State of Alabama, GIA is working to establish a network of mentors who work with the AMSTI hub site specialists in providing support for all AMSTI teachers.

AMSTI has been introduced into three areas of Alabama and has meet with tremendous implementation success in its first three years. AMSTI currently has three hub sites serving 72 schools, 1800 teachers, and 42,000 students on a daily basis. Eleven AMSTI sites are required for the program to reach all students in Alabama. As the AMSTI program grows with the addition of future hub sites, GIA must ready itself to train thousands of AMSTI teachers during the two-week summer professional development institutes that are part of AMSTI.

The initiative provides three basic services: professional development, equipment and materials, and on-site support. Schools become official AMSTI Schools by sending all of their math and science teachers, and administrators to two-week Summer Institutes for two summers. At the summer institutes teachers receive grade and subject specific professional development that is highly applicable to their own classrooms. Instruction is delivered at the Summer Institutes by "master" teachers who have been certified as AMSTI trainers after successfully completing AMSTI trainer workshops.

Evaluation results, provided by the initiative's external evaluator, indicate that AMSTI is highly successful in improving student achievement. Students in AMSTI Schools are scoring dramatically higher on the Stanford Achievement Test in math, science, and reading, and on the Alabama High School Graduation Exam, as compared to schools with similar demographics that had not participated in AMSTI.

The Alabama Department of Education has just received $15M for fiscal year 2006. These funds will the three existing AMSTI sites to bring new schools in their regions into the initiative while continuing to provide services to all of the schools that have previously received training. Such funding will also allow three new AMSTI sites to begin serving schools in three of the remaining eight regions of the state that are now without AMSTI services

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

35. A New GLOBE Partner in Sonora, Mexico

By: Martha P.L. Whitaker[1], Jim Washburne[1], Ty P.A. Ferré[1], and Bart Nijssen[1,2]

The University of Arizona (1) Department of Hydrology and Water Resources; (2) Department of Civil Engineering and Engineering Mechanics, mplw@hwr.arizona.edu

Thanks in large part to a grant from the Consortium for North American Higher Education Collaboration (CONAHEC), a Train-the-Trainer workshop was held in January 2005 at the Universidad de la Sierra (UniSierra) in Moctezuma, Mexico. As a result of the TTT and a related GLOBE workshop held in 2004, there are now a total of nine GLOBE schools in Sonora, Mexico. At the TTT, fifteen high school and university

teachers were certified as GLOBE Trainers, and four more became GLOBE- certified Teachers. Seven professors at UniSierra are now serving as points-of-contact GLOBE partners. In particular, they are currently overseeing the distribution of eighteen GLOBE atmosphere, soil, and hydrology equipment kits (six each) that UniSierra is loaning to new GLOBE schools in the region.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

36. Surface Temperature and Soil Temperature Protocols; Observations, Partnerships, Science

By: Kevin Czajkowski, Timothy Ault, Takelia Bragg
Department of Geography and Planning,
The University of Toledo, Toledo, OH 43606, USA
Jason Witter, Alison Spongberg
Department of Earth, Ecological and Environmental Sciences
The University of Toledo, Toledo, OH 43606, USA
Contact Information:
Department of Geography and Planning, University of Toledo
Toledo, OH 43606
Telephone: 419-530-4274 Fax: 419-530-7919, kczajko@utnet.utoledo.edu

As NSF funded GLOBE scientists, we have engaged students and teachers in the surface temperature and soil temperature protocols. In 2002, we started to develop the surface temperature protocol and finalized it this past spring 2005 for the Teacher's Guide. Surface temperature is the temperature of sidewalks, parking lots, leaves, grass, bare ground, etc. as determined by the electromagnetic energy they emit. Use of the surface temperature protocol by teachers has grown significantly this past year although the total number of schools taking surface temperature observations is still relatively small. To date we have concentrated on partnering with GLOBE partners in the United States, in particular Ohio, Michigan and Iowa, as well as a few international GLOBE teachers via email. We have received very favorable feedback about the surface temperature protocol from the teachers who have implemented it. Our ultimate goal is to use GLOBE surface temperature and soil temperature observations to better understand the influence of land use/land cover on the Earth's energy budget. Surface temperature is at the center of the energy cycle because it is influenced by incoming solar radiation as well as the properties of the surface and subsurface. We plan to use satellite imagery to enhance our understanding of the influence of land use change on global temperatures. To do this, we need to form international partnerships to expand the scope of our surface temperature and soil temperature research.

37. Finding and Using Free, High Quality, Digital Resources to Support GLOBE Student Investigations

By: Dr. Edward E. Geary
Deputy Director, GLOBE and Director of Community Services for DLESE

The Digital Library for Earth System Education (DLESE) contains over 10,000 high quality digital resources that support learning about Earth as a system. For students conducting hands on GLOBE investigations these resources can enhance student understanding and provide access to other data sets, visualizations, and information. For teachers, DLESE provides access to lesson plans, laboratory and field activities and ideas on how to teach a variety of different Earth and environmental concepts. DLESE resources can be easily accessed by topic and grade level and include data sets, images, lesson plans, animations, assessments, models, and laboratory investigations. GLOBE is currently collaborating with DLESE to provide direct access to these resources via the online GLOBE Teachers Guide. This presentation will introduce GLOBE participants to DLESE resources, services, and tools.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

38. GLOBE ONE: Providing a Model for a Project-based Approach

By: Peggy LeMone USA
lemone@ucar.edu
John McLaughlin USA
jmclaughlin@globe.gov
Sharon Sikora USA
sharons@ucar.edu

GLOBE ONE is the first major field campaign run cooperatively by the GLOBE Program Office, GLOBE Principal Investigators, and a U.S. GLOBE Partner. Many lessons have been learned, and are still being learned as GLOBE ONE progresses. These lessons will be critical as GLOBE moves forward with a more project-based approach. The lessons learned so far are as follows. First, the basic education and scientific goals and implementation need to be outlined before funding can be secured. Adequate time must be allowed for the project to be implemented and its goals achieved. Second, once funding is in place, a management structure has to be developed that allows all entities to have input and keeps all participants informed of how the project is proceeding. Third, a structured plan is put in place for making sure that appropriate data are collected and made available. Fourth, teachers and students need to be supported and their participation encouraged. Fifth, special materials need to be developed to support student research related to the project. Finally, a process needs to be in place and time allowed for scientists and students to share results. This presentation will outline how these lessons were learned and then applied in meeting the needs of GLOBE ONE.

