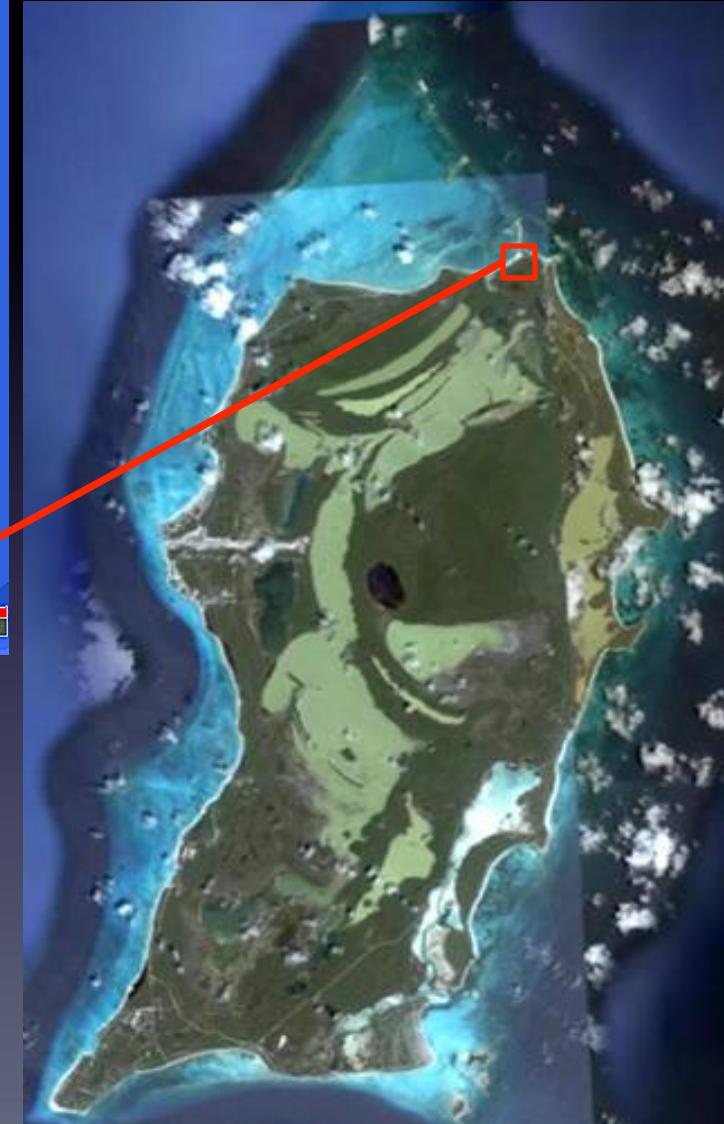
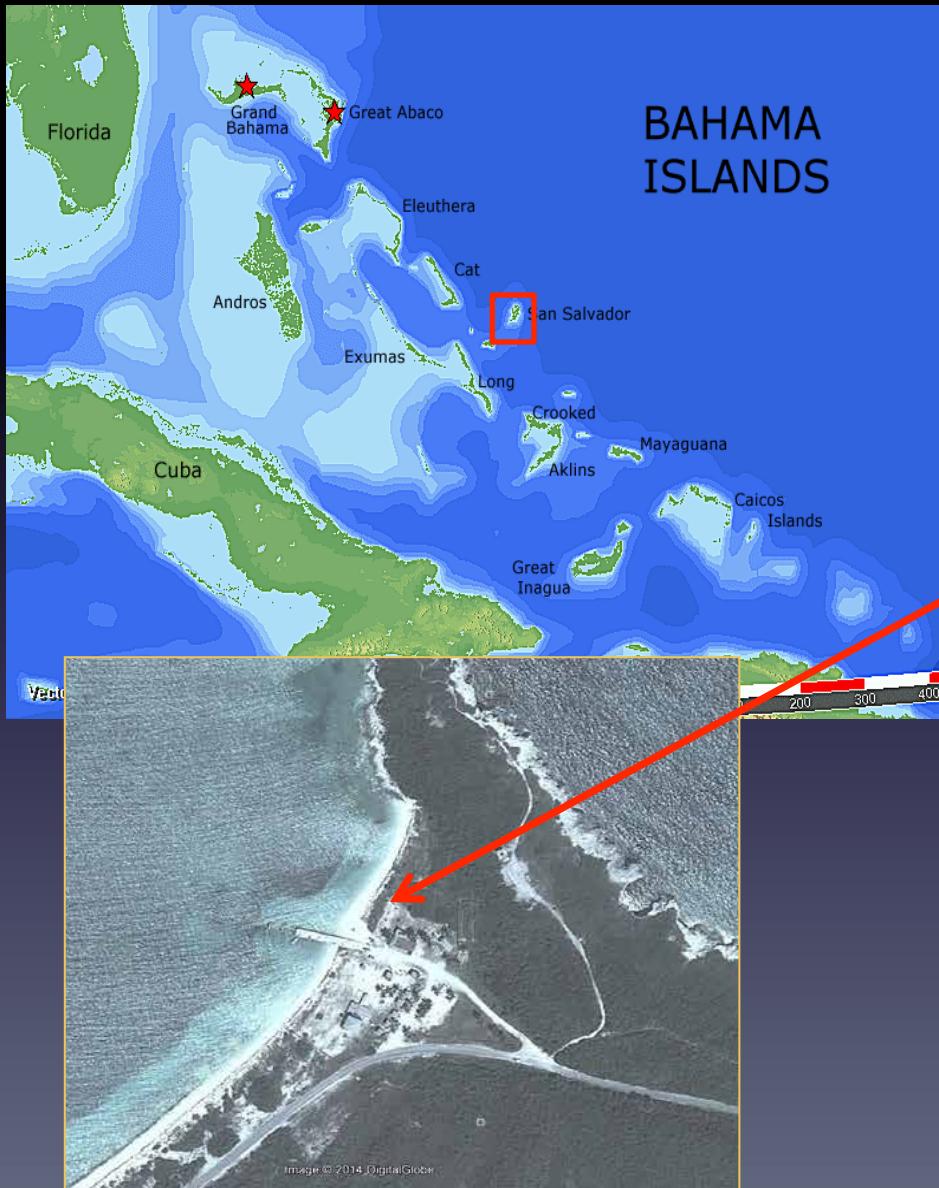


