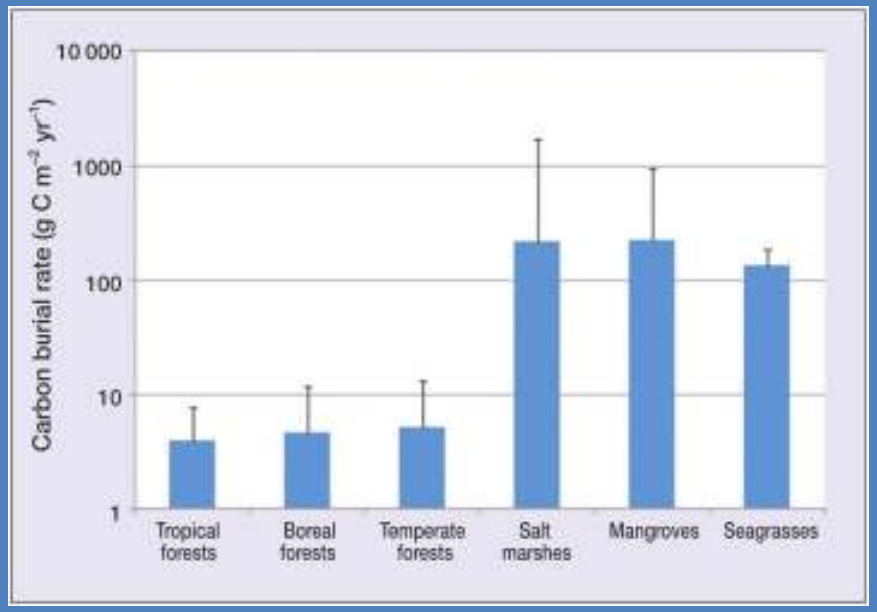
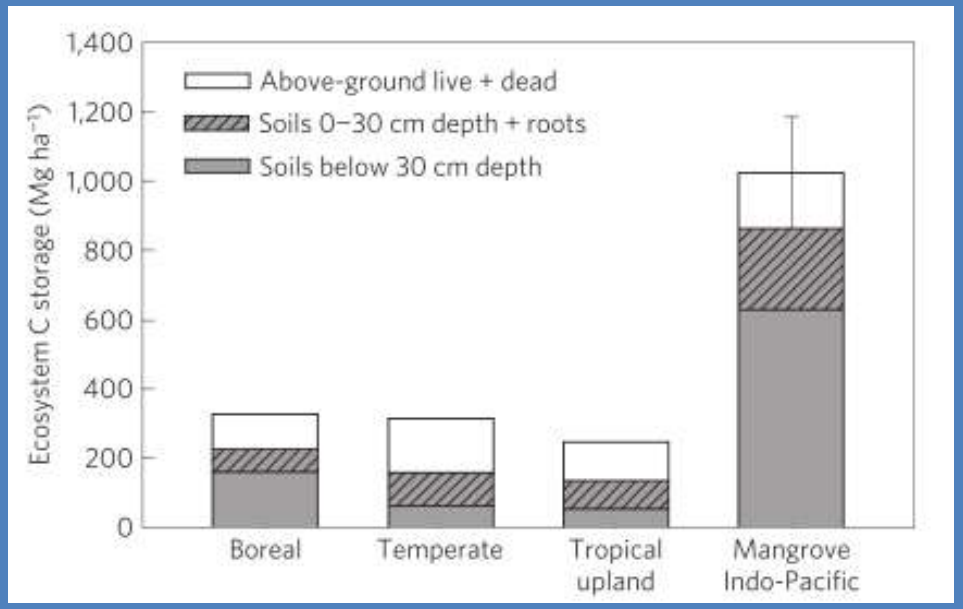
Mangrove Forests Response to Climate Change and Sea-level Rise

Donny Smoak, Josh Breithaupt, Halime Etemadi, Tom Smith, Ryan Moyer, and many others

Burial and Storage of Carbon "Blue Carbon"



McLeod et al. 2011



Donato et al. 2011

How does burial and storage of carbon respond to sea- level rise and climate changes? Do these systems become a source of carbon to the atmosphere and therefore a positive feedback to climate change?


