The GLOBE Program

Introduction to the Hydrology Investigation

NOAA Gulf BWET Grantee Workshop

May 29-31, 2015

Global Learning and Observations to Benefit the Environment

Why Investigate Surface Waters?

- Sustains plant and animal life
- Only ~.003% of Earth's water is consumable by humans
- Helps shape the Earth's surface
- Covers approximately 70% of Earth's surface
- Key role in formation of weather

Children in Poland

Scientists use data for:

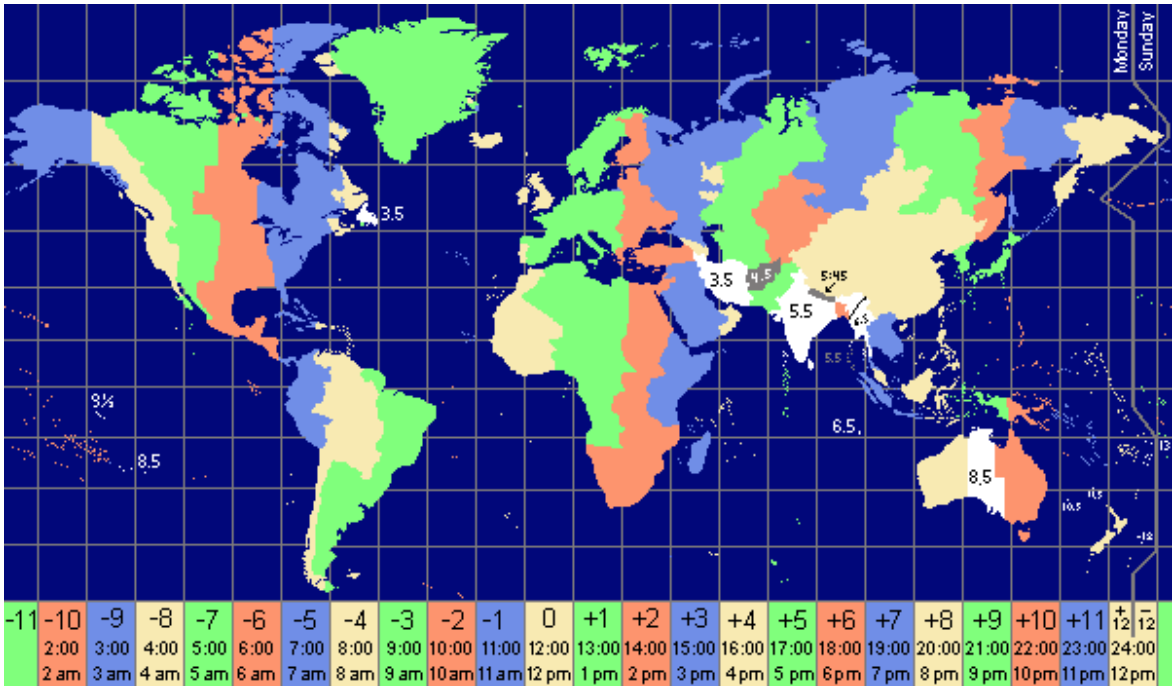
- Mixing of air & water at water's surface, and plants and animals who can live in water (DO)
- Evaporation rates, mixing in estuaries & along coasts, the overturning of lakes (Temperature)
- Resistance to pH decreases (Alk)
- Relationship of pH to soil, geology, & pH of rain and snow melt (pH)
- Limiting nutrients (NO_3-NO_2)

