

## Introduction

Geophysical Information for Teachers (GIFT) Workshops, initiated by AGU in 1991, are offered in conjunction with the annual Fall and Spring Meetings. Up to 50 secondary school teachers attend these workshops, which provide an opportunity to learn about the latest discoveries in the Earth and space sciences from the scientists themselves. Useful hands-on activities and classroom resources are also demonstrated, and complimentary meeting badges allow teachers to attend the technical sessions and exhibits of the AGU meeting. As of 2003, GIFT Workshops have also been offered at the annual meeting of the European Geosciences Union (EGU), in collaboration with AGU. Recent GIFT Workshops have addressed these topics:

2008 Joint Assembly (29-30 May, Fort Lauderdale, FL)

### Theme: Hurricanes and Atmospheric Science

Hugh Willoughby, Florida International University – Hurricane Science

LuAnn Dahlmann, TERC – Putting Hurricanes on the Calendar: Exploring HURDAT

<http://www.aoml.noaa.gov/hrd/hurdat/>

Chris Landsea, NOAA – Hurricanes and Global Warming: Expectations and Observations

Susan Buhr, University of Colorado Boulder – Atmospheric Science Literacy Framework

<http://eo.ucar.edu/asl/>

Chris Costello, Google – Google Earth as a Scientific Tool <http://earth.google.com/>

Steven Lloyd, NASA – Using GIOVANNI, a database of Earth Science Remote Sensing data

<http://disc.sci.gsfc.nasa.gov/techlab/giovanni/>

Lin Chambers, NASA – Classroom activity: Hurricanes as Heat Engines

([HTTP://MYNASADATA.LARC.NASA.GOV/MND\\_LESSONS.HTML](http://mynasadata.larc.nasa.gov/mnd_lessons.html))

Shirley Murillo, NOAA – Hurricanes at Landfall

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2007 Fall Meeting (12-13 December, San Francisco CA)

### Theme: Climate Change Science and Policy

Tim Killeen, NCAR – Climate Change Realities

Richard Somerville, UCSD – The Intergovernmental Panel on Climate Change and its Report Development Process

Peter Aldhous, New Scientist magazine – Global Warming: Americans' Evaluations of Policies to Reduce Greenhouse Gas Emissions

Roberta Johnson, UCAR – Atmospheric Science and Climate Literacy

Annegret Schwartz, Integrierte Gesamtschule Mainz – Energy Reduction at a School in Mainz, Germany

UCAR EO staff – Climate Change Science and Classroom toolkit

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## 2007 Joint Assembly (23 May, Acapulco, Mexico)

Theme: Aspects Earth and Space Science (given in English and Spanish)

Mark Moldwin, UCLA - An Overview of Solar Terrestrial Relations

Blanca Mendoza - Efecto de la actividad solar en la salud humana

Pat Reiff, Rice University - Space Weather

Roberta Johnson, UCAR – Magnetometer and Terrabagga; Using the Carbon Cycle Interactive Game in the Classroom

Sandra Henderson, NCAR - Thermal Expansion of Sea Water

Roberta Johnson, UCAR - Mapping Ancient Coastlines; Graphing Sea Ice Extent in the Arctic and Antarctic

Sandra Henderson, NCAR - Snack tectonics; The Geography of Land Planning; Adaptation Investigation, and; Food Chain Checkers

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## 2006 Fall Meeting (13-14 December, San Francisco, CA)

Theme: Earthquakes and Tsunamis

John Taber, IRIS and Michael Hubenthal, IRIS - Exploring Earth Structure with Occam's Razor

Michael Wyession, Washington U. Journey to the Center of the Earth

Shelley Olds, UNAVCO - Visualizing Relationships between Earthquakes, Volcanoes, and Plate Boundaries

Hiromichi Tsuji. ERI - Japanese Archipelagos: A Battlefield to Mitigate Earthquake Disasters

Michael Hubenthal, IRIS and Robert de Groot, SCEC - Causes of Earthquakes

John Taber, IRIS - Seismic Waves (Human and Slinky)

Robert de Groot, SCEC - Putting Down Roots in Earthquake Country: California Seismicity and Earthquake Safety

John Leck, NASA: GSFC - Remote Sensing Earthquakes and Tsunamis: NASA's Earth Observatory

Kenji Satake, GSJ - The Orphan Tsunami of 1700 -- A Trans-Pacific Detective Story

Michael Hubenthal, IRIS and John Taber, IRIS - Preparing for the Big One

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## 2006 Ocean Sciences Conference (21-22 February 2006, Honolulu, HI)

