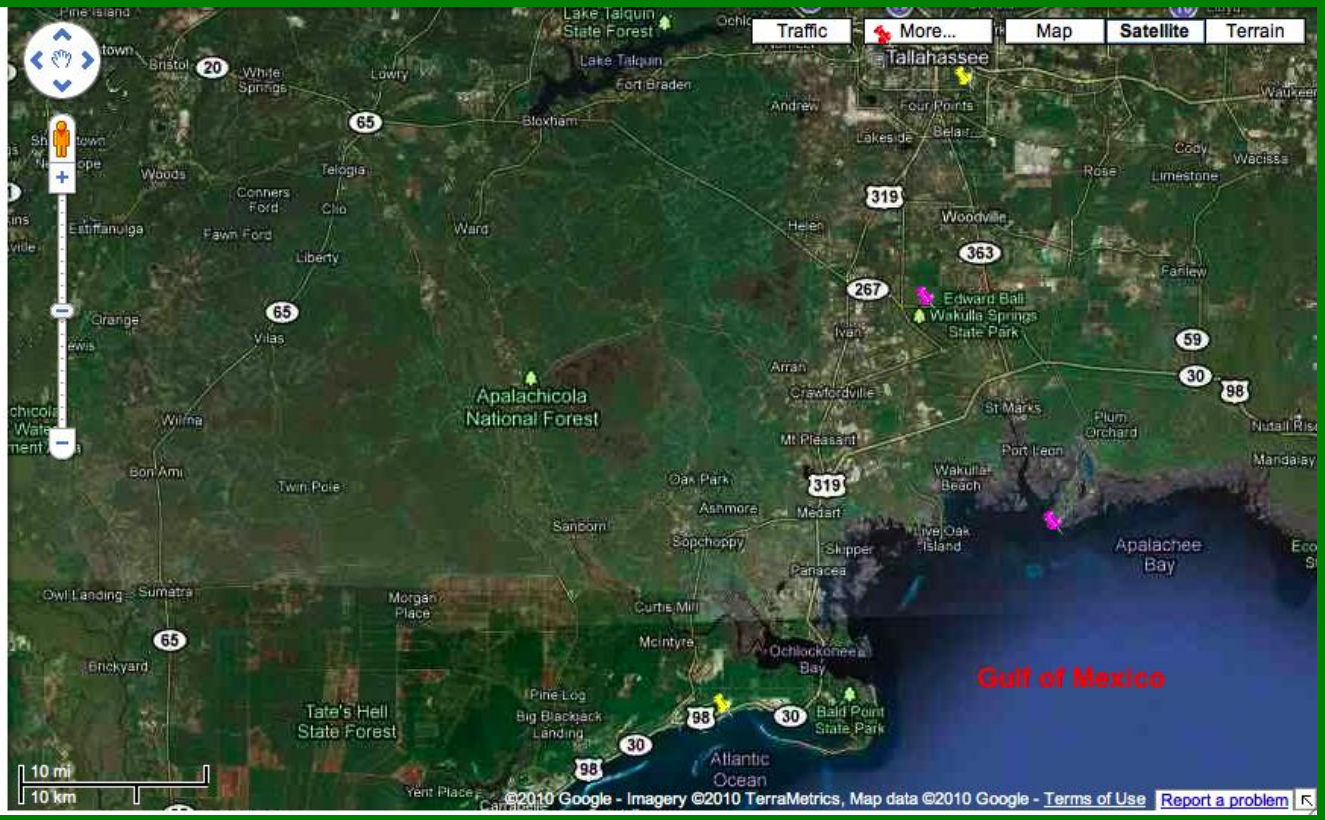
A New Partnership with the Florida Department of Environmental Protection and the LIFE Network



Paul Ruscher
FSU Meteorology
Coastal & Marine Lab
GFDI / FSU-Teach
NOAA NGI / IESES