39. Promoting Student Use of Landsat Satellite Imagery: Tutorial for Downloading Free Imagery and Updates to MultiSpec Software

By: Frank Niepold GSFC NASA USA, Landsat Project Science Office
Frank_Niepold@eburke.org
John McLaughlin USA, GLOBE Program
jmclaughlin@globe.gov

New development have made it possible to download free Landsat satellite imagery and efficiently work with this imagery in MultiSpec software. There is a set of free Landsat imagery that encompasses almost the entire land area of Earth for download from the University of Marylands Global Land Cover Facility Web site. These images are ortho-rectified and available in 1990, and 2000 editions (sometimes 1975), and lend themselves well to use in the GLOBE Land Cover investigation, notably with respect to change detection. However the imagery needs to be processed before it can be used for GLOBE. A tutorial was developed by Frank Niepold of NASA that guides the user through the process of downloading and processing this imagery. Developments in the MultiSpec software package have made for a more robust set of capabilities and more straightforward application to GLOBE activities. Participants will be able to download and prepare Landsat images for any location and prepare change detection image sets. Country coordinators, Partners, GLOBE teachers and GLOBE students can all use the tutorial to assist them in their investigations.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

40. The Clouds Online Teaching Module

By: Susan Gallagher The GLOBE Program, USA
sgallagher@globe.gov
Kirsten Meymaris The GLOBE Program, USA
kirstenm@globe.gov
Sharon Sikora The GLOBE Program, USA
sharons@globe.gov
Becca Hatheway The GLOBE Program, USA
hatheway@globe.gov
Shannon Spencer The GLOBE Program, USA
shannon.spencer@globe.gov
Sandra Henderson The GLOBE Program, USA
sandrah@globe.gov

In April 2005, the GLOBE Program released the Cloud Protocols Online Teaching Module to refresh your knowledge of the Cloud Protocols. The interactive online teaching module was designed for teachers and trainers, but can be adapted to other audiences. This new approach explores the science content behind cloud and contrail identification, simulates taking protocol measurements, demonstrates data entry, and data

analysis as well as provides practical information about inquiry-based classroom implementation. The online teaching module takes about 30 minutes to complete and is an example of modules being developed for all GLOBE protocols.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

41. The GLOBE Trainer Certification Program: A Mixed Design

By: Sharon Sikora sharons@globe.gov
Susan Gallagher sgallagher@globe.gov
Sandra Henderson sandrah@globe.gov
Kirsten Meymaris kirstenm@globe.gov
Becca Hatheway hatheway@globe.gov
Shannon Spencer shannon.spencer@globe.gov

GLOBE is an international science and education program consisting of students, teachers, and scientists working in partnership to increase scientific understanding of the Earth and support improved student achievement in science, technology, mathematics, and engineering. From its inception, GLOBE has been a web-based program and is now offering distance learning components to support and enhance GLOBE training and professional development activities. The new GLOBE Trainer Certification Program (TCP) is a three-part sequence developed as a mixed design approach of online and face-to-face components, including a pre-requisite online Orientation course, a face-to-face workshop, and a post-requisite online Practicum course. This presentation explores the new GLOBE training model that uses a mixed design approach of online and face-to-face instruction to empower and engage the GLOBE community

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

42. ESPERE – Climate Information for schools

Dr. Elmar Uherek
Max-Planck-Institute for Chemistry
Mainz – Projekt ESPERE
euherek@espere.net

ESPERE (Environmental Science Published for Everybody Round the Earth) is a science driven initiative, organised as Association for teachers and scientists. ESPERE promotes and carries out programs for understandable and reliable education and information of pupils, teachers and the interested public on climate processes, the human impact on it and related consequences. In an EU funded project (Educational Network on Climate = ESPERE-ENC) a multilingual and comprehensive web-based Climate Encyclopaedia of about 300 pages background texts and worksheets has been built up in 2003 and 2004. The material is developed in two levels for application in classes at www.espere.net . This basic publication is open for extensions and interlinks with other programs and publications. The structure of ESPERE is open for co-operation and the development of common projects in particular focussing on environmental education. Addressing the

same target group ESPERE publications could also serve as complementing material for GLOBE projects, in particular if carried out in an international frame.

STRAND 4: The Progress (public relation, marketing, fundraising)

43. Multi-regional leadership and Globe long term sustainability

By: Jana Ledvinová
Director - Globe Program Europe
janaledvinova@volny.cz

Why is the Globe such a unique and successful program?
Is that because of balanced system of scientific protocols and educational tools?
Is it the "usefulness" which keeps the schools, students and whole countries active?
Why we call each other "the GLOBE Family" so often?