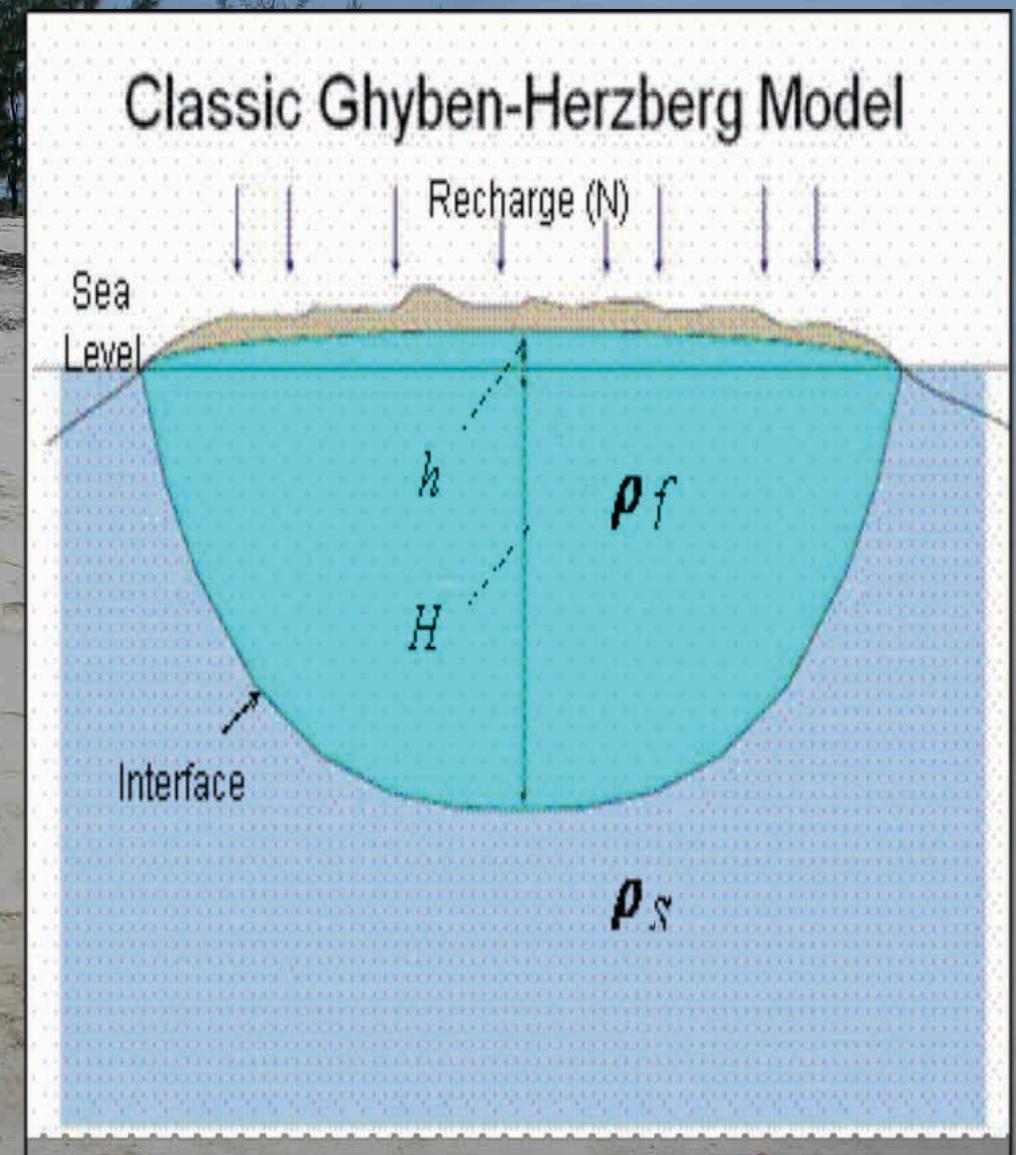


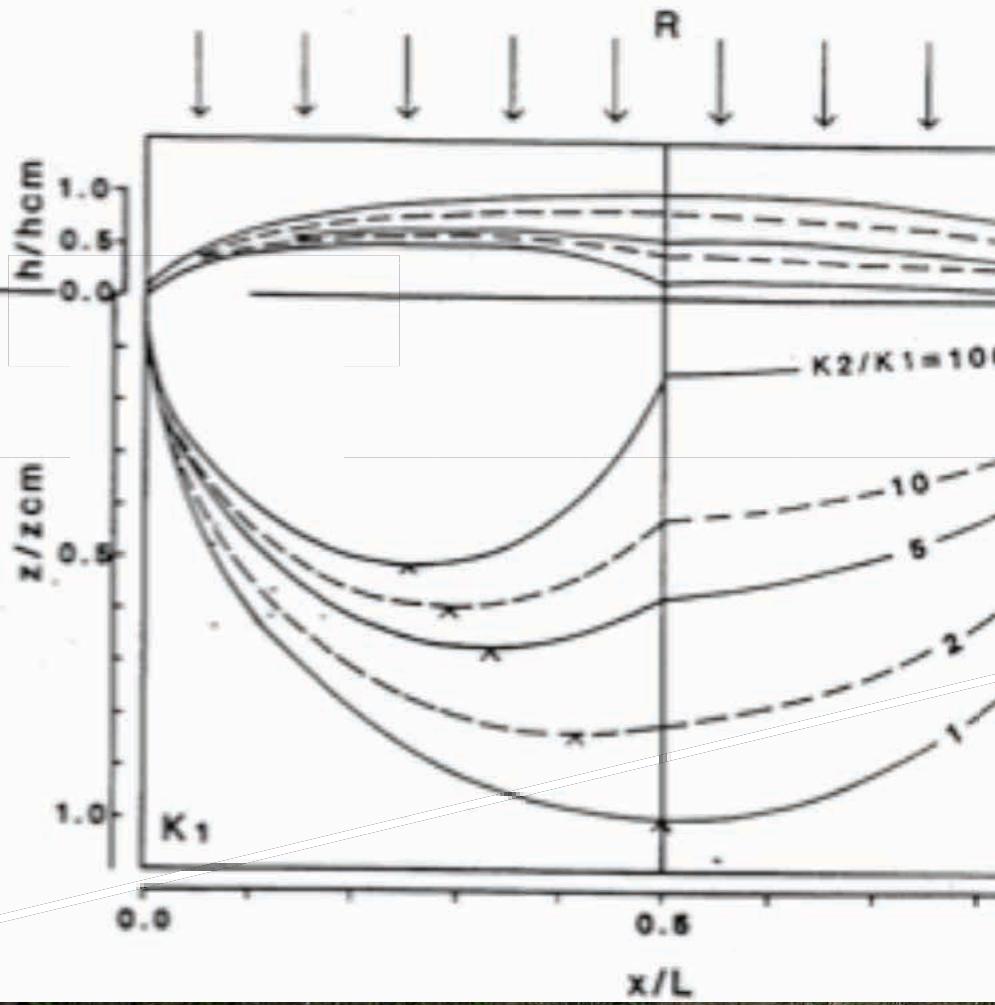
# Time lapse ERT of tidal pumping of nearshore groundwater from Grahams Harbor, San Salvador, Bahamas