Soil Coring

Age, Accumulation and Accretion

Accumulation = $\frac{\text{mass}}{\text{time}}$

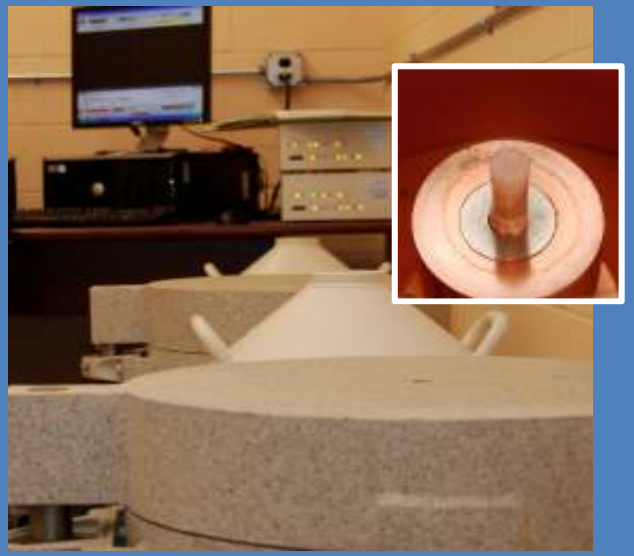
Organic Matter
Inorganic Matter
Organic Carbon
Carbonate etc.