The Globe Program has been developed helping by a unique long term cooperation of skilled and enthusiastic people all over the world. **Participation** of everyone on the program implementation and development was widely supported by the globe leaders since the very beginning. Every teacher or student share **responsibility** for the program success through scientific protocols and worksheets. Every country has chance to develop its own "Globe" according to the **local conditions** and opportunities creating the program **diversity** in all aspects. International **communication** as massively supported by the Globe web page and services. The impact of these principles should be carefully analysed and incorporated into the official Globe managerial systems. **Participatory leadership** is the key strategy for the Globe long term survival and sustainability.

STRAND 4: The Progress (public relation, marketing, fundraising)

44. Fundraising and public relations strategies for Globe development

By: Jana Ledvinová
Director - Globe Program Europe
janaledvinova@volny.cz

Where are the Globe program financial resources from?
Who pays Globe at schools? Countries?
Who supports the Globe headquarters? Web and informational services? Scientists?

The detailed survey of financial resources for the Globe program in its all layers (global-regional-local) has never been done. It is clear that the major massive support of the Globe program coordination comes from the US governmental resources mainly through NASA and NSF. It is not that clear how different countries fundraise for the Globe operations. Some use governmental resources, but others also approach corporate donors and individuals. Last but not least come countries support part of the Globe budget from fees paid by schools. The European survey of resources for different Globe country coordination units was done at the beginning of the year 2005. Clarification of different

financial resources for Globe stakeholders will help to build the long term sustainability in all layers, from schools and local communities, through countries and regions to the globe central coordinating body.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

45. Spineless Wonders, or, What is that little wiggly thing anyway? A workshop on Macroinvertebrate Lives

By: Sarah May
University of California, Merced, USA: smay@ucmerced.edu
Rebecca Boger
GLOBE, Boulder, CO, USA: rboger@globe.gov
Martha Conklin
University of California, Merced, USA: mconklin@ucmerced.edu

The Freshwater Macroinvertebrate protocol is one of the newest protocols introduced to GLOBE. Although studying macroinvertebrates can be complex, these communities are a great unifier of GLOBE protocols. For instance, macroinvertebrates that scrape algae like to feed where algae grow well. Algae grow well in more sunny areas of streams (ATMOSPHERE). Most macroinvertebrates have specific substrate requirements, so whether a study site has cobbles, gravel sand or mud will influence the types of organisms found (SOILS). The types of trees around a stream or lake determine the quality of food for macroinvertebrates. A lake or stream surrounded by evergreens typically has much fewer useable nutrients that are available to macroinvertebrates than one surrounded by deciduous leaves with softer leaves (LAND COVER). Finally, the quality of the water and the water flow will also influence the community of macroinvertebrates found at a particular site (HYDROLOGY).

This workshop will discuss the lives of macroinvertebrates, how to recognize them and what factors influence their biology and ecology. Participants will identify invertebrates from live samples and hypothesize on their environmental requirements based on the presentation material. Finally, participants will get materials to take with them to help with identifications and hypothesis formation and a copy of the presentation for training.

TENTATIVE OUTLINE

Lecture (30-40 minutes)

1) Community composition of different environments
2) What is the role of macroinvertebrates in ecosystems – who's eating whom and/or what
3) Life cycles – not everyone comes out to play at the same time
4) Physical influences on macroinvertebrates (chemistry, substrate, temperature,etc) – how GLOBE measurements fit in
5) Hypotheses building

Participant Investigation (50-60 minutes)

Participants will be able to use microscopes and magnifying glasses to look at live

specimens of macroinvertebrates from various habitats and use keys to identify them based on their morphological characteristics. Participants will also be asked to hypothesize based on the lecture material what environment certain macroinvertebrates are likely to thrive in (e.g. substrate requirements, light requirements, food requirements, etc.)

Wrap-up Participant Discussion (30-40 minutes)

LOGISTICS

Need:

1) Live invertebrate samples for people to examine (I will help with collection)
2) microscopes if possible
3) magnifying glasses
4) basic hydrology equipment (pH meter, DO kit or meter, temperature probe/thermometer)
5) Room with tables that can be placed in a semicircle – or that people can easily move around in

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

46. Young Earth Scientists at World Heritage sites: Space to learn science and gain conservation awareness among youth in developing countries

By: Jessica Bunning UNESCO

UNESCO, Remote sensing unit, Paris j.bunning@unesco.org

Teresa Kennedy GLOBE

GLOBE tkennedy@globe.gov

The Young Earth Scientists at World Heritage sites program extends the GLOBE program to youth from developing countries, in remote areas and living in close proximity to World Heritage cultural and natural sites and other protected areas. This new partnership aims to raise awareness, pride and support amongst these young local populations in order to sustain the Earth's precious cultural and natural resources for generations.

Through field-based environmental learning, young students discover their local cultural and natural sites by meeting with site managers to discuss the unique characteristics of their local surroundings. They make observations of the cultural and biological features of the site and take scientifically valid data of its climate, land cover, hydrology and atmosphere. Based on their collected data and learnt knowledge of the site problems and needs, the young students are invited to create projects in co-ordination with NGOs, to assist with the protection of the site. The interaction with field specialists gives them a better appreciation of the importance of science and of the professions that use these skills. The collected data can also help to understand the Earth's biosphere using space research.

List of Abstracts

The established GLOBE program has an international network of young students, teachers and scientists studying environmental issues and sharing useful environmental data. Young students from developing countries are able to join this network and establish technology-based links to exchange information. The young students can exchange views on their local environment and gather valuable insights into how to contribute to its long-term conservation. This provides an excellent forum for cooperation and enhanced understanding of other cultures and heritage. UNESCO and GLOBE are currently developing the Young Earth Scientists at World Heritage sites program at 8 World Heritage sites around the world including: Russia, India, Jordan, Madagascar, Mexico, Iguazu National Park, Maccu Pichu and Guatemala.