Lee J. Florea, Dan Rust, & Devyn Unger









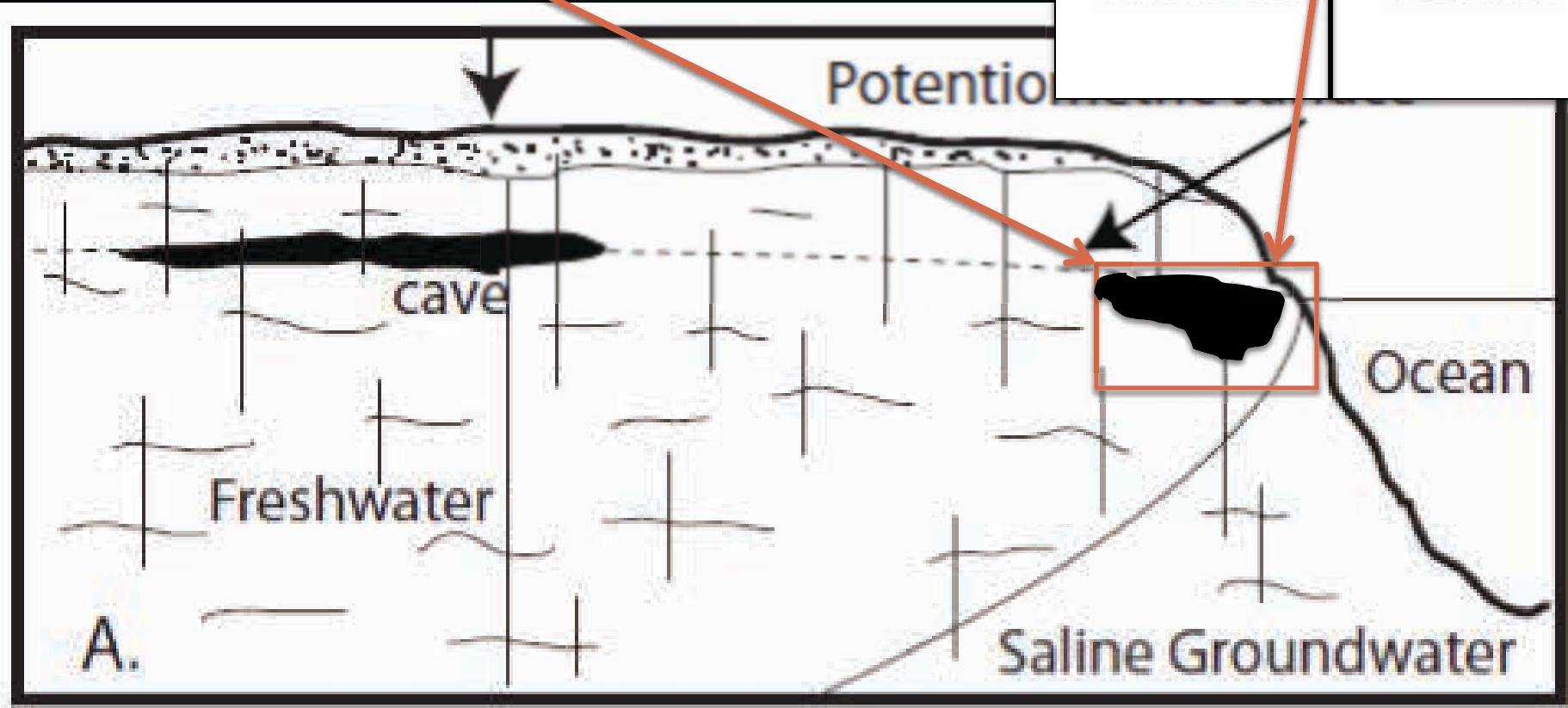
## Zone of greatest mixing, specific discharge, & geochemical activity