--> Earth, Ocean and Atmospheric Science Department on Earth Day 2010

GLOBE North American Partners Meeting ~ 17 March 2010

10 Years @ North Florida GLOBE

Davis Automated Weather and Soil Monitoring Station, FSUCML, St. Teresa FL

- PI for GLOBE 2 (relative humidity, barometric pressure, cloud “fixes”, sky obscurations, contributions to automated monitoring)
- Developed North Florida partnership in 2000 to train teachers in NWS Tallahassee region (incl. adjacent areas of GA & AL)
- Traditional teacher training, no state support, limited district support, developed aggressive preservice component within undergraduate and graduate science education courses, with NSF & NMSI support
  - Teaching Earth and Space Science (ugrad/grad)
  - Geoscience Visualization (grad)
  - Research Methods - FSU-Teach new dual major in science educaiton and applied geosciences (ugrad)
- Past GIAC North American Representative
- Training for Science Majors - observations and data entry
- Joining NASA ESSEA Program summer 2010

Digression[a]

The lack of movement on (geo)science education in Florida and many other states is real - Florida example

1. 1995 - State adopts first ***Sunshine State Science Standards*** with five-year review cycle
2. 1996 - Broad publication of ***National Science Education Standards***
3. 1998 - abolition of statewide professional development funding began and replacement with district/regional level implementation & training
4. Rewriting of state science standards (2006-2008)
5. Adoption by State BOE and FL Legislature (2008) - equal balance between life, physical. Earth/space sci.
6. Abandonment attempt by FL DOE &/or Legislature due to funding (?) - concentrate on Biology only (2009) - successfully thwarted by letter-writing & lobbying campaign by science professors statewide
7. Little support for teacher travel/professional development activity in final state budgets
8. 2010 renewal of attempts to institute meaningful graduation standards include life and physical science, but not Earth science!
9. Achieve launches nationwide Math and Language standards - what will national science standards look like?

[a]This slide is presented from my perspective and role as a homeschool director/teacher at Sherwood Forest Academy, not in my official role as a GLOBE partnership director or faculty member at FSU