~50 yrs old

Accretion = $\frac{\text{depth}}{\text{time}}$

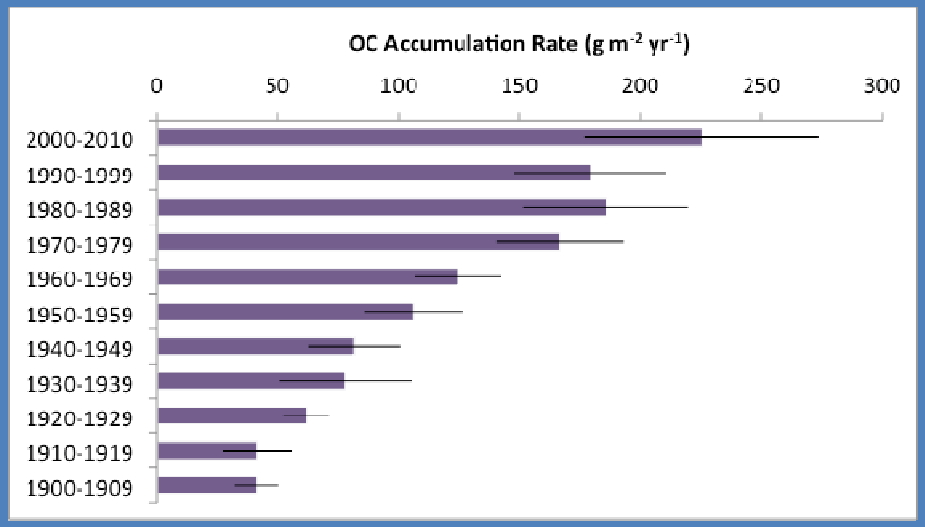
~100 yrs old

^{210}Pb Dating Method