Providing a joint presentation on the partnership program of GLOBE at the conference will help to promote its activities and attract potential donors or interested countries.

Jessica Bunning
UNESCO
Remote Sensing Unit
7 Place de Fontenoy
75352 Paris 07 SP (France)
tel: + 33 (0)1 45 68 14 26
fax: + 33 (0)1 45 68 55 70

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

47. GLOBE LEARNING COMMUNITIES

Dr. Teresa Kennedy
Mr. Gary Randolph
Dr. Sheila Yule

The GLOBE Learning Community (GLC) concept encourages the participation of a broad range of community members who share a common commitment to supporting teachers and students in the implementation of GLOBE for the benefit of their community. A GLC might begin as a GLOBE Partner based at a university working with teachers and students from primary and secondary schools in the local school district, and then branch out to include parents, youth clubs, scientists, senior citizens, other colleges and universities, daycare centers, museums, businesses, government agencies and other community members.

The purpose of this session will be to give an overview of GLOBE Learning Communities within highlighted models. Each participant will receive a copy of The GLOBE Learning Communities Toolkit in CD format. Additional resources designed to assist in the development of preservice programs, and in developing community involvement in understanding data will also be available in CD format.

48. GLOBE Urban Phenology Year Project: A Preliminary report

Authors: Rico Gazal, Department of Aquatic, Watershed and Earth Resources
5210 Old Main Hill
rgazal@cc.usu.edu
Michael White, Department of Aquatic, Watershed and Earth Resources
5210 Old Main Hill
mikew@cc.usu.edu
Robert Gillies, Department of Aquatic, Watershed and Earth Resources
5210 Old Main Hill
rgillies@gis.usu.edu
Leslie Gordon, Department of Aquatic, Watershed and Earth Resources
5210 Old Main Hill
leslie@oregoncoast.com
Elena Sparrow, School of Natural Resources and Agricultural Sciences
317 O'Neill; PO Box 757200
University of Alaska Fairbanks
Fairbanks, AK 99775-7200

Urban areas tend to have warmer temperature than the surrounding rural fringes. Because of high concentration of buildings, roads and artificial surfaces in urban areas, heat retains and creates a phenomenon called heat island effect. Some studies have suggested that heat island effect results in changing patterns of vegetation phenology, causing plants in cities to have longer growing season than the rural areas. In this study, we are interested in the effect of the urban environment on the timing of leaf appearance of deciduous trees. The GLOBE Urban Phenology Year (GUPY) project started its groundwork in September 2004 and enlisted 11 cities in Asia, Europe, North America and Africa to participate in a measurement campaign to investigate patterns of vegetation phenology around the world. Before the spring budburst campaign started, workshops were conducted in different cities to orient the teachers and students on the GUPY project and the GLOBE budburst protocol. The GUPY project also provided the participants with incentives, mentoring support on species and site selection and suggestions for other student inquiry projects related to urban phenology. Budburst data from some cities were collected this spring season while others are scheduled to start next year. Satellite imagery from each city is also being analyzed to determine patterns of urbanization and temperature gradient. The project hopes to complete the data analysis by the end of Fall 2005.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

49. GLOBE Egypt, a prospective view

By: Mohamed El Awadly
Port Said Language School
Ministry of Education, Egypt

List of Abstracts

About 10 years ago, on April 1995, GLOBE program was launched in Egypt as an educational program, since then, a plan was made and the necessary measures were taken for implementing the program in some Egyptian schools. But where the program is standing now, and what are the obstacles that hindered its satisfied implementation in the last 10 years, and what is our next future plan to overcome these problems and for the desired promotion of the program in Egypt.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

50. GLOBE Port Said-A case study

By: Mohamed El Awadly
Port Said Language School
Ministry of Education, Egypt.

Port Said School is one of the pioneer schools that implemented the GLOBE program in Egypt 10 years ago. What are the lessons that can be concluded from our experiment, how it was implemented inside the school, how it was linked to the curricula inside the class, what are the problems we faced and how we overcomed them, and what are the effects that the program left on our students and the benefits they had from??

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

51. Unifying Science Outdoor Education in Los Angeles with GLOBE

By: Henry Ortiz, Los Angeles GLOBE Coordinator, USA
Henry.Ortiz@lausd.net

GLOBE teacher, student, and community cooperation:
Many outdoor education providers look for ways to align their programs with school District goals. The GLOBE website is a logical resource to allow students the opportunity to share their data with the school community and other students throughout the world. In Los Angeles, we have introduced GLOBE to a variety of formal and informal education Agencies that have used components of the program to expand their science curriculum and link it to the school's curricular goals. What kind of programs have we worked with in Los Angeles? How have we introduced the program in the schools in Los Angeles? How have we encouraged participation in GLOBE and what strategies have been the most successful for us?

52. Understanding GLOBE Student Data

By: Gary Randolph
Regional Director - Europe and the Middle East
The GLOBE Program
P.O. Box 3000
Boulder, CO 80307
USA
Phone: 303-497-2645
Fax: 303-497-2638
Email: randolph@globe.gov

The GLOBE Database, as of April 2005, houses nearly 13 million student data from over 6,900 schools in 89 countries! This has been accomplished in 10 years of data collection. As the GLOBE Program celebrates 10 years from its implementation on April 22, 1995, it is appropriate to ask, "Chat can these data tell us? What can students and teachers do with all of
these data?"

