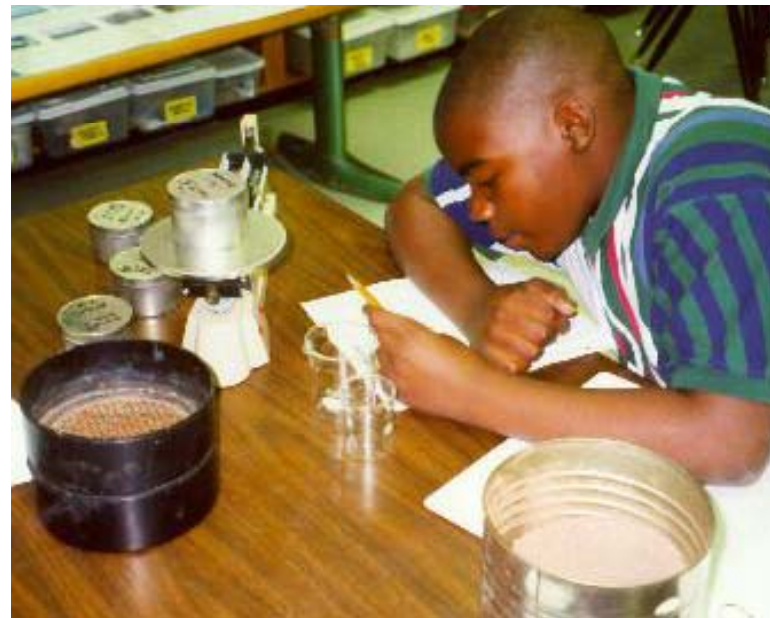


What is GLOBE?

- ❖ *GLOBE is a hands-on inquiry-based environmental science and education program involving students in primary and secondary schools throughout the world.*



GLOBE support

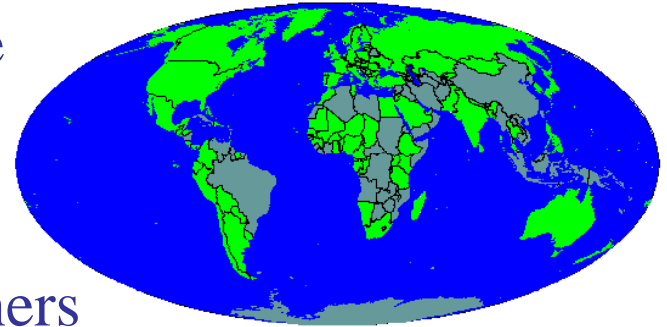


GLOBE is managed by UCAR in partnership with CSU and supported by NASA, NSF, and the U.S. Department of State. Many other organizations collaborate with GLOBE.



History of GLOBE

- ❖ The GLOBE initiative was announced on Earth Day 1994
- ❖ The first GLOBE training workshops were conducted in 1995
- ❖ All US schools were invited to participate
 - ❖ Over 12,000 US schools have registered
- ❖ All nations were invited to participate
- ❖ 110 countries have become GLOBE partners
 - ❖ Over 20,000 schools world-wide have registered
- ❖ The United Nations issued a resolution in 1994 which:
 - ❖ Endorsed GLOBE and encouraged nations to participate
 - ❖ UN agencies were requested to support GLOBE implementation



GLOBE Program Goals

- ❖ Improve students' achievement across the curriculum with a focus on student research in environmental science;
- ❖ Enhance awareness and support of activities of individuals throughout the world to benefit the environment;
- ❖ Contribute to scientific understanding of Earth as a system;
- ❖ Inspire the next generation of global scientists.



GLOBE Partnerships

- ❖ GLOBE is a world-wide partnership involving:
 - ❖ Students
 - ❖ Teachers
 - ❖ Scientists
 - ❖ Schools
 - ❖ Local organizations
 - ❖ Communities, States, and Countries



GLOBE Students Learn Science while Helping Scientists

- ❖ GLOBE students learn authentic science by collecting accurate data and using the data in their investigations.
- ❖ GLOBE student collected data, in the areas of atmosphere, hydrology, soil and land cover, are used to:
 - ❖ Help scientists generate new knowledge about the Earth;
 - ❖ Generate student research projects that are relevant to the students and their community.