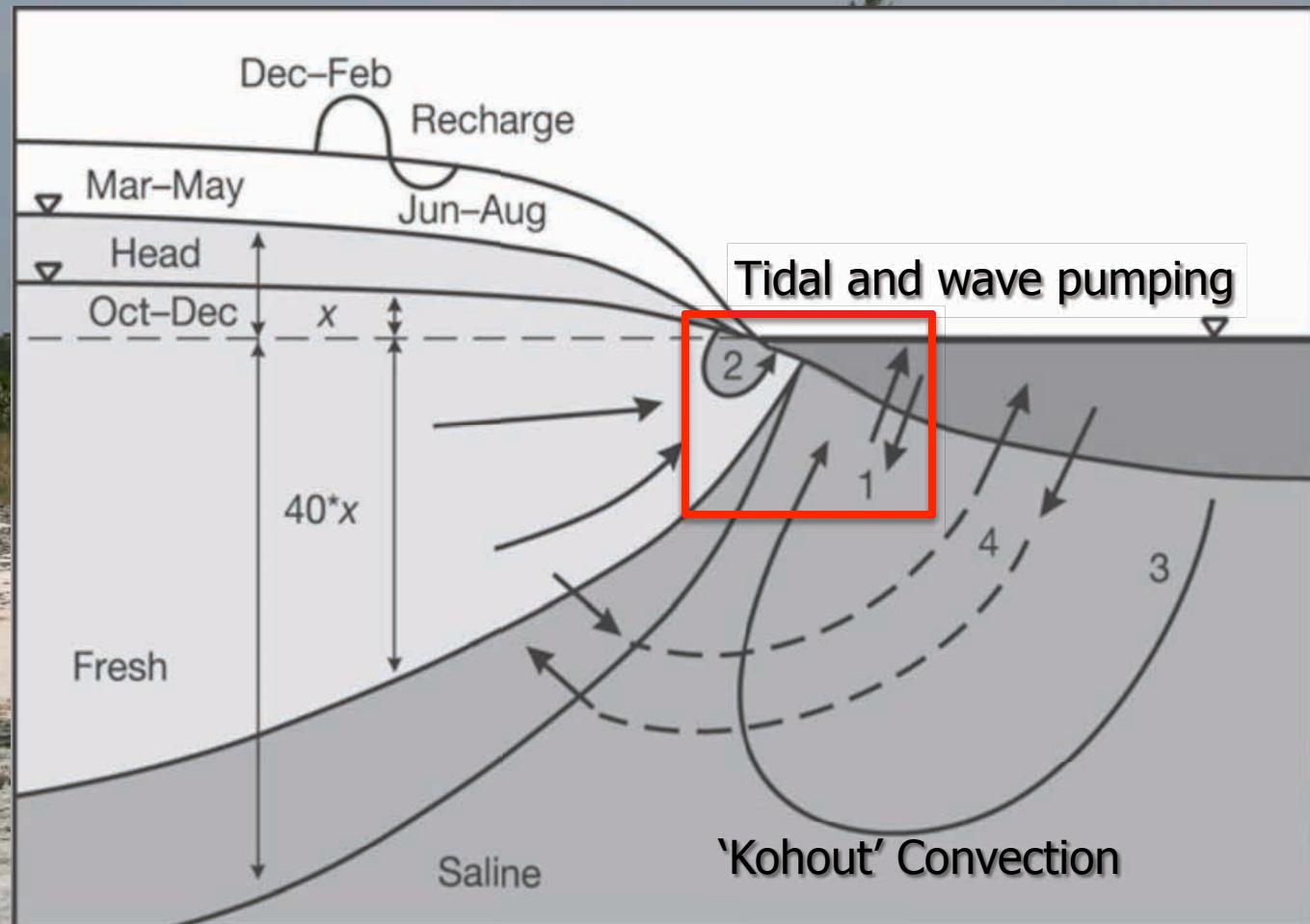
Vadose

Meteoric

Phreatic

Marine

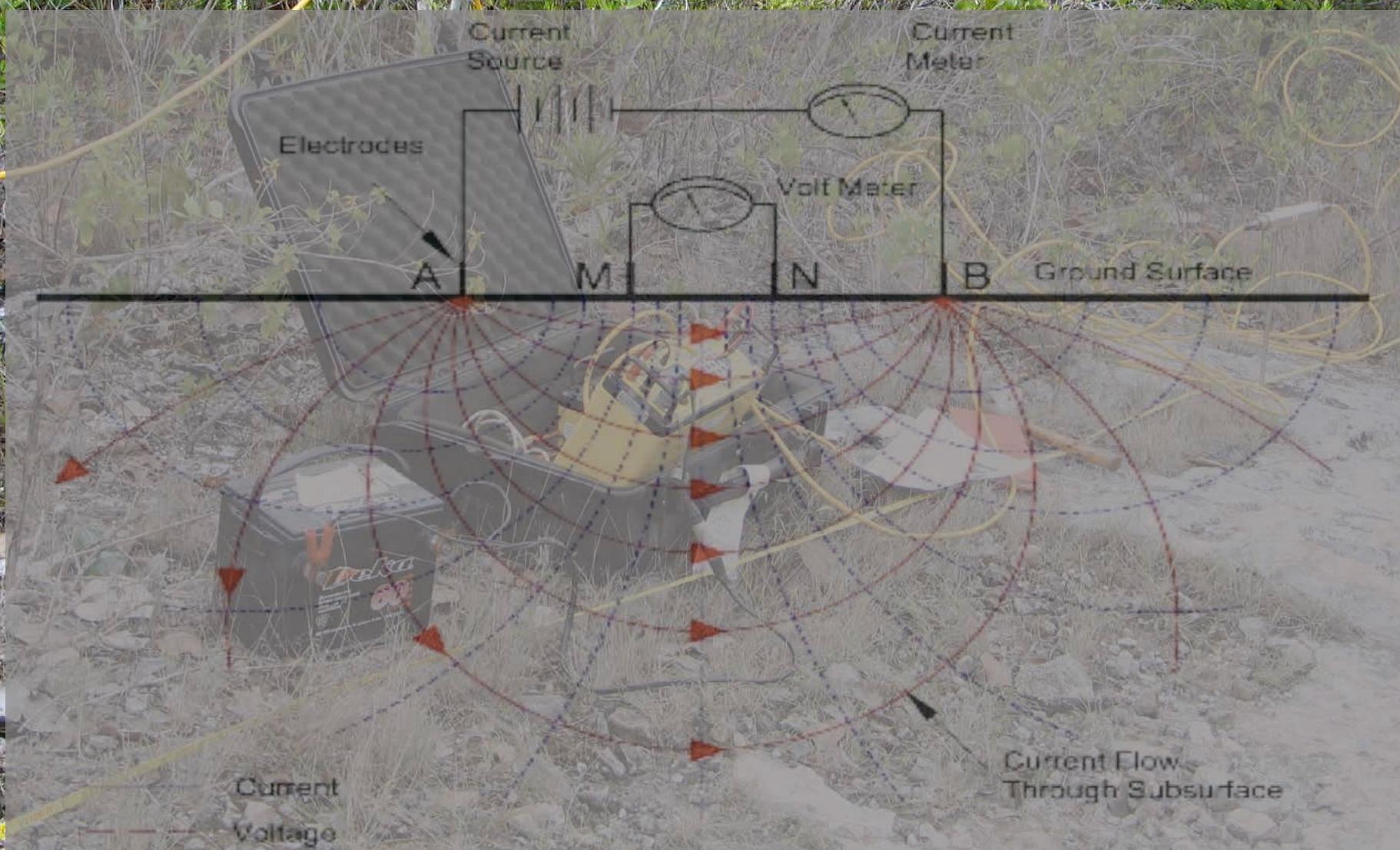