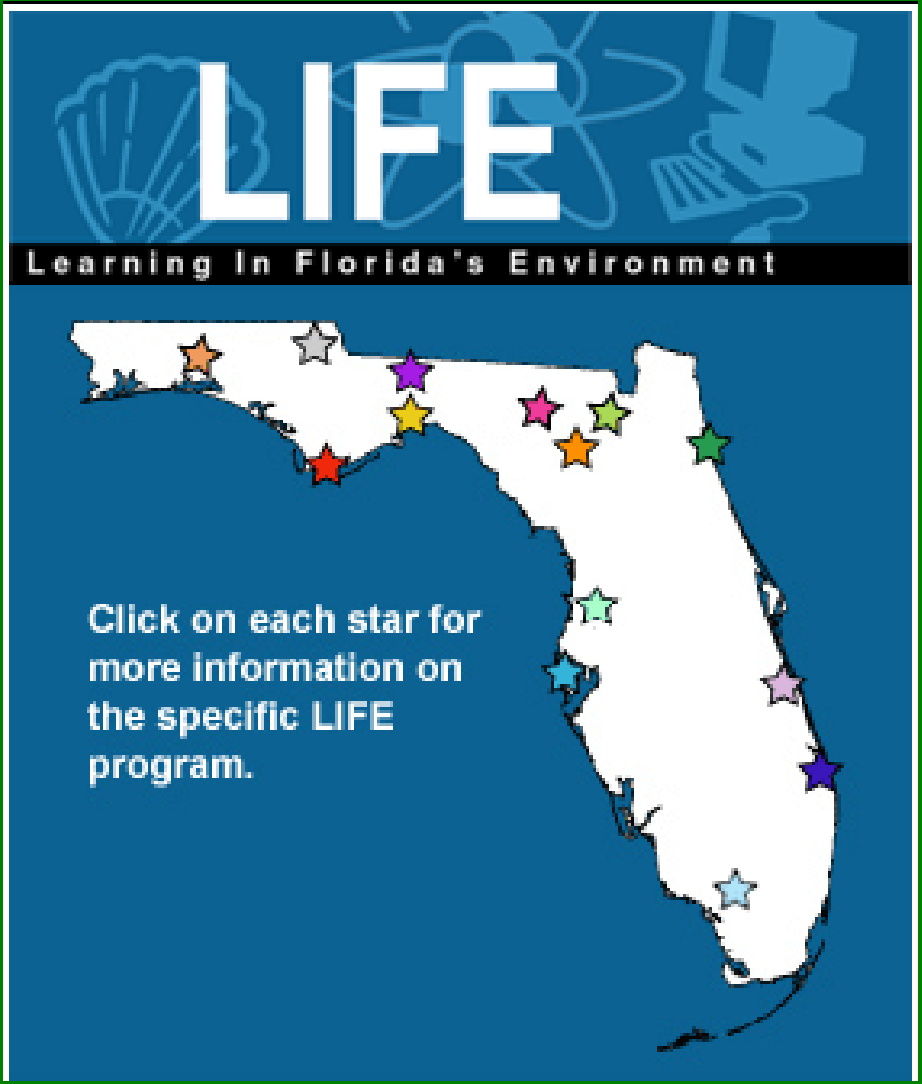
FL DEP & The Life Network

- Alignment with Florida Sunshine State standards.
- Multi-day, field experiences emphasizing current technologies for environmental science serve as the entry-point for learning.
- Emphasis on observation and inference as critical components of the scientific method.
- Long-term partnerships between DEP and a local school district(s) that include teacher professional development.
- Program content derived from teacher identified needs.
- Integration of all subject areas by connecting field experiences with pre- and post-classroom lessons.
- Focus on underrepresented and underserved audiences.