NASA Teacher Training

Hydrology Protocols

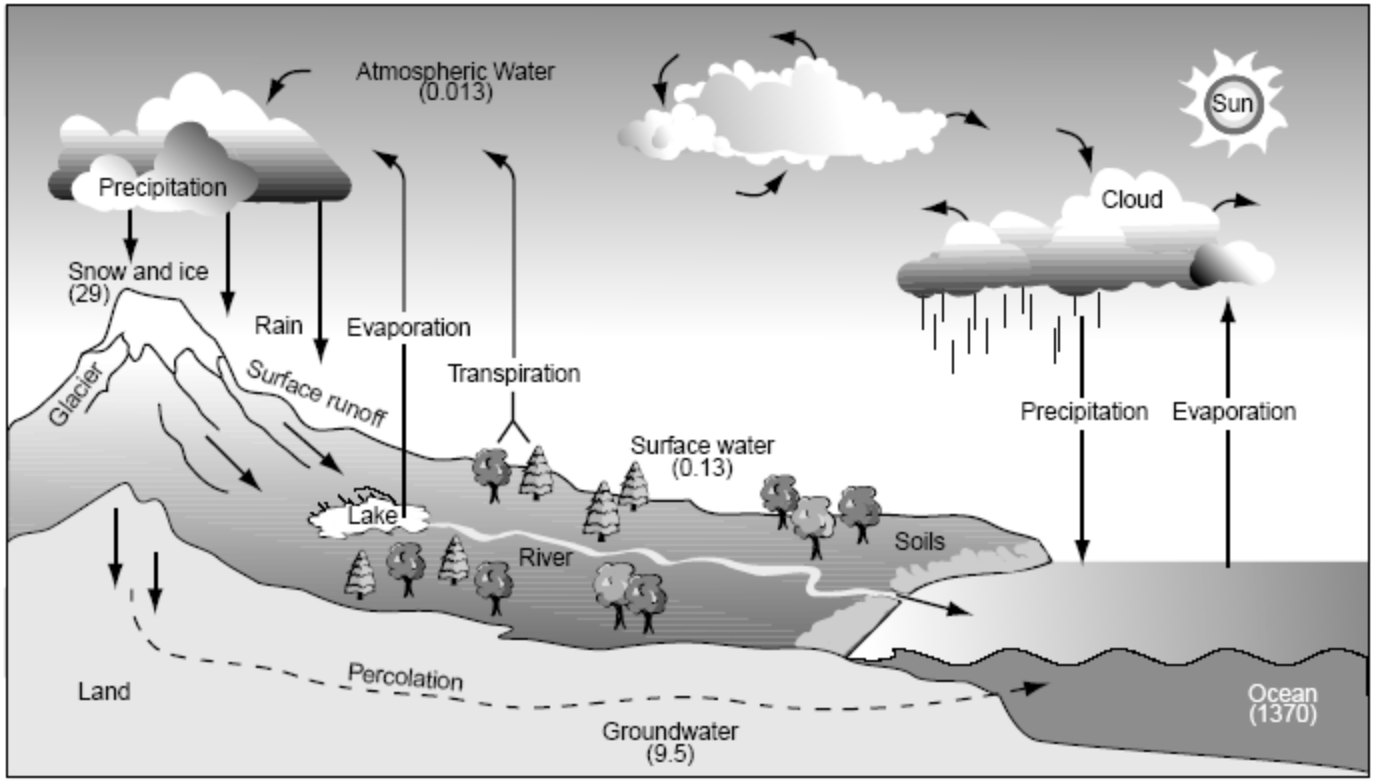
- Water Transparency
- Water Temperature
- **Dissolved Oxygen**
- Electrical Conductivity
- **Salinity**
- **pH**
- **Alkalinity**
- **Nitrate**
- Freshwater Macroinvertebrates
- Salinity Titration

Hydrology Measurements



- Weekly measurements
- All data are reported in Universal Time (UT)
- Link to “Local Time to UT Converter” if needed

The Hydrologic Cycle



The GLOBE Program

Introduction to the Atmosphere Investigation

NOAA Gulf BWET Grantee Workshop

May 29-31, 2015

Global Learning and Observations to Benefit the Environment

Why Investigate Atmosphere?

- Help calculate rate of heat exchange in atmosphere
- Verification & improvement of automated remote sensing
- To understand how cloud climatology may be changing
- To help improve interpretation of satellite observations of Earth's radiative balance
- To provide ground-based data on contrails (one of few sources)

Gulf BWET Tampa Bay

Scientists use data for:

- Augment data needed for regional forecasts and climate records
- Provide a denser network of observations than is available using only official weather stations
- Provide finer resolution data crucial for investigating localized variations
- Investigating relationship between relative humidity & land cover
- Pressure observations to measure aerosol optical thickness and barometric water vapor

