

# Hydrodynamics and Sediment Dynamics of Missisquoi Bay, Lake Champlain



2015 VT EPSCoR Student Research Symposium

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# Why does circulation matter?

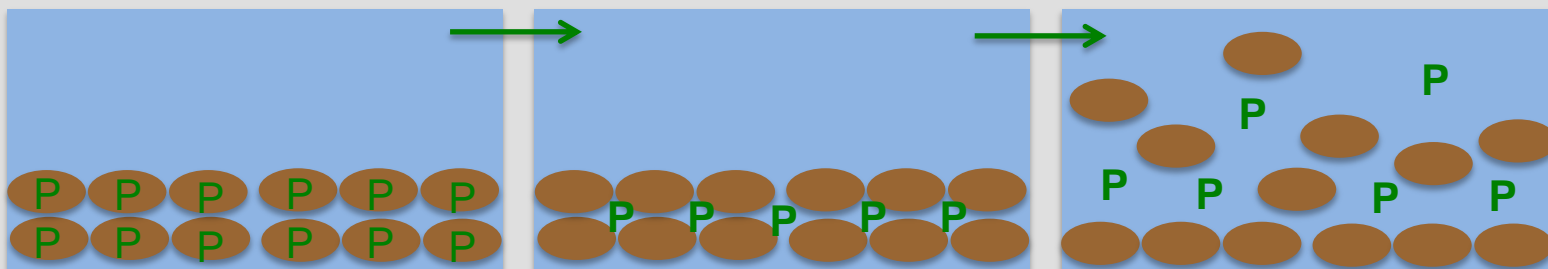


- Currents control the mobility of all chemical constituents and pollutants in the water
- Surface currents
  - Distribute and spread algal blooms
  - Transport phytoplankton and zooplankton
- Bottom currents
  - Move/re-suspend sediment