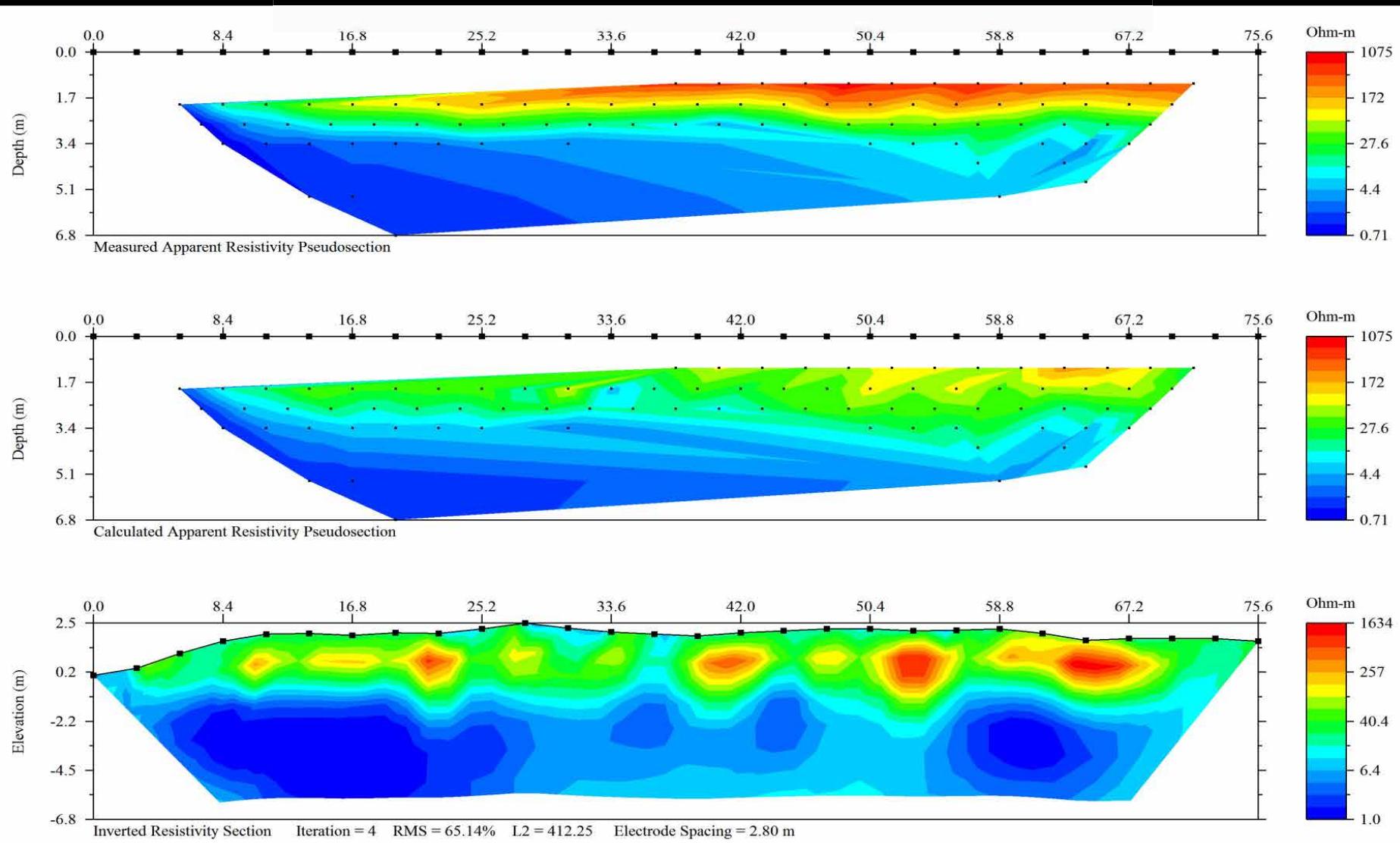
# Joachín







# 2009 Data

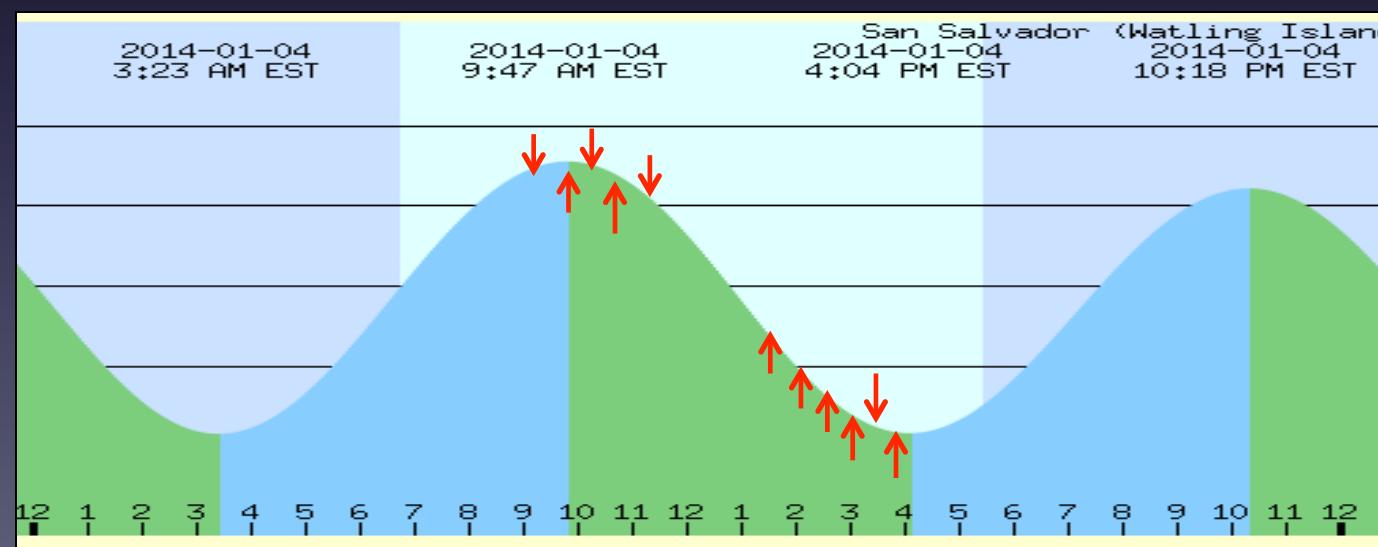