The purpose of these activities is two-fold: first, to help guide the teacher through these millions of data, and second, to inspire teachers and students to both collect GLOBE data as well as to use these data in their own research. Data exploration can be exciting and a little
addicting. Understanding GLOBE Student Data activities can fit into various parts of the curriculum. These activities contain step-by-step procedures as well as notes on what students should see in and understand about the data. These activities should be presented, not as assignments, per se, but as fun activities to aid in developing observational skills and applying prior knowledge to understanding GLOBE student data.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

53. Sustainability of the GLOBE program in Estonia

By: Ülle Kikas

No abstract

54. E-Learning materials created by European GLOBE teachers and country coordinators in the e-LSEE project

By: Ülle Kikas
GLOBE CC, Estonia
K. T. Hetland, I. Kocova, M. Machinko-Nagrabecka, A. Tasker, Y. Bellens

In the years 2001 – 2003 the GLOBE Country Coordinators and teachers of Czech Republic, Estonia, the Netherlands, Norway, Poland, and United Kingdom were involved in the project „e- Learning in Science and Environmental Education", supported by European Commission under Socrates- Minerva program.

The presentation will give overview of the e-LSEE project and describe the created materials for online learning. The applied pedagogical principles, selection of target groups, and educational use of the GLOBE database are considered.

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

55. Towards a Next Generation GLOBE Web Site

By: Michael Turpin, Sandra Henderson, David H Brown

Throughout GLOBE's 10-year history, the GLOBE Web site has been a central component of the program. In response to the changes implied by Next Generation GLOBE (NGG) and to user community input, we are currently planning a significant redesign of the GLOBE Web site. Major structural changes and improvements will be made throughout the site, resulting in a more effective tool for our partners, teachers, and students. In this paper we will describe the high-level goals, audience, functions, and design guidelines for a Web site redesigned to support NGG. We will include a planned timeline and will describe an open collaborative process for how the new site will be designed and implemented.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

56. The GLOBE Program and EcoSchools

By: Andy Tasker
Country coordinator, Great Britain

Eco-Schools is a practical project for schools, to raise the awareness of pupils – and the whole school community - to the impacts that they have on the environment. Set up by the Foundation for Environmental Education (FEE) in 1994 as a response to the needs identified at the 1992 UN Conference on Environment and Development, the Eco-Schools programme is now running in 31 countries and implemented in over 13,000 schools. Eco-Schools Coordination was set up with the support of the European Commission. In 2003, a Memorandum of Understanding between UNEP and FEE

recognised Eco-Schools as a “global model for environmental education for sustainable development”.

At the basis of the programme is a participative environmental management system, which helps to structure a plan of action for the school and the surrounding community, involving all the stakeholders of the school. Pupils work with teachers, parents, caretakers, governors and even cleaners, to assess the environmental impact of the school, and then create and carry out an action plan for improvements. Themes covered include energy, travel, water, waste and biodiversity.

While involving a strong education perspective, and demonstrating the importance of responsible individual and community citizenship and lifestyle choices, the programme aims to result in concrete and tangible improvements to the school and its surroundings. When schools can demonstrate successful implementation of the 'Eco-Schools process', and meet internationally agreed criteria, they can apply for the 'Green Flag' as a symbol of their achievements.

Comparing Eco-Schools with the GLOBE Programme, it can be seen that Eco-Schools offers a participative and process-based approach to environmental education and participation, whereas GLOBE offers a strong methodology and excellent internet tools for measuring and reporting on environmental parameters. These two international environmental programs thus complement each other, with Eco-Schools focusing inside the school, looking at human impacts, and GLOBE looking at the external environment, and monitoring changes.

Several steps are possible to develop these potential links between the two programmes:

- **Mutual recognition**: Coordinators responsible for GLOBE and Eco-Schools programmes could disseminate information on the two programmes to both networks, at the level of national coordinators, in order to raise awareness of the respective programmes and opportunities for complementary cooperation. In some countries, the same organisation already runs GLOBE and Eco-Schools: in others links could be made. In the UK we have linked our websites, so teachers can see the links and access both programmes.

- **Participation at events:** On the basis of mutual interest, GLOBE representatives could be invited to attend Eco-Schools-organised events, and vice versa, in order to better understand the respective programmes and interact with other programme coordinators, with a view to better understand opportunities and challenges to complementarity.

- **Synergy**: Based on the interest of national implementation focal points for Eco-Schools and GLOBE, participation in the respective programmes could open up opportunities for participation, education and access to useful resources by schools. For example, schools which are part of the Eco-Schools programme wishing to go further in environmental science education, monitoring of environmental variables or contributing

to international databases could also integrate GLOBE. Conversely, GLOBE schools wishing to extend their activities to an integrated environmental management programme, could integrate the international Eco-Schools programme.

- One natural issue on which a thematic synergy could be possible and interesting could be on **Climate Change**. Here, the opportunities for cooperation between Eco-Schools and Globe programmes could provide much added value to schools
- **Sustainable Development** Using GLOBE's methodology for defined protocols and objective measurements, GLOBE-UK has developed a series of sustainable development activities which measure our impact on the planet. These are complementary to existing GLOBE activities, and also fit in perfectly with Eco-Schools measurements. They therefore provide tools to link the two programmes even more closely, with the GLOBE-UK SD database providing a location for data from Eco-Schools and GLOBE Schools alike.

Further potential for collaboration is already being explored, with the aim of providing teachers and students with an integrated approach to the environment.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

57. The role of forests in global carbon cycling and global climate change

By: Jana Albrechtova, Czech Republic, albrecht@natur.cuni.cz

Forests are an important part of global carbon cycling and a question to what extent they can act as carbon sinks is very important. Examples of how forests can affect climate in landscape will be presented. The link between the role of forests in landscape and tree physiology will be explained.