Students testing salinity

Students studying soil composition

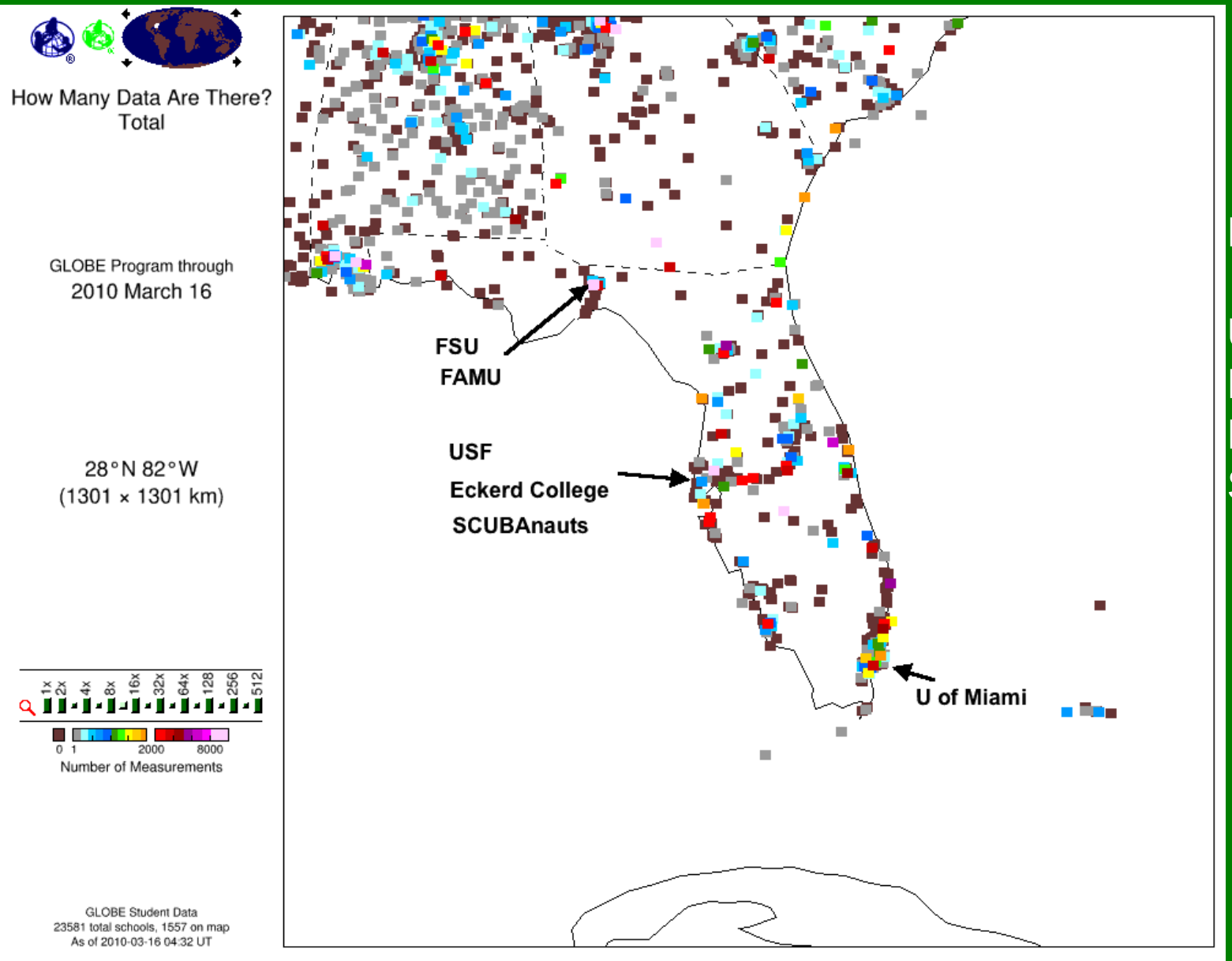
FL DEP & The Life Network



Legend

- Apalachicola National Estuarine Research Reserve
- Collier County
- Edward Ball Wakulla Springs
- Florida Caverns
- Guana Tolomato Matanzas National Estuarine Research Reserve
- Honeymoon Island
- Ichetucknee Springs
- Lake City
- Leon Sinks Geological Area
- Madison County
- Okaloosa County
- Savannas Preserve
- St. Sebastian River Preserve
- Werner Boyce Salt Springs State Park

GLOBE in Florida



New partners!

USF
Eckerd College
FAMU
SCUBAnauts

:)

Partnership Maintenance

Partnership Limitations

- No travel budget
- No infrastructure support since 2004 (internally or through external grants)
- Δ GLOBE
- Workshops often limited in terms of facilities for data integration and input - many teachers report they use GLOBE, but few actually report data
- Many workshops limited to “conference” venues (FAST, FETC, EXPLORES! wx-sat workshops)

Benefits of Partnering with Partners

Use of other staff - DEP Environmental Education staff includes 3 FTE + interns at HQ
Training at state parks and other facilities operated by FSU allows us to exploit their employees, too
DEP wanted a portal through which their teachers and students could report data - they did not wish to develop one themselves and liked what they saw in GLOBE
Leverage successful partnerships through GOMA and IOOS to foster coastal schools to think about how GLOBE can help them implement new standards (assuming that happens)

FL DEP & FSU GLOBE

Two trainings in 2009 - Wakulla Springs State Park & Shoal River Middle School, Okaloosa County (Crestview)

Training GPS and soil temperature (with Emma)