# 2014 Data



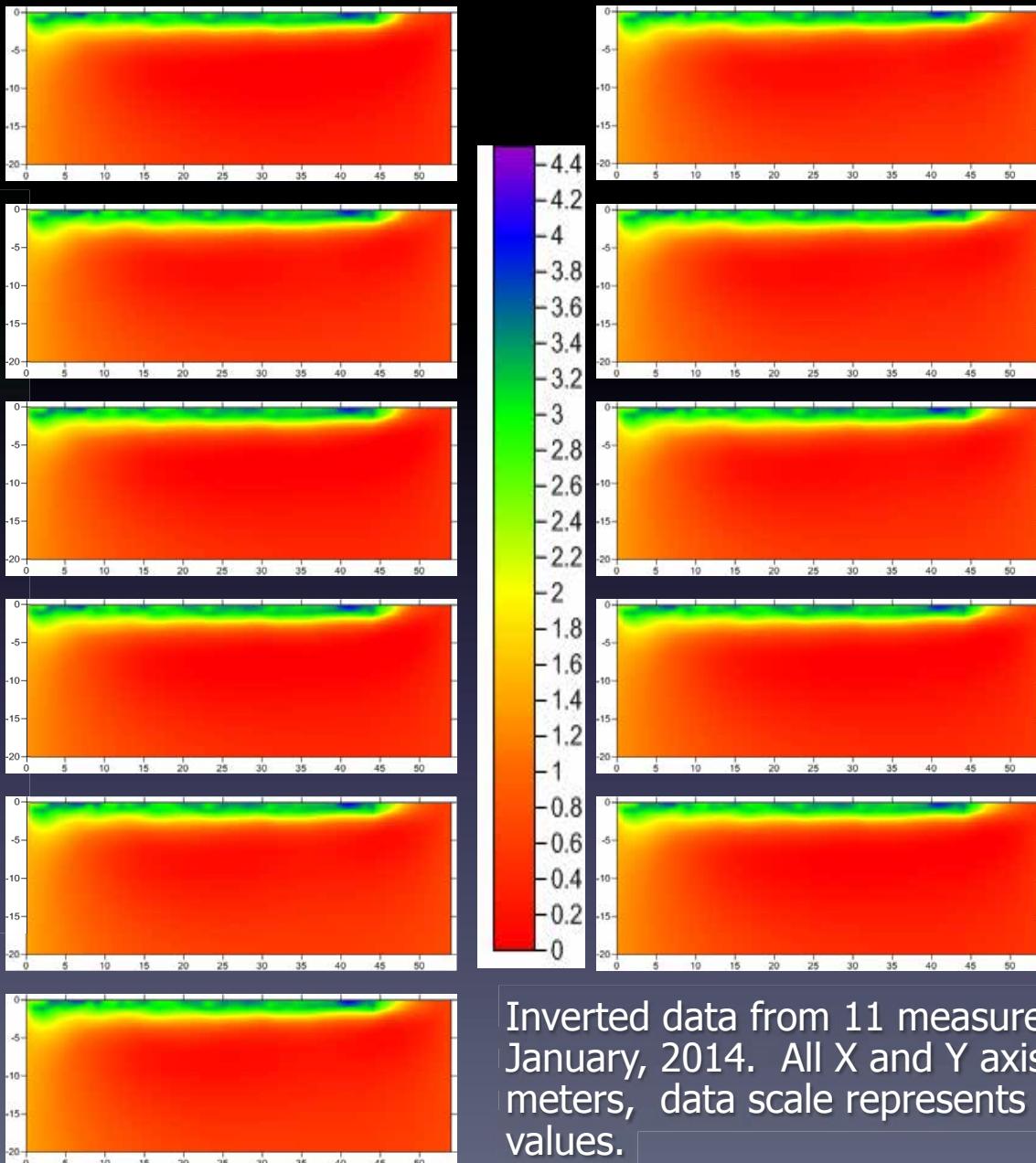
AGI R1/IP – 28 electrodes, 2 m spacing, 30 min intervals