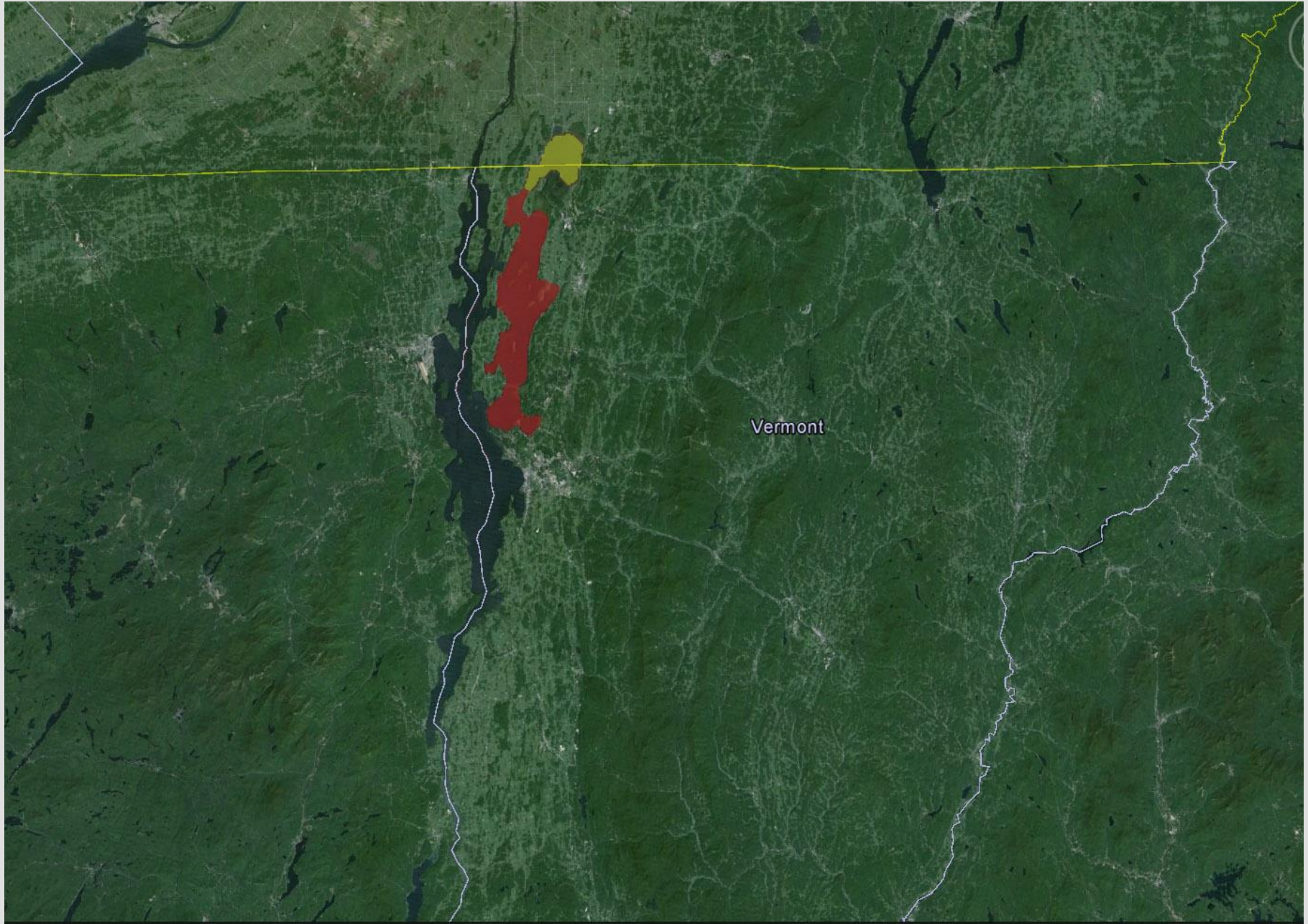
Calm

Reducing

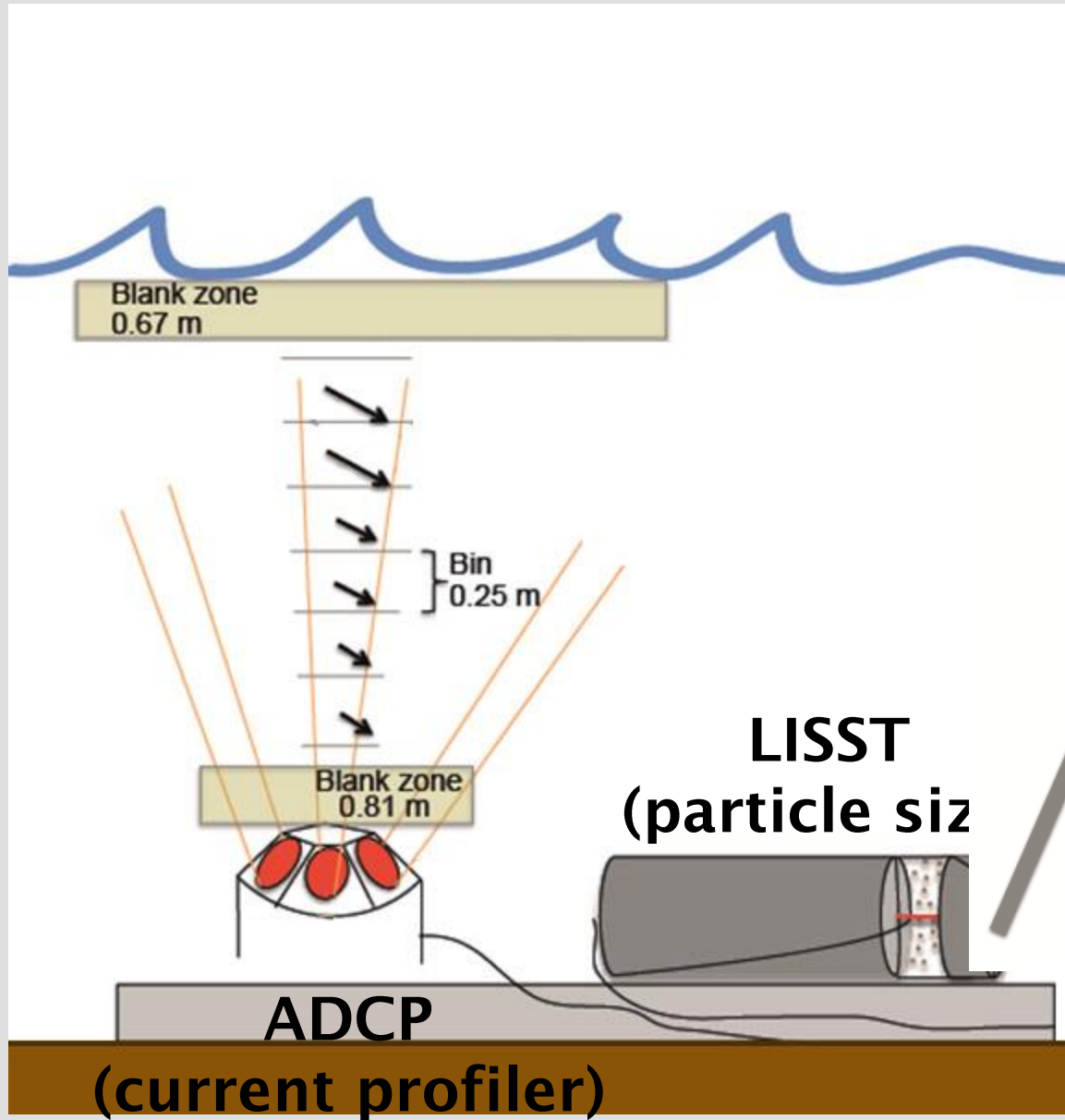
Turbulent