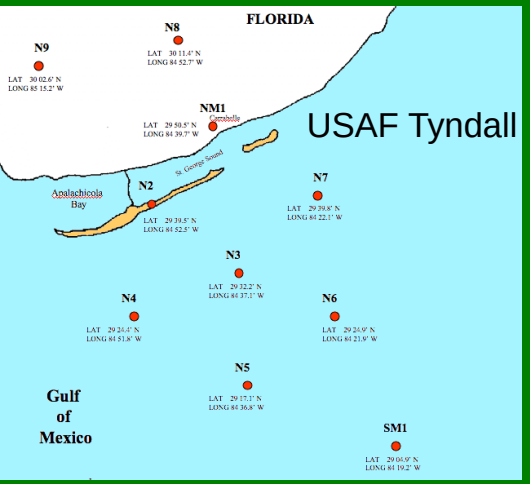
Training hydrology protocols

Park boats and the automated weather and water temperature station

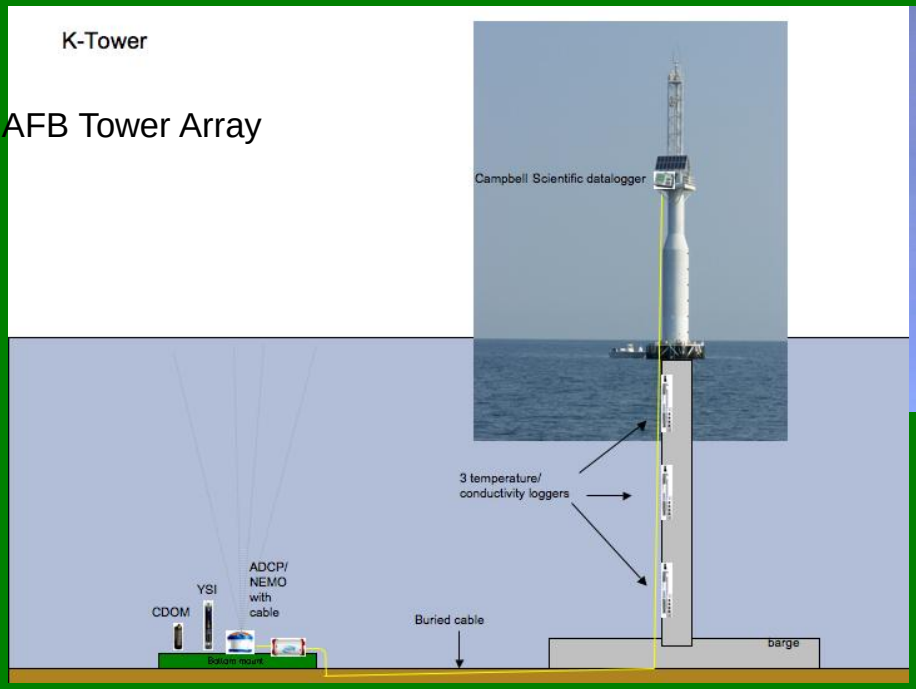
Bringing Science to GLOBE Teachers
Coastal Science

This effort engages FSU students and prospective science teachers in coastal and offshore monitoring in collaboration with the NOAA Northern Gulf Institute, headquartered at Mississippi State University

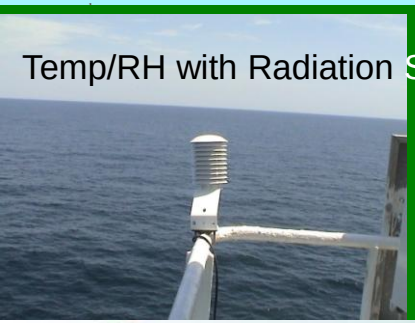
Measurement levels - 4.5 m, 19 m, 30 m MSL



USAF Tyndall AFB Tower Array



RM Young Aerovane, SST, Wave Ht



Temp/RH with Radiation Shield

GLOBE Students at FSU participate - future teachers beginning summer 2010 (?)