Times of Array Initiation and Tidal Data



# Results



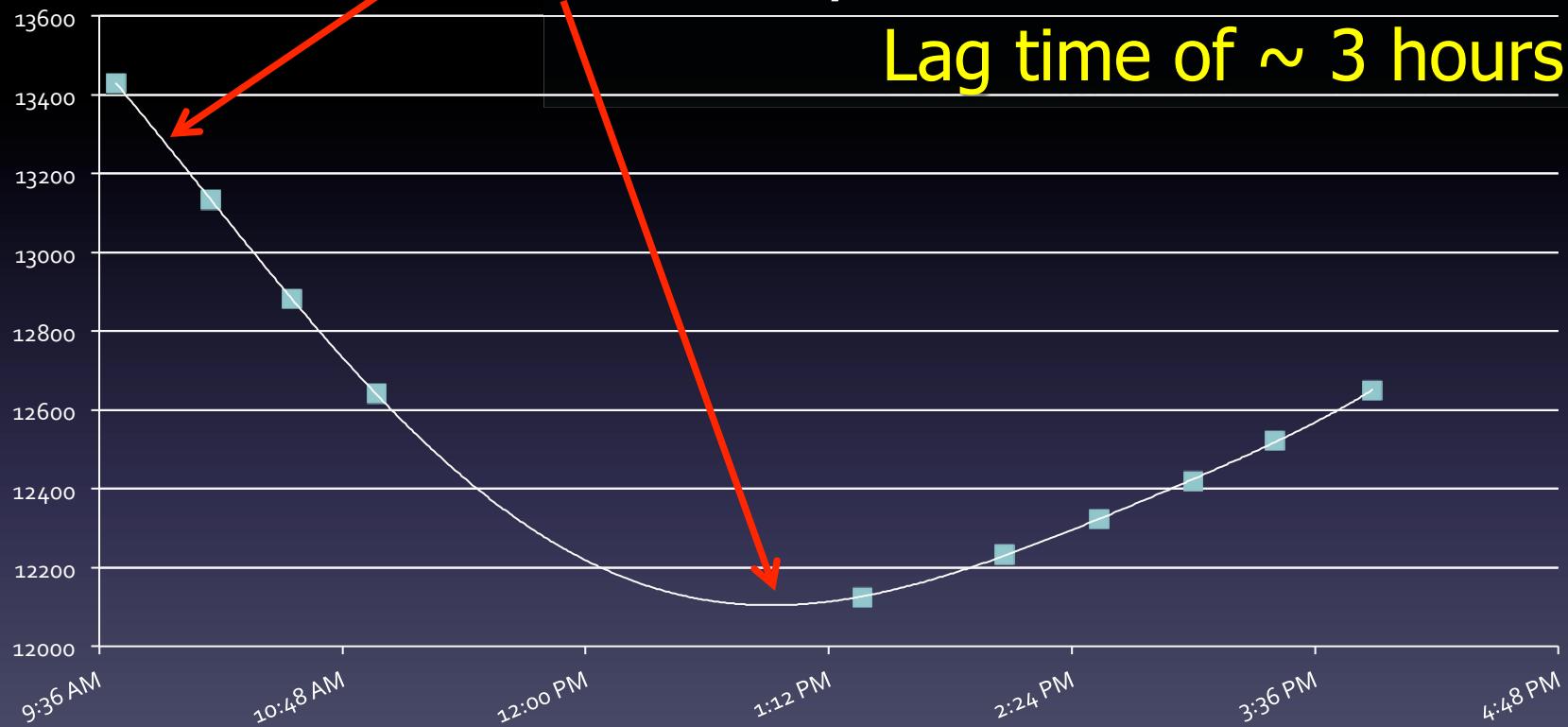
Inverted data from 11 measurements taken on 4 January, 2014. All X and Y axis measurements in meters, data scale represents estimated resistivity values.