Next Generation GLOBE – Earth System Science Projects (ESSPs)

- In June 2006, NSF announced four new Earth System Science Project (ESSP) partners for GLOBE that focus on student research experiences to explore and learn about Earth through a network of students, teachers, and scientists.



Arizona Rivers' Role in GLOBE

- AZ Rivers was originally proposed to GLOBE, but as an international project
- AZ Rivers now funded by Science Foundation Arizona but collaborates with GLOBE
- We're **“GLOBE Plus”** !
 - Put education first (emphasize classroom, rather than professional scientists' use of data)
 - Emphasize local and regional relevance
 - Promote more collaboration
 - Utilize GLOBE protocols and Internet database
 - Welcome other organizations and their protocols



GLOBE Protocols

❖ *GLOBE protocols were chosen using the following criteria:*

- ❖ The data have research significance
- ❖ The procedures can be done by primary and secondary school students
- ❖ The equipment needed is inexpensive enough for schools to purchase
- ❖ Students will have *fun!*

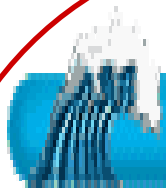


Basic Protocols



Atmosphere/Climate

- Cloud
- Temperature
- Precipitation



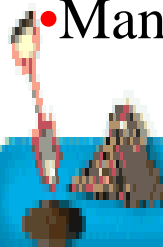
Hydrology

- Transparency
- Temperature
- pH
- Conductivity
- Salinity



Land Cover / Biology

- MUC
- Qualitative Land Cover Sampling
- Quantitative Land Cover Sampling
- Manual Mapping

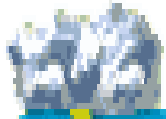


Soil

- Field Characterization
- Bulk Density
- pH
- Temperature
- Gravimetric Moisture

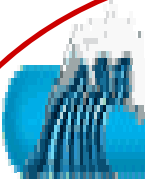


Advanced Protocols



Atmosphere/Climate

- Aerosols
- Barometric Pressure
- Relative Humidity
- Surface Ozone



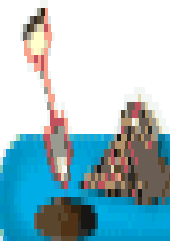
Hydrology

- Dissolved Oxygen
- Alkalinity
- Nitrate



Land Cover / Biology

- Unsupervised Clustering
- Accuracy Assessment

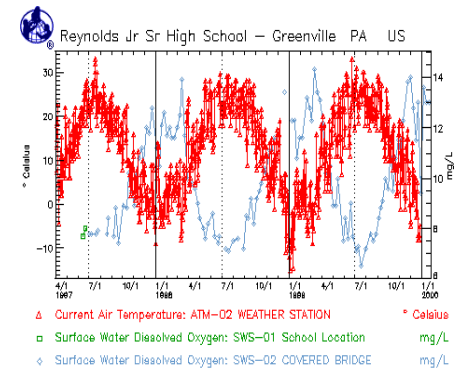
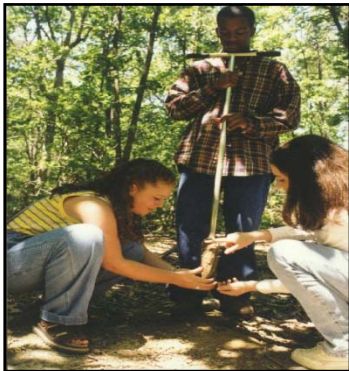
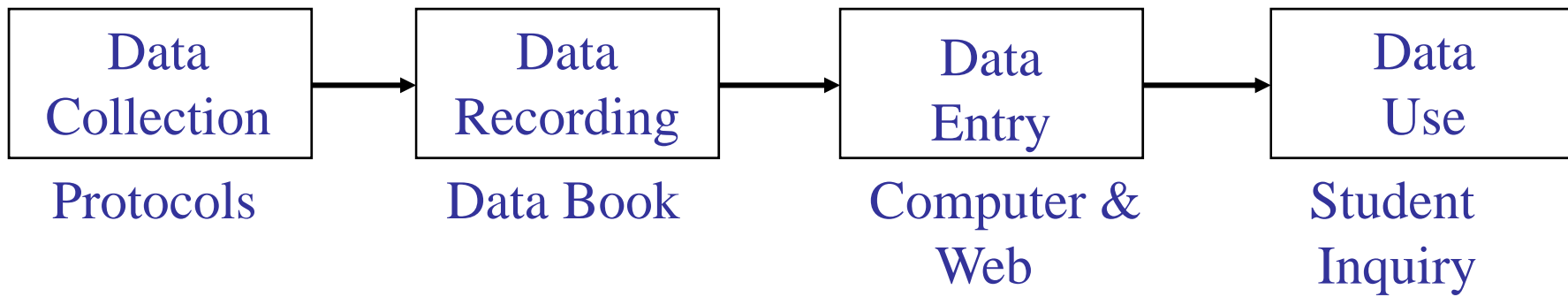