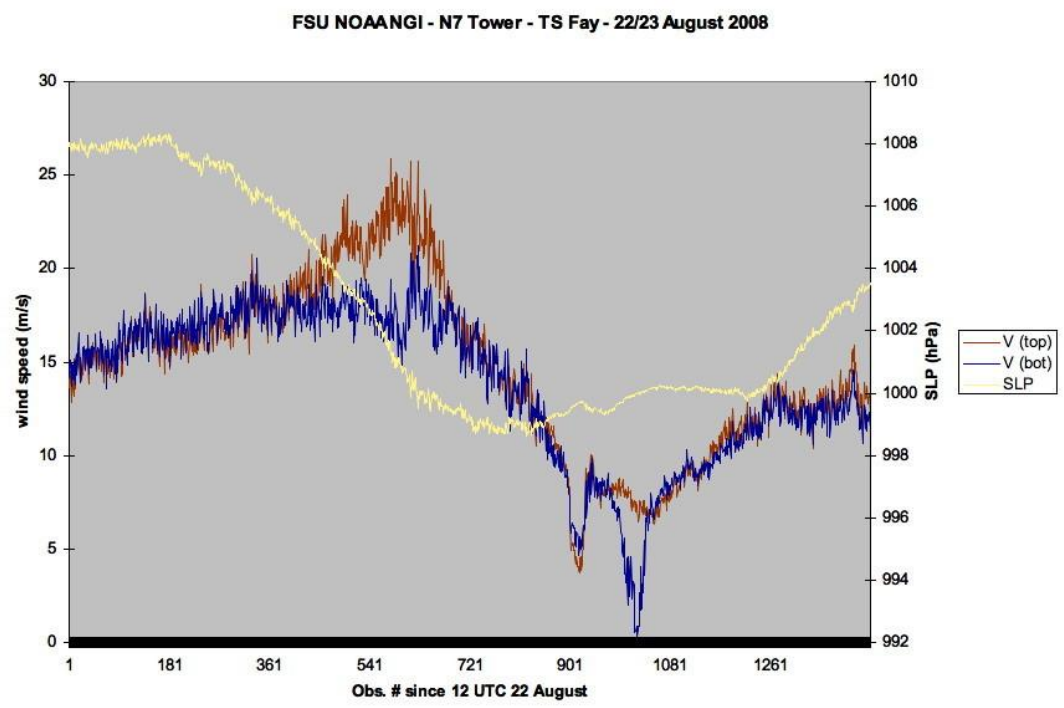
NGI Northern Gulf Institute

A NOAA-sponsored Cooperative Institute for Developing Research at Academic Institutions in the Northern Gulf of Mexico Region

Celebrating 200 Years of Science, Service, & Stewardship

FSU Science & GLOBE

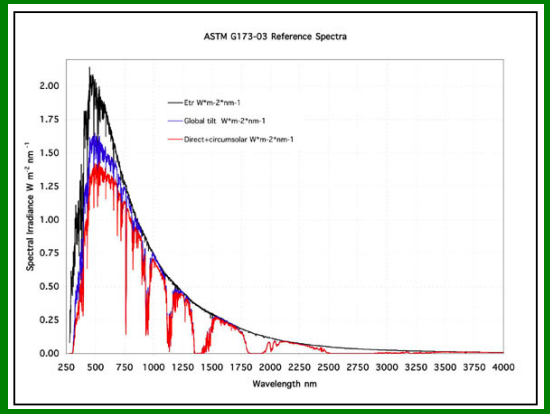
QuickTime™ and a
decompressor
are needed to see this picture.



Top: TS Fay - our first tropical storm interception (August 2008)
Bottom: Fauna at K-Tower (aka N7 Tower)

Ah, isn't symmetry in nature wonderful?

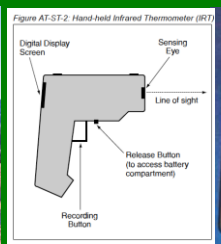
FSU Science & GLOBE: Solar Energy



Problem: In many tropical locations (e.g., Jamaica), received solar radiation is less than predicted by commonly-used engineering models. Many in developing nations ask, "is solar practical for me?"

Solution: Determine what factors reduce transmission of solar energy for surface collectors. In most cases, the solutions lie in engineering or meteorological factors. GLOBE may provide some answers…

Benefits: Involve students in developing tropical economies in practical decision-making related to energy independence; expand GLOBE in the Caribbean basin?



FSU Science & GLOBE

Typical Meteorological and Surface Factors Affecting Calculations of Available Solar Energy Potential in the Tropics

Variable	Surrogate/Description	Symbol	Range/Values
Aerosol optical depth	aerosol optical depth	σ	
Air mass factor	(latitude ϕ, zenith angle ζ)	AM	0-10 (1.5)
Air temperature	Dry-bulb temperature	T_a	0-40°C
Albedo		α	0.05 - 0.95
Barometric pressure		p	700-1040 hPa
Carbon dioxide	Ground concentration CO_2		370 (~390) ppm
Cloud cover (tenths/oktas)	Cloud fraction (reduced set)	cc	0-1.0
Irradiance		I	0-1370 Wm^{-2}
Land surface type			Lookup table
Panel temperature	Brightness temperature	T_B	0-50°C
Precipitable water	Relative humidity, Dew point	PW	0-70 mm
Total ozone	(Column Total)		344 DU
Visibility	Runway visual range	VR	0-50 km
Wind speed		V	0-25 m s^{-1}