Gulf BWET
Tampa Bay

Atmosphere Protocols

- **Cloud**
- Aerosols
- Water Vapor
- **Relative Humidity**
- **Precipitation**
- Digital Max/Min/Current Air Temperature
- Maximum, Minimum, and **Current Air Temperature**
- Surface Temperature
- Surface Ozone
- **Contrails**

Extras

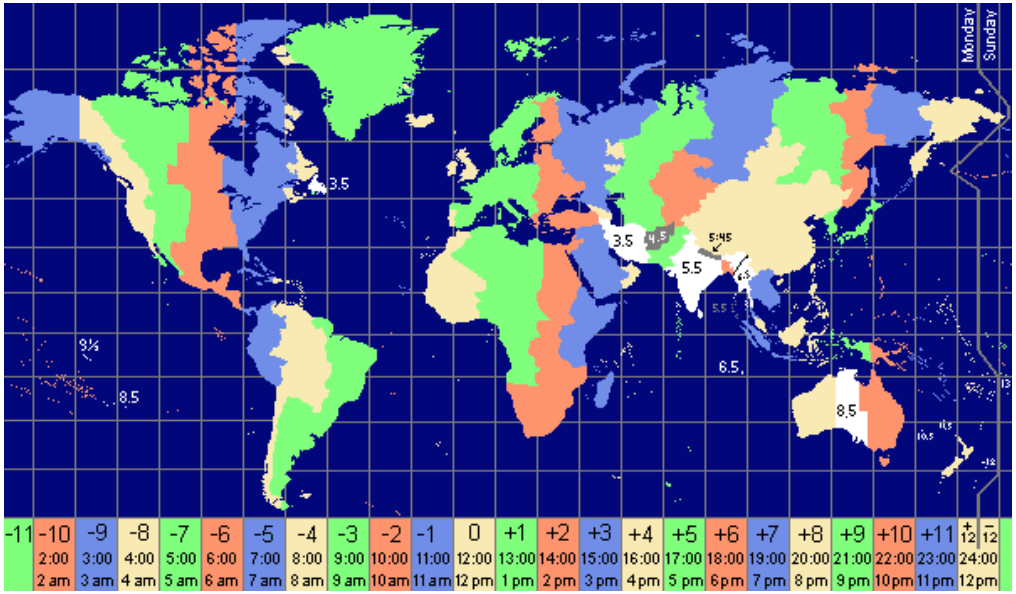
Wind Speed & Direction

Atmosphere Measurements

- “Solar Noon” is the time when the sun reaches its highest point in the sky during the day.
- Link to “Solar Noon Calculator” on the Data Entry page if needed

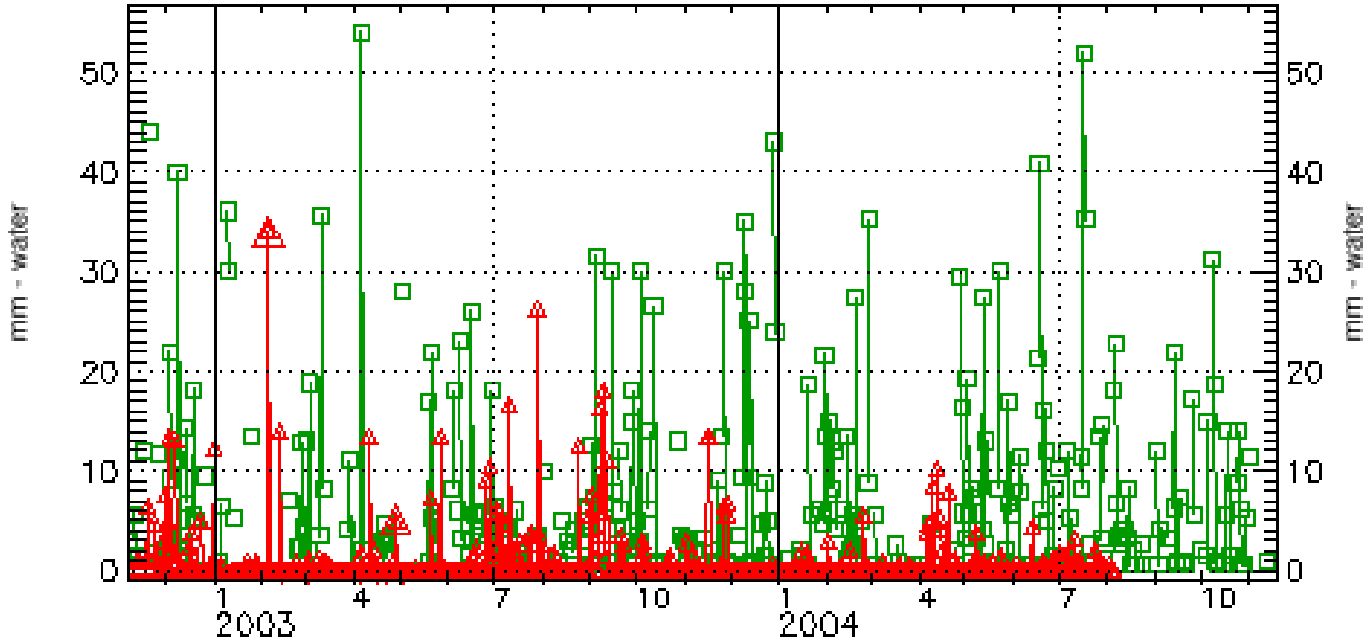
•All Measurements are reported in Universal Time (UT) time.