### Theme: The Ocean: Some Things Every Student Should Know

Peter Etnoyer, Natural History Museum of Los Angeles County - Five Ways Deep Sea Coral Communities are like Shallow Tropical Coral Reefs

Dr. Randy Keller, Department of Geosciences, Oregon State University - Hotspots of the North Pacific

Dr. Veronique Robigou, University of Washington: Deep Sea Vents

Dr. Edie Widder, President and Senior Scientist Ocean Research & Conservation Association - Secret Lights in the Sea: Explorations and Applications of Marine Bioluminescence

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## 2005 Joint Assembly (24-25 May, New Orleans, LA)

### Theme: Severe Weather

During the summer of 2004, many southern states of the United States were threatened and damaged during an unusually intense hurricane season. In the New Orleans region, nearly 1.2 million residents were urged to evacuate in advance of Hurricane Ivan because of its potential to submerge the city, which lies below sea level. Thankfully, Ivan's track shifted and New Orleans was spared from any significant damage. Severe weather events, such as hurricanes, tornadoes, and strong thunderstorms, result in significant wind and water damage. They can also cause additional damage in the form of mass wasting and coastal erosion, which can have prolonged effects on communities. As scientists continue to research the forces which influence the behavior of severe weather systems, they are developing more sensitive models to predict their paths and potential impacts, helping to mitigate damage. This two-day GIFT Workshop offered up-to-date information on the current state of research into severe weather processes and efforts to better predict its consequences.

Talk 1 -Frank Revitte-NWS- Hurricanes and Severe Weather in the New Orleans Region

Talk 2- Lou Reese- New Orleans Emergency Manager- Preparing New Orleans for Disaster

Talk 3- Hassan Mashriqui- Hurricane Center- Flood Surge and Social Impacts

Activity: Russane Lowe

Using the Digital Library for Earth System Education (DLESE)

Activity: Susan Foster

Web Weather for Kids

Talk/Activity: Lin Chambers

Student Cloud Observations On-Line (S'COOL)

Talk 4- Patricia Brown- River Forecast Center- Flooding in the Region

Talk 5- Charles Moore- Lightening and Related Extreme Weather

Activity: Lin Chambers

Using Atmospheric Data

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2004 Fall Meeting (14-15 December, San Francisco, CA)

Theme: Extreme Exploration: NASA Solar System Missions 2003-2006

The public has been awed by the exciting imagery and data being collected by the twin Mars Exploration Rover missions and the Cassini mission to Saturn. Between 2004 and 2006, these and other NASA-sponsored solar system exploration missions will provide two-dozen extraordinary teachable moments during their launches, encounters, and landings. Long-range planning at NASA offers the potential for even more focused efforts in the future for the moon and Mars. Educators can use mission science and technology to meet their curriculum and standards requirements, get up close and personal with the NASA Solar System team, and experience exploration as a human endeavor. This two-day Workshop offered up-to-date mission information and science background (see detailed topic list on back) and practical, inexpensive, hands-on classroom activities that encourage discovery and critical thinking. Participating teachers received certification to use Lunar/Meteorite Education Disks.

Jaclyn Allen, NASA Johnson Space Center, Houston, TX

How we explore-Strange New Planet

Extreme Exploration

“Where do we come from?” - Solar System formation

The Solar System: Gas Giants and Icy Moons

“Are we alone?” - Astrobiology presentations and activities

Rocky Terrestrials

Why do we explore?

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2004 Joint Assembly (18-19 May, Montreal, Canada)

Theme: Living With A Star: Sun-Earth Connections

This GIFT Workshop, organized by the AGU Space Physics and Aeronomy Section's Education and Outreach Committee, explored a variety of sun-Earth interactions that influence space weather, auroras, ozone chemistry, climate change, and the human experience. The workshop was conducted almost exclusively in French.

Dr. Cherilynn Morrow - Deux Jeux d'Astronomie

Dr. Morrow (with Dr. Paul Charbonneau of the University of Montreal) - Des Idées Fondamentales au Sujet des Interactions Soleil-Terre

Dr. Paul Charbonneau, University of Montréal - Interactions Soleil-Climat

Dr. Gordon James, Communications Research Center, Ottawa Géomagnétisme et Les Aurores

Dr. Cherilynn Morrow - Astronomie Gymnastique

Dr. Martin Charron, Service Météorologique du Canada, Québec - Le Soleil et la Mésosphère

Dr. Lyatt Jaegle, University of Washington, Seattle - Le Soleil et la Couche d'Ozone