The ability of forests to use atmospheric CO2 is determined by their physiological state. The ways of monitoring forest health will be given and a GLOBE local protocol "How are spruces?" will be presented. Currently the project is in its 6th year and tens of schools across the Czech Republic have participated in it. Is this protocol suitable for introduction into GLOBE protocol curriculum of more countries in Europe?
http://www.natur.cuni.cz/~albrecht/
http://www.nrdc.org/onearth/05spr/triangle3.asp

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

58. "River Watching" (Re-naturalisation of a little stream)

By:Hanspeter Meier, GLOBE Switzerland

The presentation is based on three topics:

a) How can I do researches – how do I get the right persons involved in my project?

b) An example of re-naturalisation of a little local stream.
c) What students can observe and how they attend to the changes.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

59. Let´s link GLOBE & ASA! International students´ exchanges with mutual benefits.

By: Silke Alsen, Nordic/Baltic Regional Environmental Office (REO), US Embassy Copenhagen

The presentation by Silke Alsen, US Embassy Copenhagen, gives an insight in the current initiative to interlink two successful global network programs involving the youth in environmental considerations and activities: the GLOBE PROGRAM and the GERMAN ASA PROGRAM.
Existing since 1960, ASA (**www.asa-programm.de**) is a network for learning in the field of development policy addressed to students and young professionals. The non-profit organization, administered by InWent, Germany, organizes three months work and study stays for students and young professionals from Germany and other European countries in Africa, Asia, Latin America and Southeast Europe. ASA offers preparing and follow-up training for the young European participants and a scholarship for the stay including insurance and a travel allowance.
Among the 120 annual ASA-projects covering all kinds of university disciplines for teams of 2-3 European students, one special focus is regularly laid on environmental education and research. This is the direct link to GLOBE and its active community.
Since 2003, ASA is also cooperating with civic solidarity organizations in the three Baltic countries as well as in Poland, Czech Republic, Slovak Republic and Hungary. This initiative called ***Global Education Network for Young Europeans - GLEN*** has recently been awarded by the **Council of Europe** with the **World Aware Education Awards** for "the excellence of the GLEN project for networking, co-ordination and partnership for increased and improved Global Education." (May, 2005; www.glen-europe.org)
The linking idea for GLOBE and ASA is to run so-called special ASA *South-North Projects*.
These *real exchange* projects last six months: three months in Germany and/or one of the European partner countries with Southern students visiting Europe and three months in the host country abroad for Europeans. By this, GLOBE partners from over the world will be able to interlink on personal basis during a three months period and receive additional assistance to work on GLOBE data, strengthen networking capacities, organize teachers' trainings or even GLOBE international conferences.
In 2006, a pilot project is about to run between Cameroon, Estonia and Germany.
ASA can offer GLOBE: Funding for international GLOBE cooperation; professional student's preparation for the stay abroad; professional evaluation and follow-up with the students after the stay; existing network and fundraising experiences.
GLOBE can offer ASA: Reliable partners for the future with regular project cooperation; international network support incl. GLOBE International Alumni network; GLOBE PR material; co-funding or fundraising assistance for international GLOBE cooperation.

Benefits for participating GLOBE students: Insight in GLOBE activities abroad; assistance in organizing and funding the stay abroad; preparation through seminars; integration in the ASA Alumni Network; access to African GLOBE data and cooperation; training of intercultural communication skills.
Current partners: ASA Coordination, Germany; GLOBE networks in Estonia, Latvia and Germany; Regional GLOBE facilitators (US Embassies Copenhagen and Tallinn) – and high interest of GLOBE HQ and GLOBE EUROPE.
Further interested partners are encouraged to get in contact with Silke Alsen – REO, US Embassy Copenhagen (alsensx@state.gov; Phone: +45 - 3341 7294).

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

60. GLOBE FAMILY - STUDENT´S CONTACTS

Hana Grundová – GLOBE trachet
Iva Víšová – student
Gymnazium Ceska Třebová, Czech Republic

The teacher of Grammar school talks about the usage of the program GLOBE for establishing personal contacts among students, their cooperation in common research and about the influence of such contacts on breaking cultural bariers among nations.
The Grammar school at Ceska Trebova in Czech Republic has made contacts with GLOBE schools in 5 countries since it started to work in the GLOBE program 8 years ago. There are regular students exchanges with a school in Prestfoss (Norway) as well as with schools in Cyprus and Croatia.
The students have had opportunity to meet foreign GLOBE students at confereces in Bahrain, Croatia, Finland and at GLOBE Games in Norway. While working on common projects connected with the GLOBE program
(Project Budburst, Energie, Drinking water for Europe), they have learnt environmental problems and varius solutions in various countries.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

61. GLC on Young Soil Doctor in Thailand

By: Assoc.Prof.Dr.Charlie Navanugraha
IPST and Faculty of Environment and Resource Studies
Mahidol University, THAILAND
encnv@mahidol.ac.th

Soil protocols of GLOBE have been applied to run on the training and workshop of "Young Soil Doctor" during June 15-19, 2005 at Hauy-sai Royal Project, Cha-Am, Petchaburi province. There are 40 peoples of both teacher and student from 20 schools and asked to be trained to be the young soil doctor. Six of soil experts from Land development department were asked to train and build up the knowledge on soil

conservation and land management for all participants. Basic and advance of Globe's soil protocols are main courses and using appropriated field test kit in field study and also collected soil samples for laboratory analysis. Soil conservation practices and soil management have also been applied to them in order to build up their skill on soil conservation and land management. Practicing on Vetiver grasses seedling, compose fertilizer, and bio- insecticide have been used on field training to all participants. They are all impressed and willing to be the young soil doctor to develop their own community.