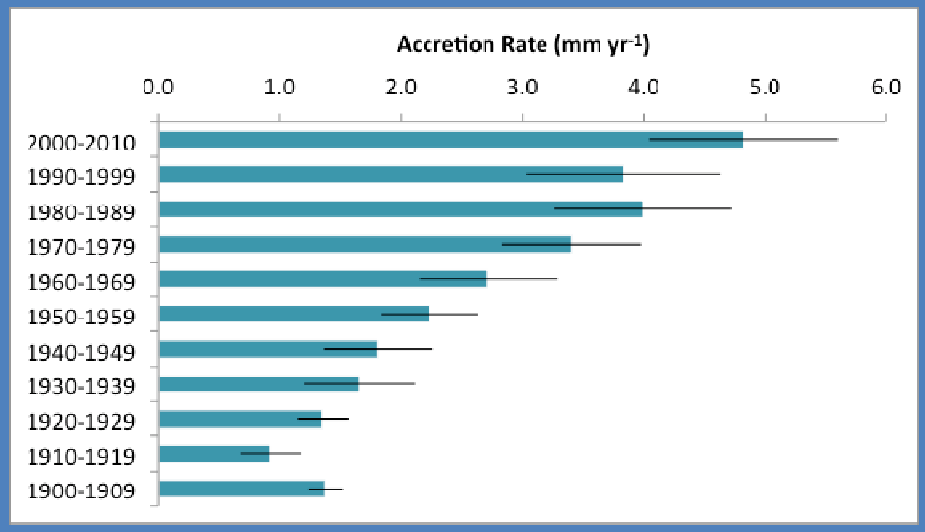


Organic Carbon and Accretion Rates

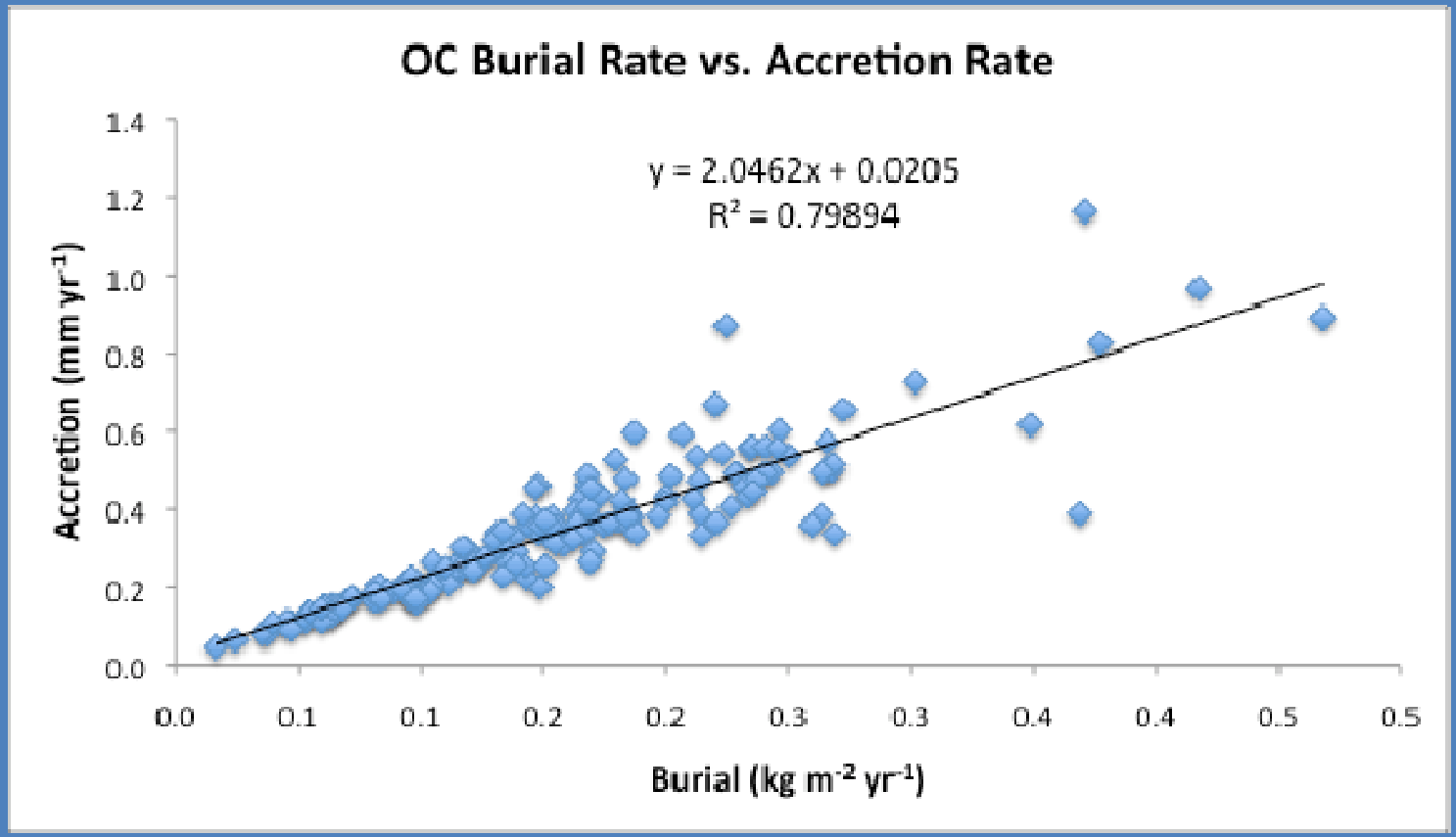
OC Sink



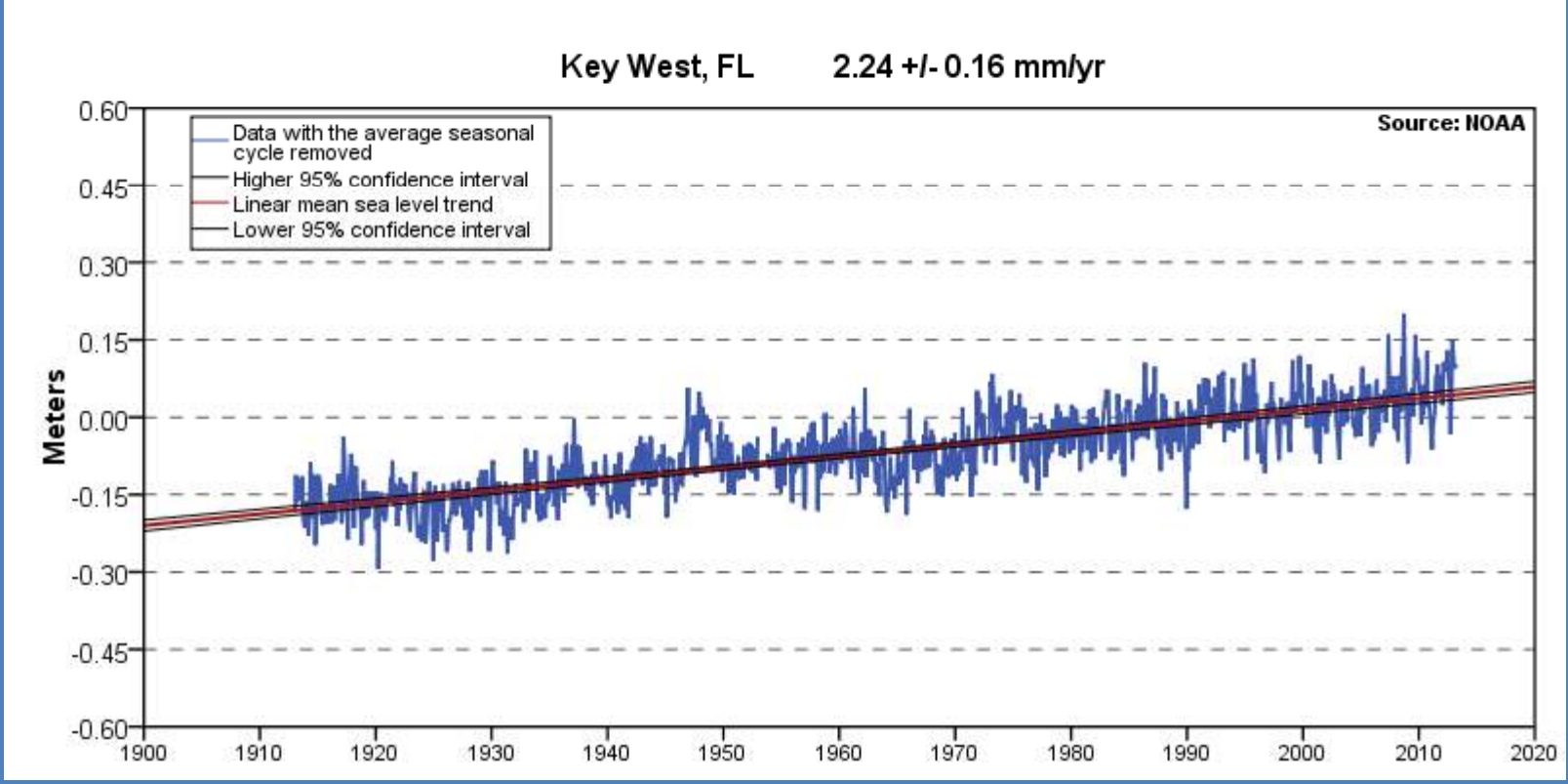
Keep up with SLR