Dr. Guy Brasseur, Directeur, l'Institut Max Planck, Hamburg, Germany - Le Soleil et l'Atmosphère de la Terre II

Dr. André Blondin, Christyne Legault, and Manon Léger - Les activités qui font les liens entre la Science Soleil-Terre et les programmes de science dans les écoles de Montréal - I

Dr. André Blondin, Christyne Legault, and Manon Léger - Les activités qui font les liens entre la Science Soleil-Terre et les programmes de science dans les écoles de Montréal - II

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## 2003 Fall Meeting (December 9-10, San Francisco)

### Theme: The Polar Regions - Bellwethers of Change

This workshop was co-sponsored by the Cooperative Institute for Research in Environmental Sciences (CIRES), a joint institute between NOAA and the University of Colorado at Boulder. The focus was on polar environments, which are especially sensitive to the effects of global climate change. Ice sheet retreat and separation, decreasing sea ice, and melting permafrost are all indicators of change that have implications for potentially abrupt global response, for sea level rise, and for human populations that live within polar environments.

Dave Anderson, NOAA Paleoclimatology Group: Paleo Evidence for Climate Change in Polar Regions

Waleed Abdalati, NASA            The Frozen Polar Regions: A Hotbed for Climate Change

Konrad Steffen, CIRES, University of Colorado, Boulder:        Observed Changes in Ice Sheets: The Greenland Case Study

Mark Fahnestock, University of New Hampshire, Durham Antarctic Ice Shelf Disintegration in Response to Climate Warming, or, A Shattered Shelf-image

Finding Good Climate Change Curriculum The Global Warming Project Curriculum

Jim White, Institute for Arctic and Alpine Research, University of Colorado: Fingerprints of Abrupt Change in Antarctica

Joan Gardner, Naval Research Laboratory: Arctic Ocean methane seeps and implications for climate change

Carlo Laj, Laboratoire des Sciences du Climat et de l'Environnement: The North Atlantic Connection

Mark McCaffrey, NOAA Paleoclimatology Group: The Climate Timeline Information Tool

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## 2003 Joint Assembly (April, Nice, France)

### Theme: Seismology and Climate

This one-day GIFT Workshop, convened by the European Geophysical Union Committee on Education, focused on two main themes. In the morning, participants explored educational seismology, with special attention to the project EduSeis: The seismograph in the schools (including the analysis of on-line data from Internet) which is particularly suited for classroom activities. The afternoon session was devoted to Climate Evolution, the astronomical basis of Milankovitch theory, illustration of how to recognize Milankovitch cycles in the landscape, and the role of greenhouse gases in climate evolution.

Jean-Luc Berenguer, Centre International de Valbonne - Seismology in the Classroom: the Eduseis program

Jean-Claude Duplessy, Gif-sur-Yvette - Our Changing Climate

Cor Langereis, Utrecht - Milankovitch cycles in the Mediterranean Landscape

Michael Seesin, Duisburg - Ozone in the Classroom

Jean-Louis Dufresne, Université Pierre et Marie Curie - Climate experiments in the classroom

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## 2002 Fall Meeting (6-7 December, San Francisco)

### Theme: Explorations in Poseidon's Crucible: Volcanic, Tectonic, Hydrothermal, and Biological Processes of Mid-Ocean Ridges

The 2002 Fall GIFT Workshop was co-sponsored by the RIDGE 2000 program, which is funded by the National Science Foundation. The focus was on the geological, chemical, physical, and biological processes operating at the global mid-ocean ridge system. These active, underwater volcanic ridges are the site where new seafloor is created as Earth's crust is torn apart by plate tectonic forces. Hydrothermal seawater interactions with the newly-formed crust affect the chemistry of the rocks and overlying water column, and provide the energy to sustain bizarre ecosystems that flourish in the absence of sunlight. The complex

interplay of these various processes makes the mid-ocean ridge an ideal topic for integrating Earth System Science curricula. After two decades of concentrated research, made possible by collaborative research programs and innovative technologies for operating in the deep ocean environment, mid-ocean ridges are yielding many new insights into the evolution of our planet and the life that inhabits it.

Veronique Robigou Historical perspectives and Overview of Ridge Research

Dan Fornari Seafloor eruptions, lava flows and hydrothermal vents with sonar data & animations showing how lava flows form the upper ocean crust, and D&D overview

Rich Lutz Ecology of vents, succession at EPR, and IMAX film project

Debbie Kelly Linkages between Volcanoes, Hot Springs and Life on the Seafloor - Endeavor Segment

Katryn Wiese Seafloor spreading/paleomagnetism (includes determining spreading center rates lab demonstration)

Rob Pockalny 4D architecture of oceanic crust

Buffy Cushman Geochemistry of Plume-Ridge interaction

Dale Sawyer Discovering Plate Boundaries Activity

Bob Collier Prospecting for active hydrothermal systems and Plume Prospecting Activities (D&D, AMNH),

Susan Cowles Understanding Currents Activity with B. Collier

Bob Lowell Hydrothermal modeling

Sharon Franks & Cheryl Peach - California COSEE: Blazing new trails in ocean science education.