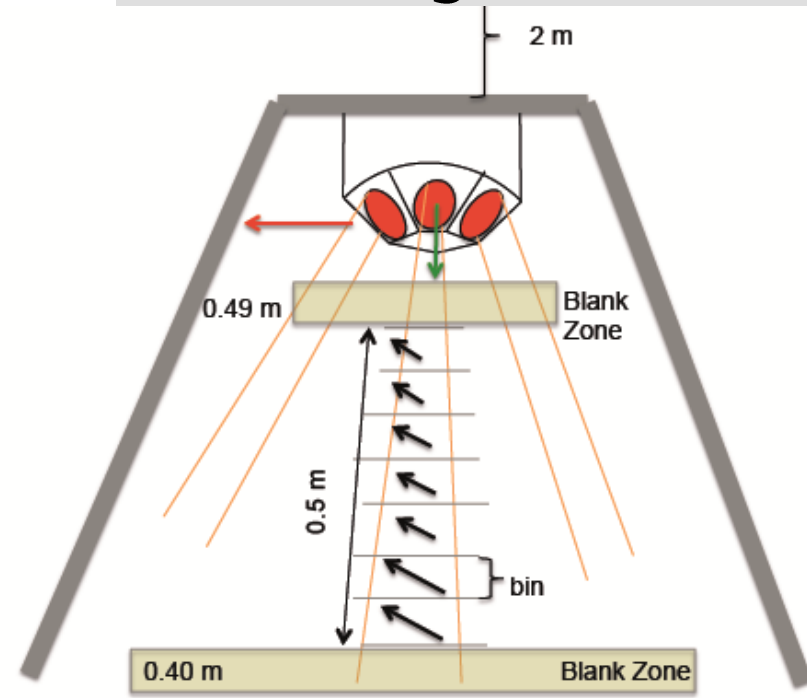
# Missisquoi Bay



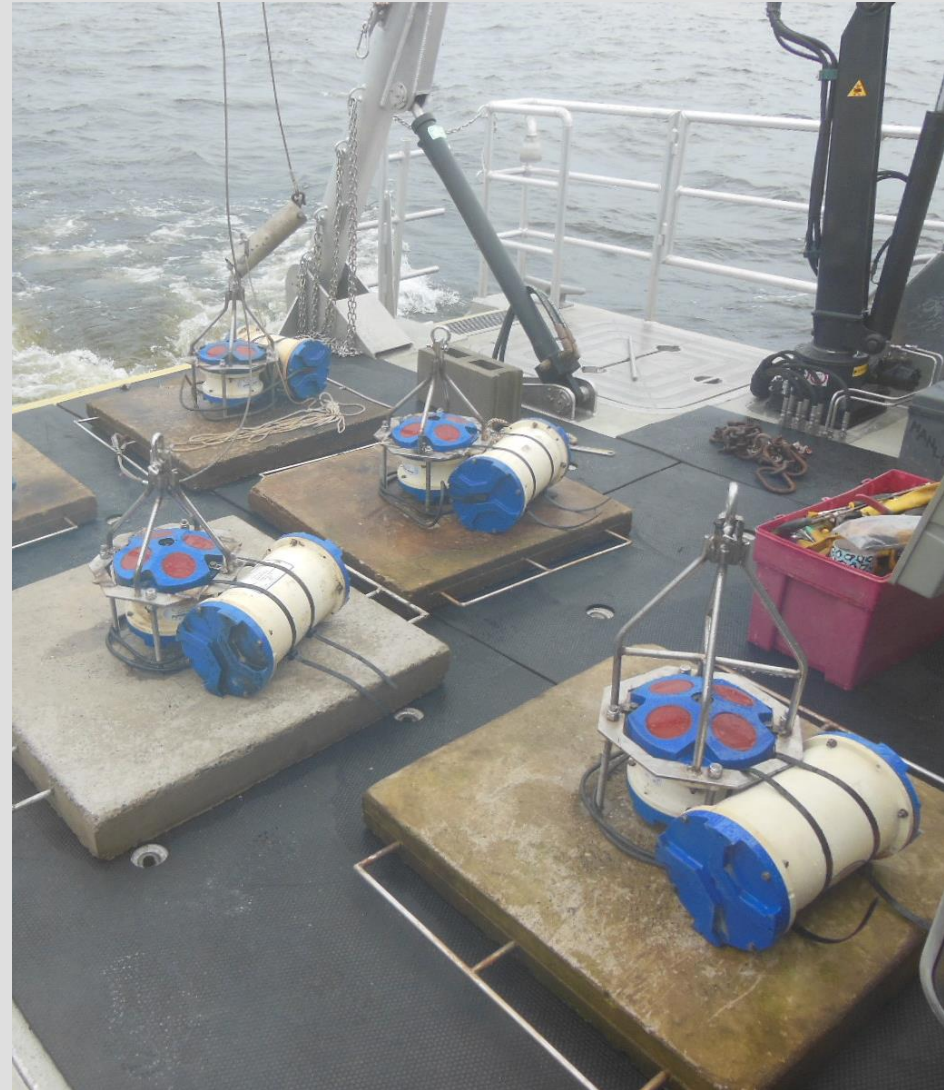