High tide @ 9:47 PM

Resistivity minimum @ 12:50 PM

Lag time of ~ 3 hours

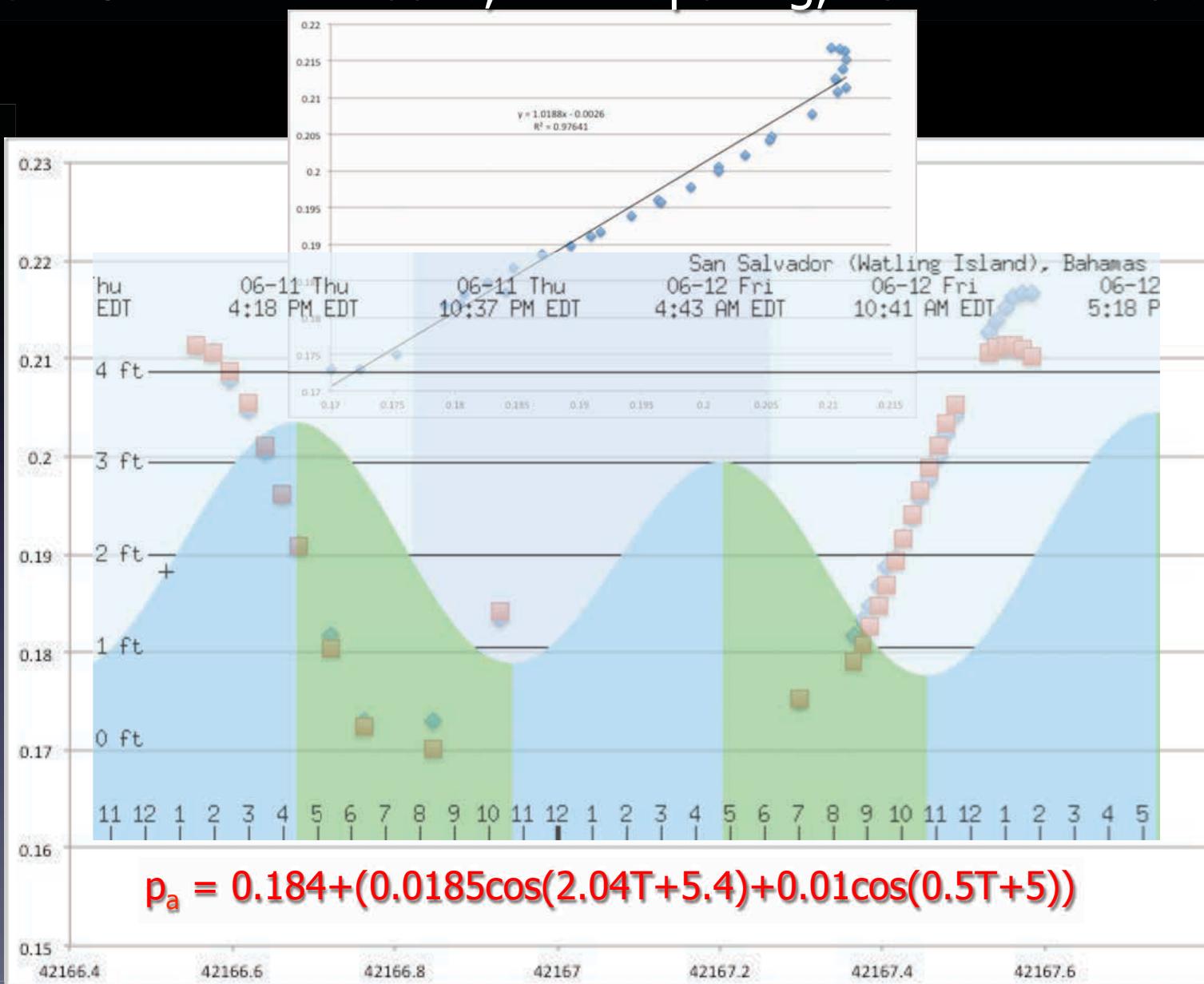


Pre-Inversion Apparent Resistivity

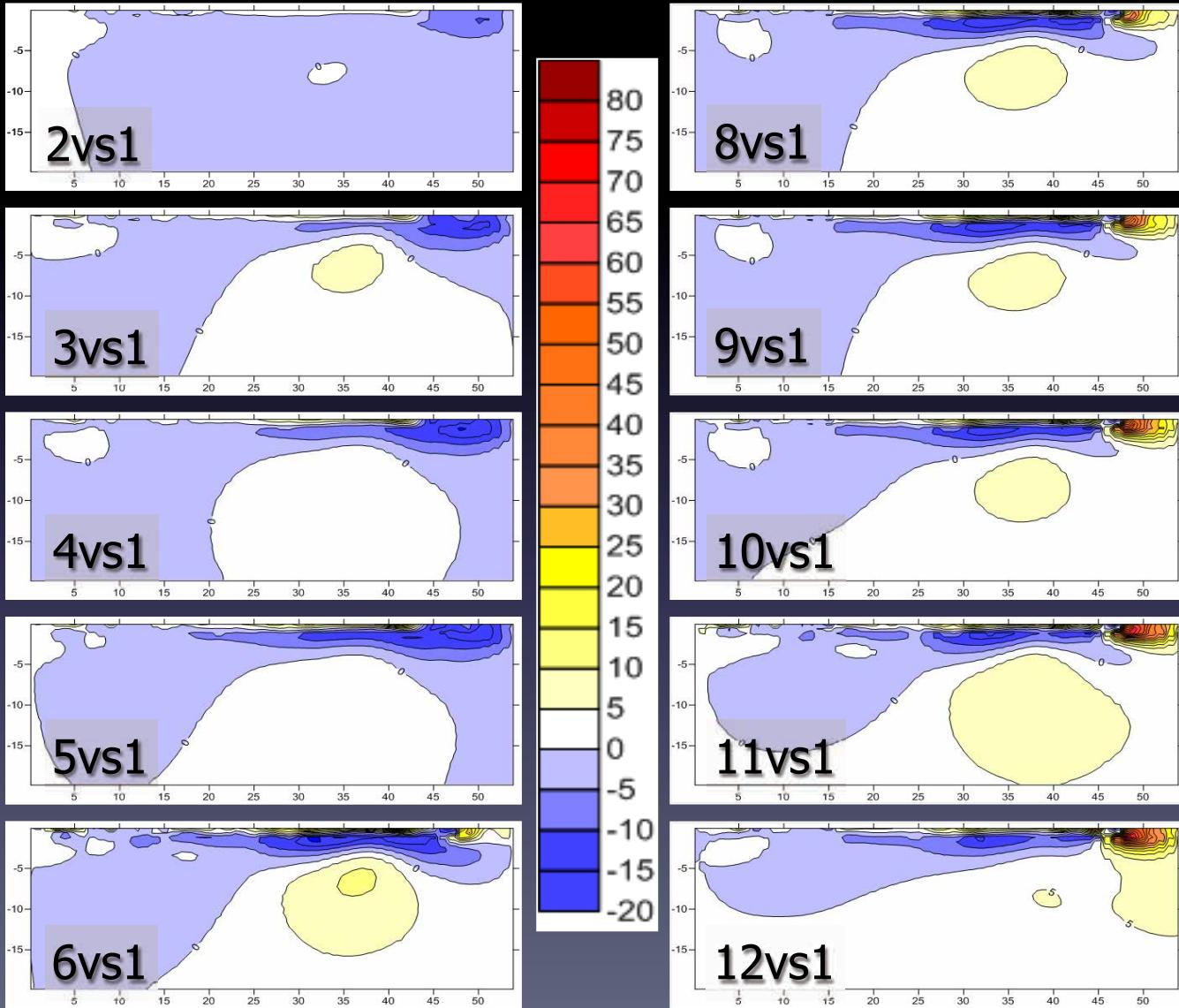


# 2015 Data

AGI R8 – 14 electrodes, 14 m spacing, 15 min intervals



# Time Sapse





# Summary

- Average  $\rho_a$  reduced by 11.5% from peak for 56 m transect using 28 electrodes (winter) and 20% using 14 electrodes (summer)
- $\rho_a$  changes in both periods of investigation indicate that tidal pumping lags behind high tide by  $\sim 3$  hrs
- Time lapse reveals changes in  $\rho_i$  restricted to the upper 5 m and more pronounced closer to the shoreline



# Next Steps

- Post-Joachin ERT to estimate residual salinification
- Longer transects near Grotto Beach strand plain
- Coordinated GPR to more accurately map changes in water table position during tide cycle



# Thank you!

Donations to the GRC, its employees,  
& the people of San Salvador:

Dr. Donald T. Gerace, Pres.

BECS Foundation

3616 Peace River Drive

Punta Gorda, FL 33983