Chuanlun Zang - How microorganisms make a living in the dark

Charley Weiland - MARVE Simulation - Virtual Exploration of EPR

Bill Chadwick - The Case of the Missing Rumbleometer curriculum

Live from Atlantis/Alvin

Liz Goehring - Following along with a Live cruise on the East Pacific Rise (Chicago Field Museum website overview)

San Francisco to Alvin... Come in Alvin! - conference call with the Atlantis/Alvin as they explore hydrothermal vent ecology at the East Pacific Rise

Kathleen Heidenreich - REVEL and Voyage into the Abyss - science writing with an IMAX film experience

Jill Zande and Deidre Sullivan, MATE - ROVing the Oceans with the MATE Center - building and testing a remotely-operated vehicle

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2002 Spring Meeting (30-31 May, Washington, DC)

Theme: Geophysical Science in Support of Society

This workshop explored research topics that have particular relevance to the general public. First-day activities focused on understanding earthquake hazards and the seismic methods used to investigate them. On the second day, three mini-workshops on ground water quality, coastal erosion, and global climate change were offered.

Larry Braile, Purdue University - Seismic Waves Elasticity, Slinky Wave Demos, Human Wave Demo

John Taber, IRIS - Journey to the Center of the Earth

Larry Braile, Purdue University - Epicenter Plotting, plate Tectonics Flipbook, Foam Models

Larry Braile, Purdue University - Walk-Run S minus P Travel Time Earthquake Location Simulation

John Taber, IRIS - US Earthquakes and Earthquake Prediction, Questions and Discussion

Larry Braile, Purdue University - Shear Wall and Building Resonance

Larry Braile, Purdue University - Building Contest Activity

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## Fall 2001 GIFT Workshop (10-11 December, San Francisco)

### Theme: Change Through Time: New Data and New Strategies for Teaching Evolution

The program was held at the California Academy of Sciences on Monday and at the Moscone Center on Tuesday. First day activities included a guided tour of the Life Through Time exhibit and presentations by California Academy of Sciences and Exploratorium staff scientists on evolution research and new geoscience curricular materials developed by the museums. On the second day, attendees participated in mini-workshops on teaching evolution presented by AGU researchers and attended a special technical session of the meeting on strategies for teaching evolution.

Dr. Carol Tang (California Academy of Sciences Assistant. Chair of Education) - Guided Tour of Life Through Time Exhibit and behind-the-scenes tour of Invertebrate Zoology and Geology sections

Dr. Karen Kalumuck taff biologist, Exploratorium - Genetics and Evolution Hands-on Activities

Eric Muller (science educator, Exploratorium ) - Hands-On Geoscience Teaching Activities from the Exploratorium

Dr. Lisa White (San Francisco State University); Dr. Mike Howell (University of South Carolina); Judy Scotchmoor (University of California Museum of Paleontology); Dr. Carol Tang (California Academy of Sciences) Reconstructing Fossils and The Concept of Timelines

Dr. Lisa White (San Francisco State University); Dr. Mike Howell (University of South Carolina); Judy Scotchmoor (University of California Museum of Paleontology); Dr. Carol

Tang (California Academy of Sciences) - Strategies for Handling Challenges to Evolution in the Classroom and for Teaching Evolution to a Diverse Student Population

Special Session - Evolution in the Classroom: Resources, Strategies, and Issues (Kathleen O'Sullivan and Edna DeVore, co-conveners)

Dr. Lawrence Lerner (California State University) - Evolution: Its Treatment in K-12 State Science Curriculum Standards,

Judy Scotchmoor (UC Museum of Paleontology) Stay Tuned for Evolution.berkeley.edu

Dr. Leslie Gordon (USGS) Resources for Teaching about Evolution from the U.S. Geological Survey,

Yvonne J Pendleton (NASA) [co-authors: J C Tarter, E K DeVore, K A O'Sullivan, S M Taylor]

Voyages Through Time: Everything Evolves

Mike Smith (AGI) [co-author M C Smith] - Enhancing Evolution Education Through K-12 Curriculum Development and Public Outreach