Paper for GLOBE 2005 Annual Conference, 31 July – 5 August 2005, Prague, Czech Republic

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

62. Science Projects in Los Angeles Classrooms: Implementing Air Quality Research as an Educational Tool

R. Turco, University of California,
Los Angeles, CA, USA 90095-1565
turco@ucla.edu
N. Enyedy, P. Lee, K. Crohn and N. Eisenberg
University of California, Los Angeles, CA, USA 90095-1565
H. Odtiž, Los Angeles Unified School District Science Advisor

We discuss the design and implementation of science projects related to urban air quality-indoors and outdoors-that are being implemented in secondary school classrooms in the Los Angeles Unified School District (LAUSD) through UCLA's GLOBE in the City project. UCLA faculty, staff and undergraduate students are working closely with LAUSD science advisors, teachers and students, mainly in high schools, to develop projects that involve GLOBE protocols integrated with other types of measurements. Our classroom-based studies of urban air quality and its health impacts has resulted in novel data collection, analysis and reporting at school campuses. In our approach, teachers and students design scientific hypotheses and test them using observations obtained with equipment provided by GLOBE, the California Air Resources Board, and the LAUSD Science Program. The UCLA staff offers broad support and guidance for the projects, advice on experimental design and instrumental applications, and data analysis and interpretation. In this way, GLOBE in the City is allowing students in low-SES schools to perform individual and team experiments relevant to their urbanized environment under the guidance of university experts, thus exposing these students perhaps for the first time to a university-level culture of learning, and environmental science as a potential career goal. Examples of student projects will be shown, and issues that arise in implementing science projects at secondary schools will be discussed.

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

63. Bringing University Science to the K-12 Classroom: GLOBE in the City as a UCLA/LAUSD Collaboration

R. Turco, turco@ucla.edu
University of California, Los Angeles, CA, USA 90095-1565
H. Ortiz N. Enyedy, K. Crohn, N. Eisenberg and P. Lee
University of California, Los Angeles, CA, USA 90095-1565
H. Odtiž, Los Angeles Unified School District Science Advisor

GLOBE in the City is collaborating with one of the largest urban school systems in the United States-the Los Angeles Unified School District (LAUSD)-to employ GLOBE-related science to enhance learning in low socio-economic status (SES) schools, and to encourage the teaching of science in an environmental context at these schools. The project involves a close relationship with the LAUSD GLOBE franchise, and the core science programs of the LAUSD. Educational aspects include training of teachers and students in GLOBE protocols, establishment of research sites at impacted school campuses, implementation of science projects in classrooms, and hands-on experience with the scientific process. To achieve these goals, faculty and staff from UCLA have been recruited to work with teachers and students in establishing classroom projects. UCLA faculty are active in the educational aspects of the program, including visiting local school campuses for presentations and discussions of scientific research, and developing materials that can be used by teachers and students in their efforts. UCLA staff thereby provide general guidance for the projects-for example, by critiquing experimental design and instrumental applications, and data analysis and interpretation. The successes and pitfalls of setting up and implementing such collaborations are discussed. The roles of faculty and support staff in such an endeavor are delineated, and incentives for participation on all sides are identified

STRAND 1: The Prospects for GLOBE future (vision, mission, ethical code)

64. The new highschool education standards in Germany - GLOBE can help to build up "competences"

By: Detlef Kaack
GLOBE Germany (translations and regional coordinator Hamburg)
kaack@globe-germany.com

"The new standards for science teaching in Germany. There are new standards of the German "Conference of Education Ministers" (KMK, www.kmk.org) issued as a guide for all German states (Länder) to be the basis of a new series of curricula that have so called "competences" as the main categories to be achieved by highschool teaching. This is a clear frame of orientation to future implementation of the GLOBE program in

German schools. GLOBE is taylored to build up competences and can show an experienced way of how to do so.

I am sure that many other countries may be interested in this new definition of highschool education standards and future curricula and that it will be interesting to analyse the GLOBE program how to serve these requirements."

Strand 3 – The Partnership and Strand 4 – The Progress

65. GLOBE Games in the Czech Republic – opportunity for cooperation at once in local communities and among countries

BY: Dana Votapkova, Ing.
TEREZA Association, Prague, the Czech Republic
dana.votapkova@terezango.cz, www.terezanet.cz

GLOBE Games is meeting of the GLOBE schools, students and teachers from the Czech Republic and different GLOBE countries. They come not only to compete, but jointly explore a chosen area, receive news about GLOBE, meet and share their experiences. Student teams compete in various disciplines covering many of the GLOBE protocol areas. They also have fun at some sites, playing the pH game or cooperating in special teambuilding tasks. One group of students works as reporters, preparing a special edition of the GLOBE Newsletter for distribution to the participants at the closing ceremony. Teachers are invited to attend a field teacher conference where they can meet scientists and local specialists, practice new measurements, share experiences.
TEREZA Association prepares and organizes GLOBE Games yearly in close cooperation with one of the very active GLOBE school. **GLOBE Games have many different impacts on the communities** and it is very helpful to **cooperate with the local community** during preparing and organizing this event. It usually brings the new way of close cooperation for the next years.
GLOBE Games is also a very **good opportunity for working with media and public awareness.**
We consider GLOBE Games to be **one of the most effective long-term methods of motivation for students and teachers to go on with the GLOBE program and to develop it.**
TEREZA Association has now hosted GLOBE Games in the Czech Republic for eight years in a row and has always welcomed schools from other countries to participate. The GLOBE Games allowed for so many students and teachers from different countries to meet and we believe that this meeting will facilitate their continued cooperation. We hope that this year's European GLOBE Games have begun a European tradition which will continue in different countries in the coming years.