•Link to “Local Time to UT Converter” if needed



Looking at the Data

Rainfall [large symbol => # days > 1]

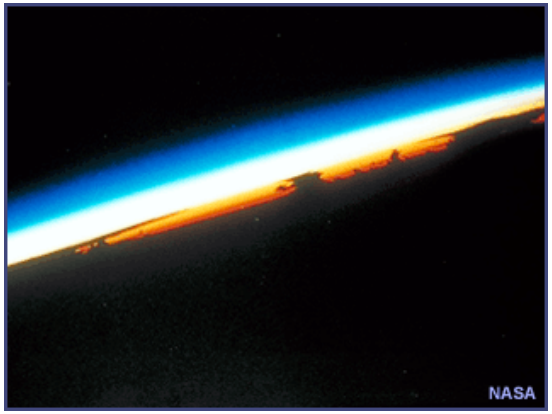


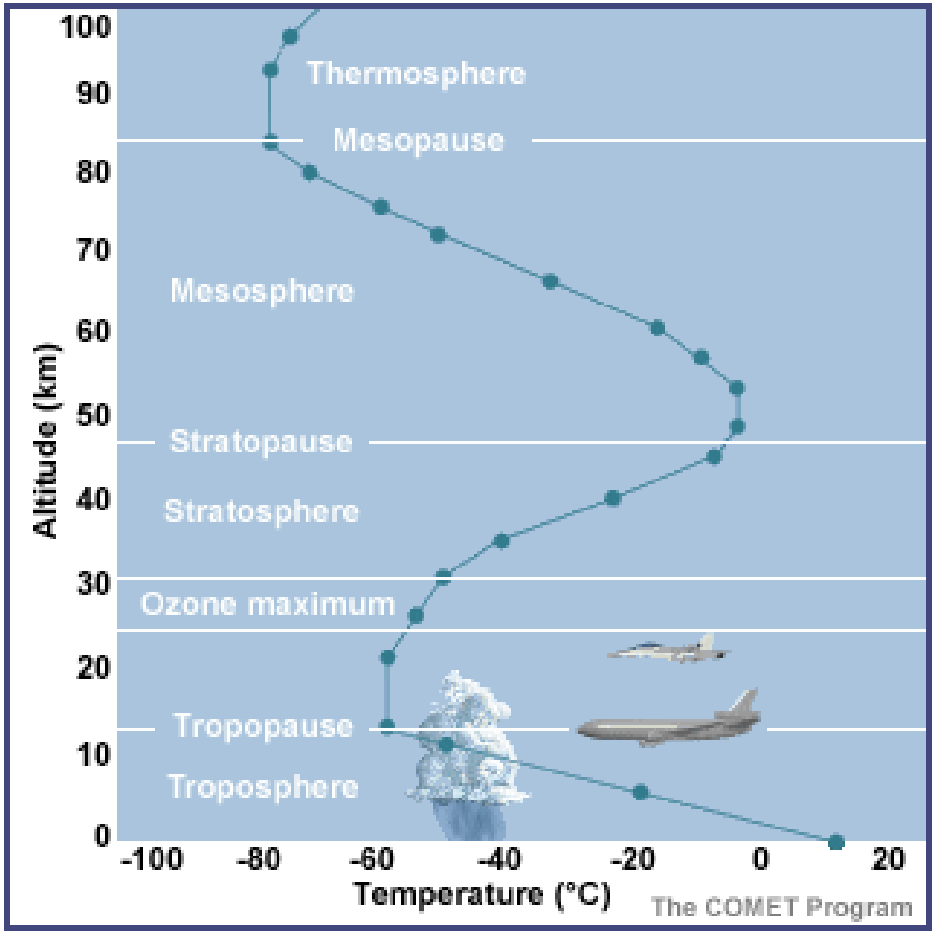
OS Konjscina-Konjscina, HR
ATM-02 SKOLSKI PARK