Soil

- Soil Fertility
- Particle Size Distribution



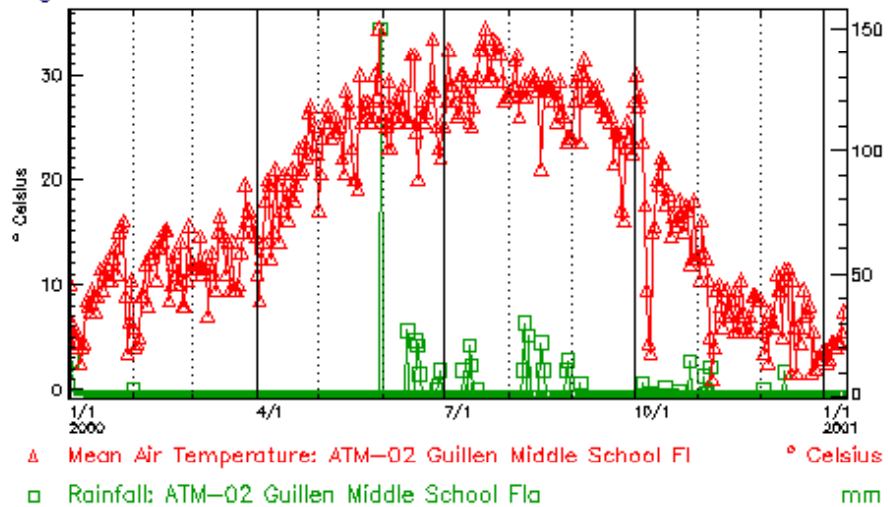
GLOBE Data Process and Flow in Schools



Change Over Time, Comparison



Guillen Middle School – El Paso TX US

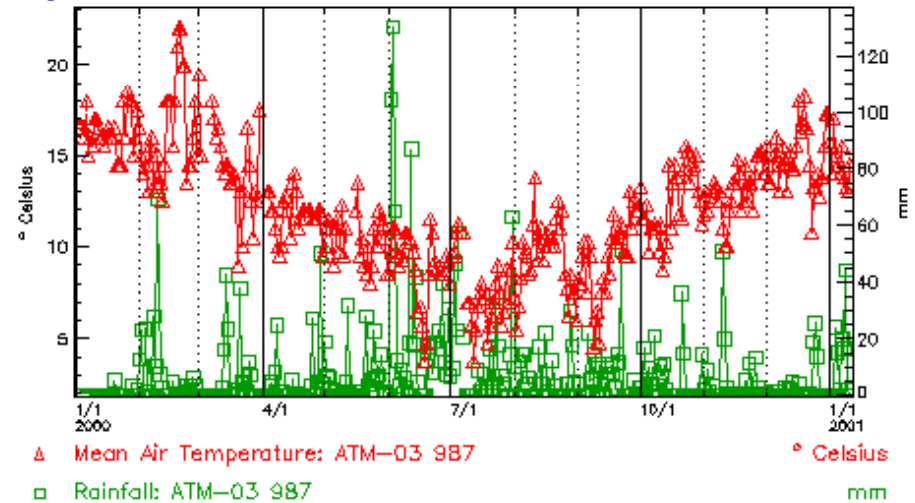


Guillen Middle School, El Paso, Texas, USA
 31.7546 N, 106.4734 W, 0 m

Escuela Rural de Niebla, Valdivia, Chile
 33.9500 S, 71.6000 W, 16 m



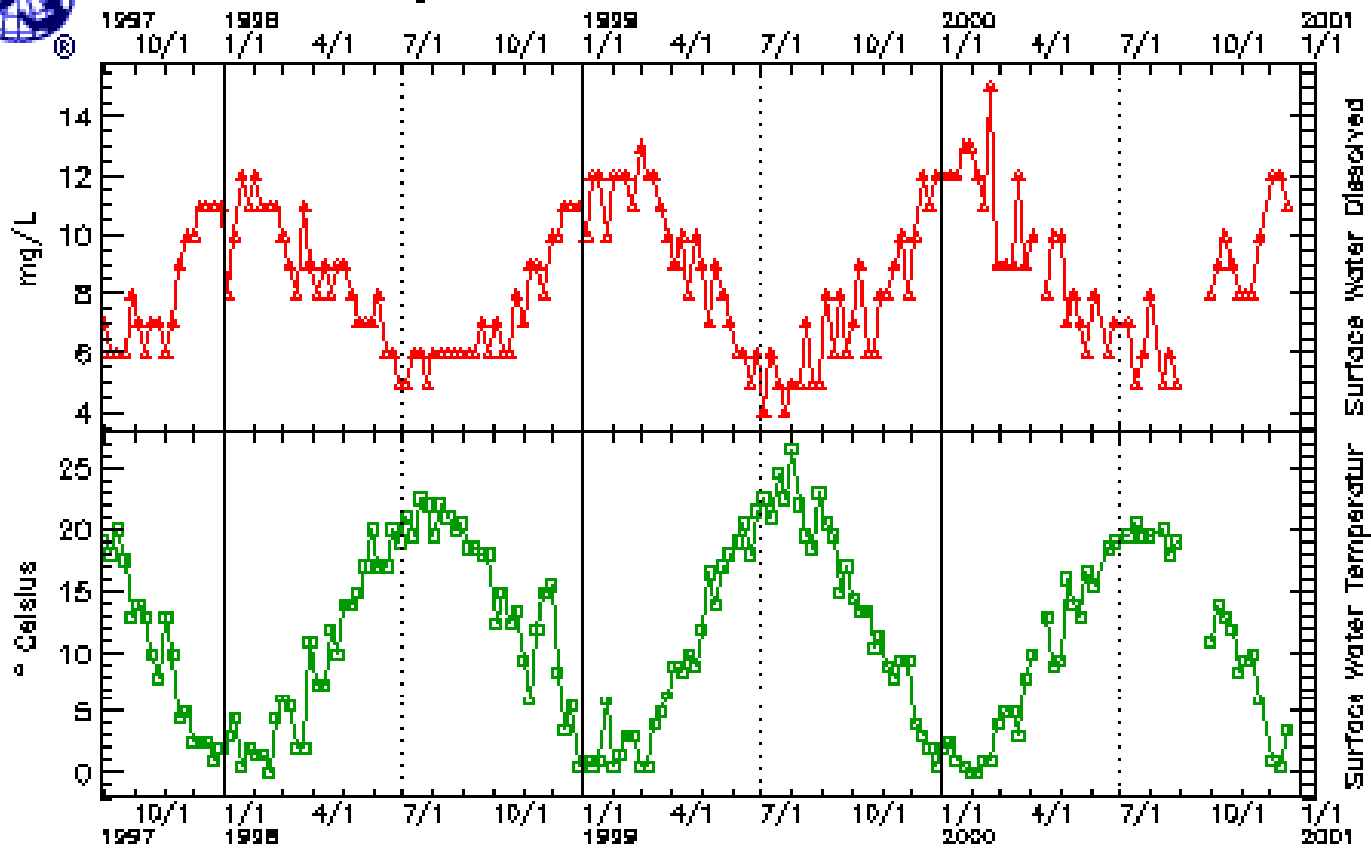
Escuela Rural de Niebla – Valdivia CL



Relations Between Variables



Tabor Academy — Marion MA US



- △ Surface Water Dissolved Oxygen: SWS-05 Sippican River CntyRd Br
- Surface Water Temperature: SWS-05 Sippican River CntyRd Br



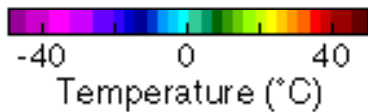
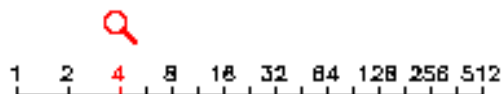
Variation Over Large-Scale Geographic Areas



Mean
Temperature

29 November 2000

38°N 96°W
(6809 × 6809 km)



GLOBE Student Data
522 total sites, 226 on map
As of 2001-01-16 19:37 UT