FL Opportunities / National Reflection

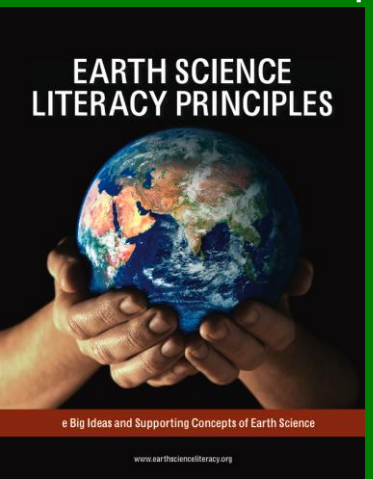
New FL partners bring new opportunities for environmental / science education across Florida - still no “blessing” from the State DOE, however

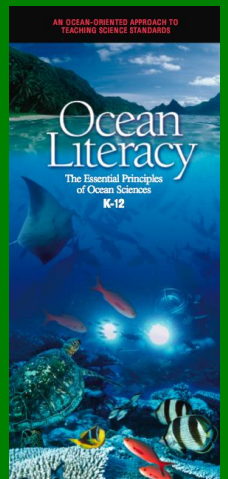
NOAA coming back on board with GLOBE is being strongly considered - this is huge as it restores GLOBE to its historical roots (and potentially new funding)

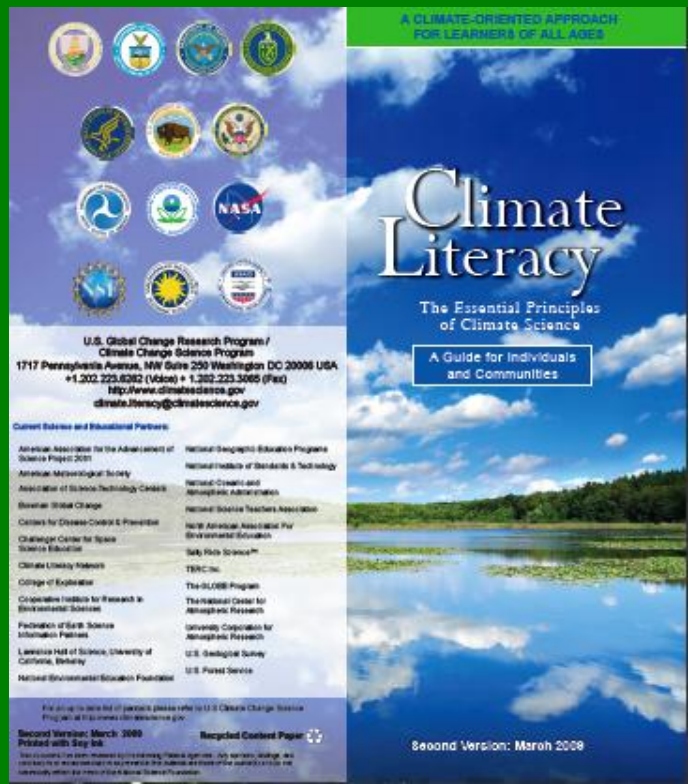
- NMFS
- NOS
- NWS
- New national climate service

Other potential partners - USDA, EPA, USGS, NPS, …

National Environmental Science Literacy documents will shape national science and education policy - GLOBE is well-suited to respond







10 More Years?

GLOBE Re•evaluation

Funding at state level - Florida but of practical interest to all of us

NOAA and other agency involvement at Federal level

How will we measure effectiveness and impact?

How can we as Partners and as a North American region respond to increased awareness/controversy related to

- Energy policy
- Climate change science
- Scrutiny of science by non-scientists
- Social pressures on education in general
- (Temporary?) Lack of attention/respect for Earth & environmental education based in quantitative methods

Can we more effectively use students' curiosity about their natural environment to improve arithmetic/mathematical, technological, and language literacy? … and …

Can GLOBE be part of this solution?

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