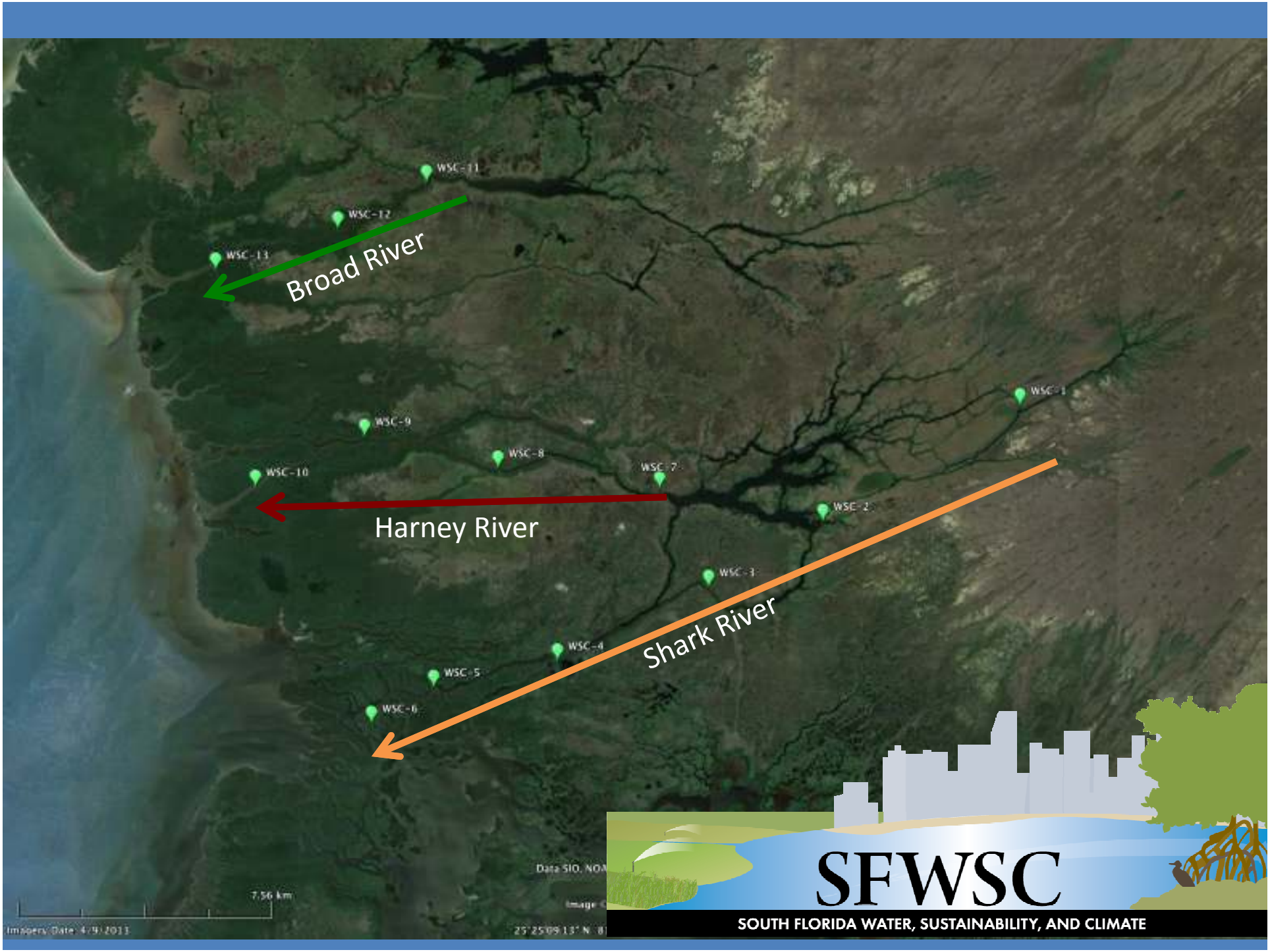


OC Contribution to Accretion in ENP

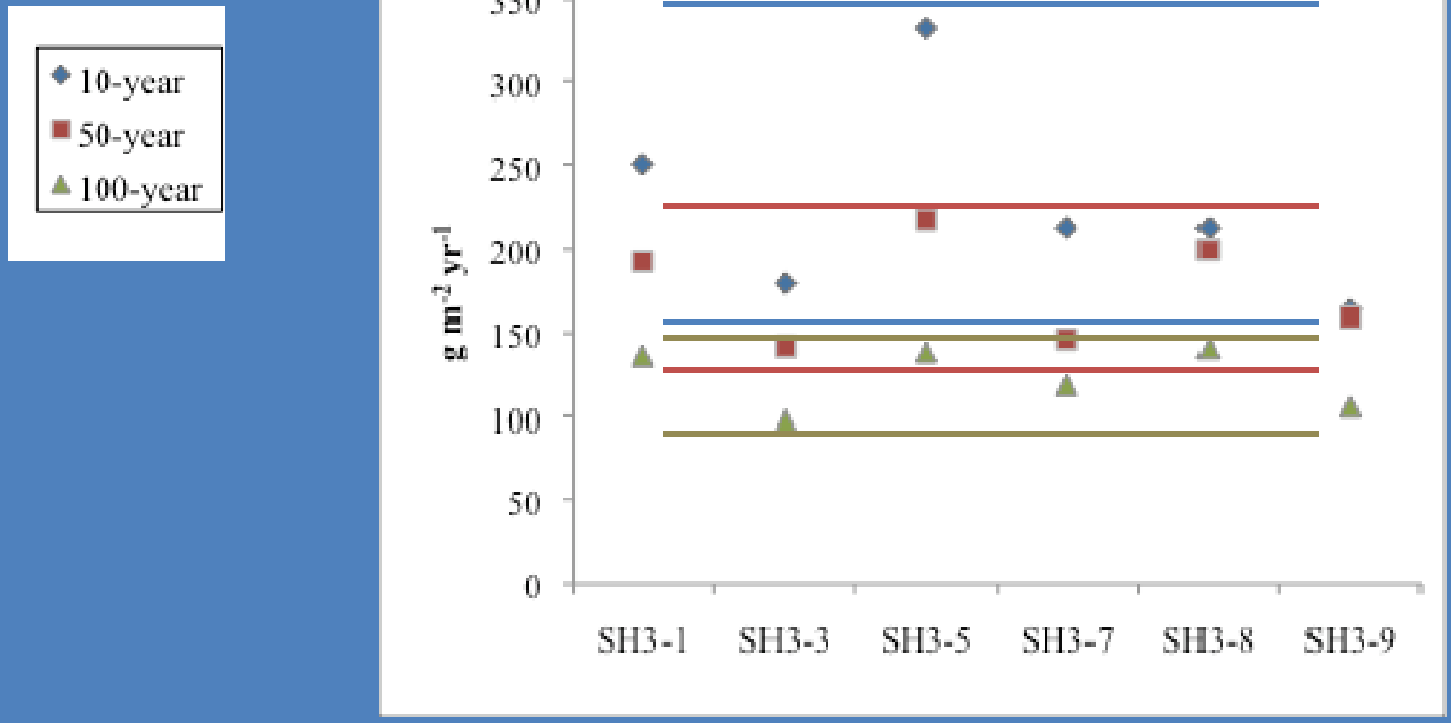


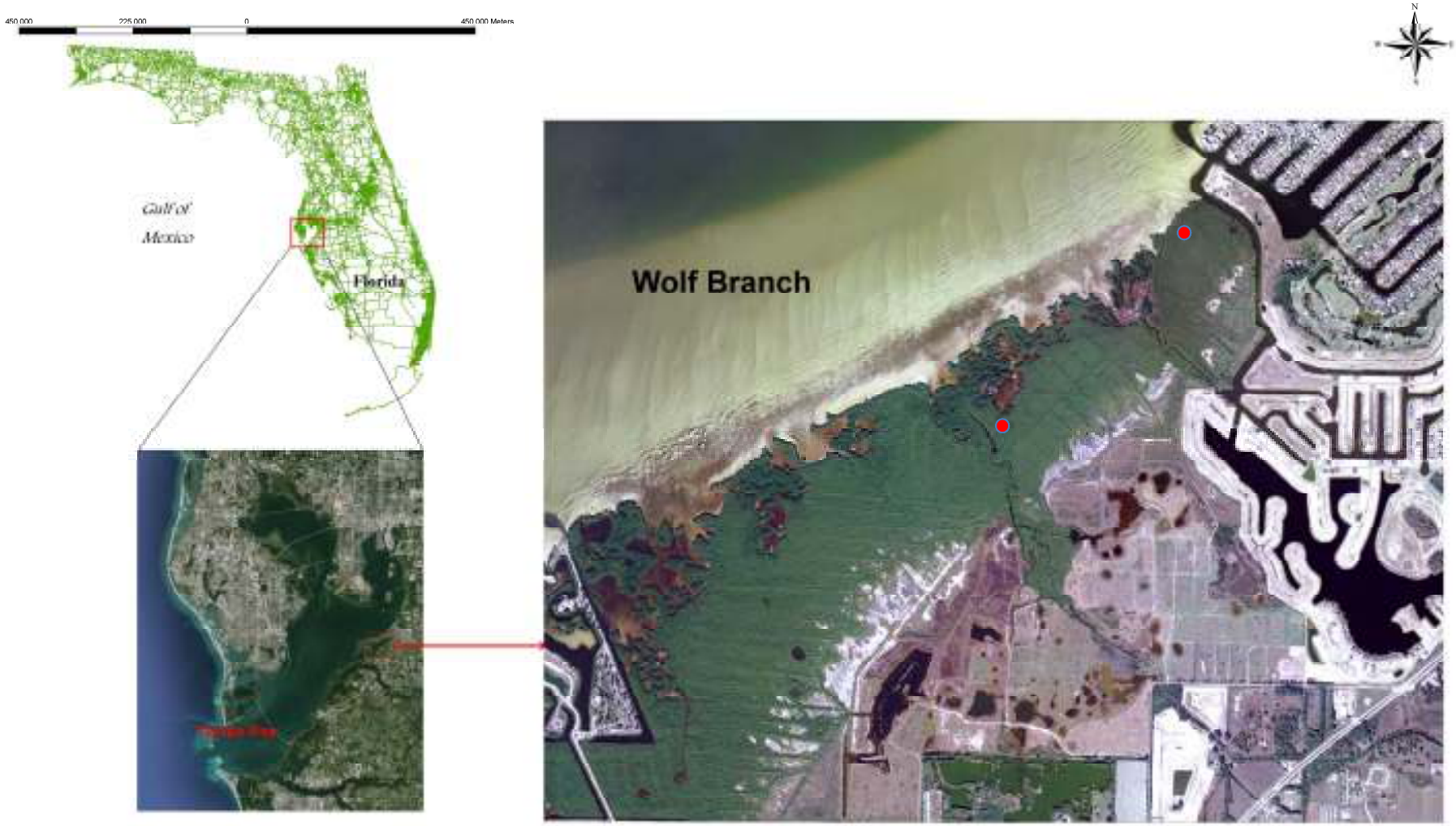