66. Globe activities in an inuit - country with a littel and dispersed populations.

By: Ole Sivertsen, CC Greenland.
Midtgroenlands Gymnasiale Skole (a high schol), country: Greenland,
e-mail: os@gu-nuuk.gl

The GLOBE posibilityes in a great, beautiful country with very few, but lovely people.
The teacher training, opportunities and obstacles.
The goal in this year with our GLOBE activities.
Do you want to visit Grenland? You are more than welcome.
Best regards Ole Sivertsen

STRAND 2: The Program
(goals in education and science, teaching materials and training, GLOBE learning communities)

67 Establishing GLOBE as a Part of the Science Plan in a Large K-12 Urban School District: Los Angeles

By: H.Ortiz, R. Turco, N. Enyedy, P. Lee, K. Crohn and N. Eisenberg
Los Angeles Unified School District GLOBE Coordinator, USA,
Henry.Ortiz@lausd.net

Los Angeles Unified School District has undergone major administrative changes in the science branch. How have these changes affected the GLOBE program in a district such as Los Angeles and what is being done to adapt GLOBE to the new district science plan? What kind of educational opportunities and challenges have we faced and how have we dealt with these? We will discuss curriculum integration, teacher trainings and equipment use in the schools.

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

68. Creating Opportunities for Synergistic Cooperation with a Large Urban Community

By: H.Ortiz, R. Turco, N. Enyedy, P. Lee, K. Crohn and N. Eisenberg
Los Angeles Unified School District GLOBE Coordinator, USA,
Henry.Ortiz@lausd.net

The focus of this presentation will be on our partnership with UCLA and the educational components of our air quality project. We will discuss the schools involved, the recruitment of schools, the development of teacher leaders and the outreach to other

educational partners within and beyond our geographical area. We will also discuss anticipated future projects with students and other agency cooperation with Los Angeles students. In addition, many outdoor education providers look for ways to align their programs with school district goals. The GLOBE website is a logical resource to allow students the opportunity to share their data with the school community and other students throughout the world. In Los Angeles, we have introduced GLOBE to a variety of formal and informal education agencies who have used components of the program to expand their science curriculum and link it to the school's curricular goals. How have we expanded GLOBE in Los Angeles? How have we encouraged participation and what strategies have been the most successful for us?

STRAND 3: The Partnership (regional concept, partners, communication, leadership)

69. INSPIRE and GLOBE - infrastructure and capacity building in Europe

By: Eva Pauknerova, PhD

Senior Scientist , Land Management Unit - TP 262
European Spatial Data Infrastructure Action
Institute for Environment & Sustainability
Joint Research Centre - European Commission
I-21020 ISPRA (VA) - Italy
Phone: +39 0332 789700 - Fax: +39 0332 789803
E-mail: Eva.Pauknerova@jrc.it
WWW: <http://www.jrc.cec.eu.int/> http://www.jrc.cec.eu.int

INSPIRE means Infrastructure for Spatial Information in Europe. The presentation introduces main goals of the INSPIRE Directive and its importance for environmental protection in Europe. It describes the basic time frame, key activities and actors in the INSPIRE development process. The Annual 2005 GLOBE Conference theme: "Global - Regional - Local" enables highlighting where INSPIRE and GLOBE are similar. Both programs support: (i) recognition and understanding of local environment and data in a regional or global context; (ii) systematic and easy use of spatial data for environmental protection, (iii) differentiating scales relevant to specific environmental phenomena, data collection and decision making, (iv) data, information and knowledge transfer cross administrative borders or professional barriers; (v) capacity building in a long-term perspective. Selected practical examples will help to demonstrate domains where INSPIRE/ESDI and GLOBE may influence or support each other (i.e. use of IMAGE 2000, Land Cover Maps combined with local data for educational purposes; guided involvement of GLOBE students into a simplified data quality testing or up-dating; education with the INSPIRE implementation 10-years perspective; empowering researchers to formulate and promote the complex INSPIRE goals and process in a clear and simple way.) Specific issues related to the European Region will be mentioned. Reference will be made to Spatial Data Infrastructures (SDIs) developed or in preparation in other parts of the World.

70. GLOBE and Art

By:Anikó Orgoványi
Globe Country Coordinator, Hungary

At the Meeting of Country Coordinators held in Prague in 2004, we had a workshop titled GLOBE and Art, seeking ways to include art in the GLOBE Program. We worked in three groups and made the following proposals:
.Announcing artistic competitions in painting and other themes, E-art and electronic judging.

- Encouraging the GLOBE schools to incorporate music in the GLOBE Program,
  - find the sounds of nature
  - compose natural symphonies, e.g. a river symphony

- Organising theatre performances, dances, cross-cultural exchanges
- Designing satellite images as an art
- Encouraging the writing of poetry and short novels
- Making the students' works of art known on websites, CDs and in travelling exhibitions.
- Involving non-scientific students and teachers in artistic activity
- Creating a virtual gallery on www.globe.gov
- Publishing GLOBE art postcards, bookmarks, postage stamps and calendars.

STRAND 4: The Progress (public relation, marketing, fundraising)

71. Marketing Strategies for the Next Generation GLOBE

By:Paula M. Robinson, The GLOBE Program

GLOBE has an existing brand value, as a unique, hands-on, international primary and secondary school-based education and science program, with students taking real measurements and contributing to real science in 106 countries. GLOBE operates in multiple markets, serving the needs of GLOBE teachers (and students), Funding agencies, and potentially corporate sponsors (and foundations). GLOBE Partners are a critical link in engaging and re-engaging the teachers fundamental to the program's success. The large-scale science program programs of Next Generation GLOBE provide the basis for defining focused market segments. Evidence of measurable success with projects can become the cornerstone of a case for support in marketing to funders inside and outside the government. Feedback from partners is sought on interdependent program marketing strategies.