Rotorua Girls High School-Rotorua, BoP, NZ
ATM-01 RGHS Atmosphere site 1.

The Nature of the Atmosphere

- Earth's atmosphere is a thin layer of gases
  - 78% nitrogen
  - 21% oxygen
  - 1% other gases





The GLOBE Program

Introduction to the Soils Investigation

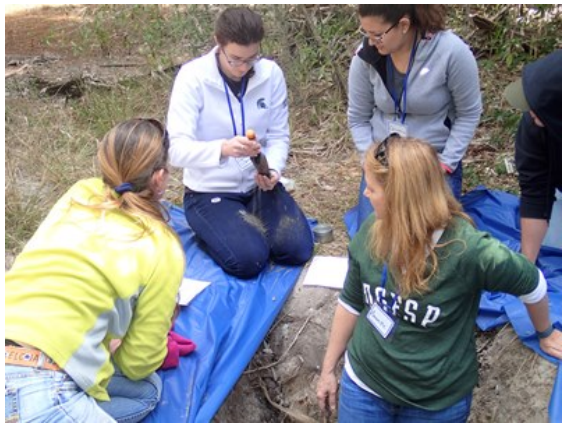
NOAA Gulf BWET Grantee Workshop

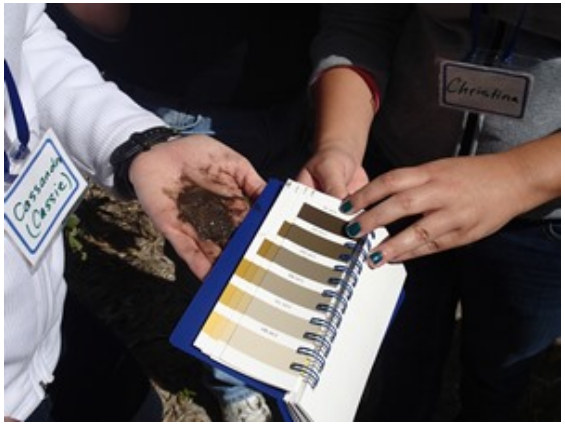
May 29-31, 2015

Global Learning and Observations to Benefit the Environment

Why Are Soils Important?

- Great integrator
- Medium for crop production
- Filter of water and wastes
- Producer & absorber of gases
- Home to organisms (plants, animals, microbes)
- Medium for plant growth
- Snapshot of geologic, climatic, biological & human history
- Source material for construction, medicine, art, etc.
- Essential natural resource &decomposer





Gulf BWET Tampa Bay

Scientists use data to:

- Help track the water cycle in the Earth system
- Help determine times of plant sprouting and growth
- Improve weather & climate prediction
- Help understand the potential for decomposition & weathering of soil
- Compare with existing models & data sets for validation & local detail

GLOBE in Thailand

Characterization
Field Analysis

Soil Profile

- Describe exposed soil
- Structure
- Color
- Consistence

Soil Profile

- Texture
- Carbonates
- Presence of Roots and Rocks

Characterization
Lab Analysis

Basic

- Soil Temperature
- Soil Moisture
- pH
- Bulk Density

Advanced

- Soil Fertility (N, P, K)
- Particle Size Distribution (24hr)
- Particle Density (24hr)