Accretion Rate ENP
2.7 ± 0.4 mm/yr



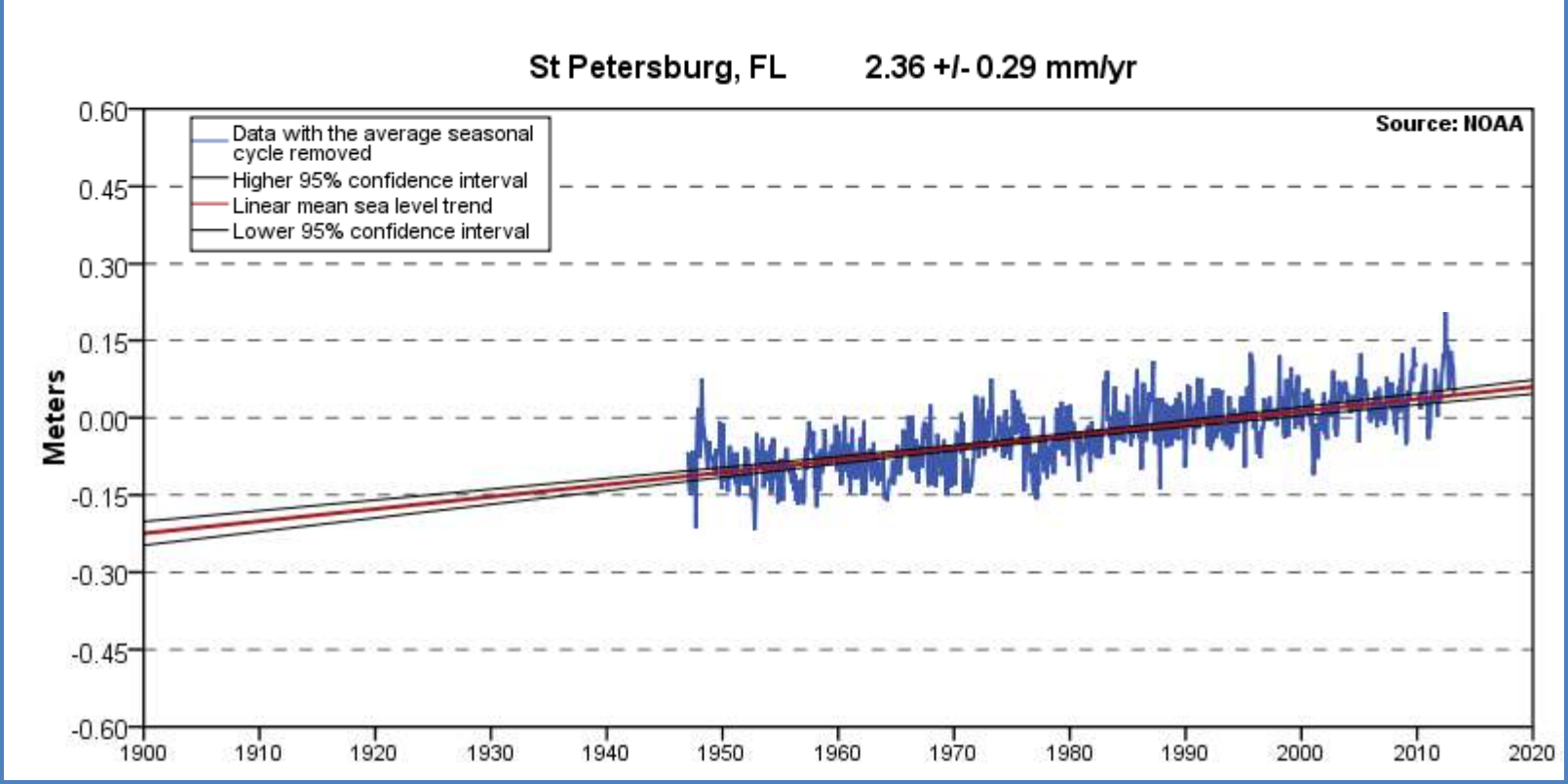

WSC-11
WSC-12
WSC-13
Broad River
WSC-9
WSC-8
WSC-10
WSC-7
Harney River
WSC-1
WSC-2
WSC-3
Shark River
WSC-4
WSC-5
WSC-6
7.56 km
SFWSC
SOUTH FLORIDA WATER, SUSTAINABILITY, AND CLIMATE

Timescale and Spatial Variability




450,000
225,000
0
450,000 Meters
N
Gulf of
Mexico
Florida
Wolf Branch

Accretion Rate Wolf Branch
2.4 mm/yr last 10 years
1.6 mm/yr last 60 years



Wolf Branch 1947-2004