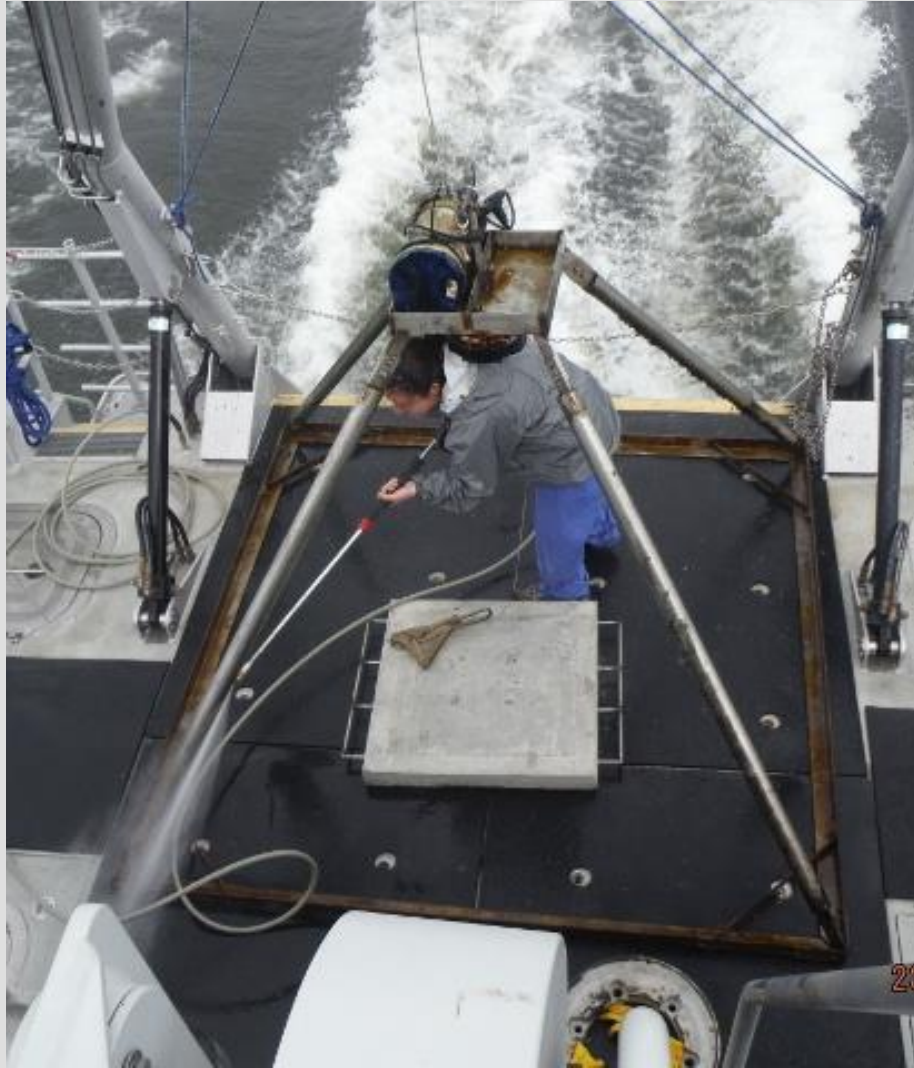
# Instrumentation - ADCPs



## Downward-looking ADCP



# Instrumentation - ADCPs

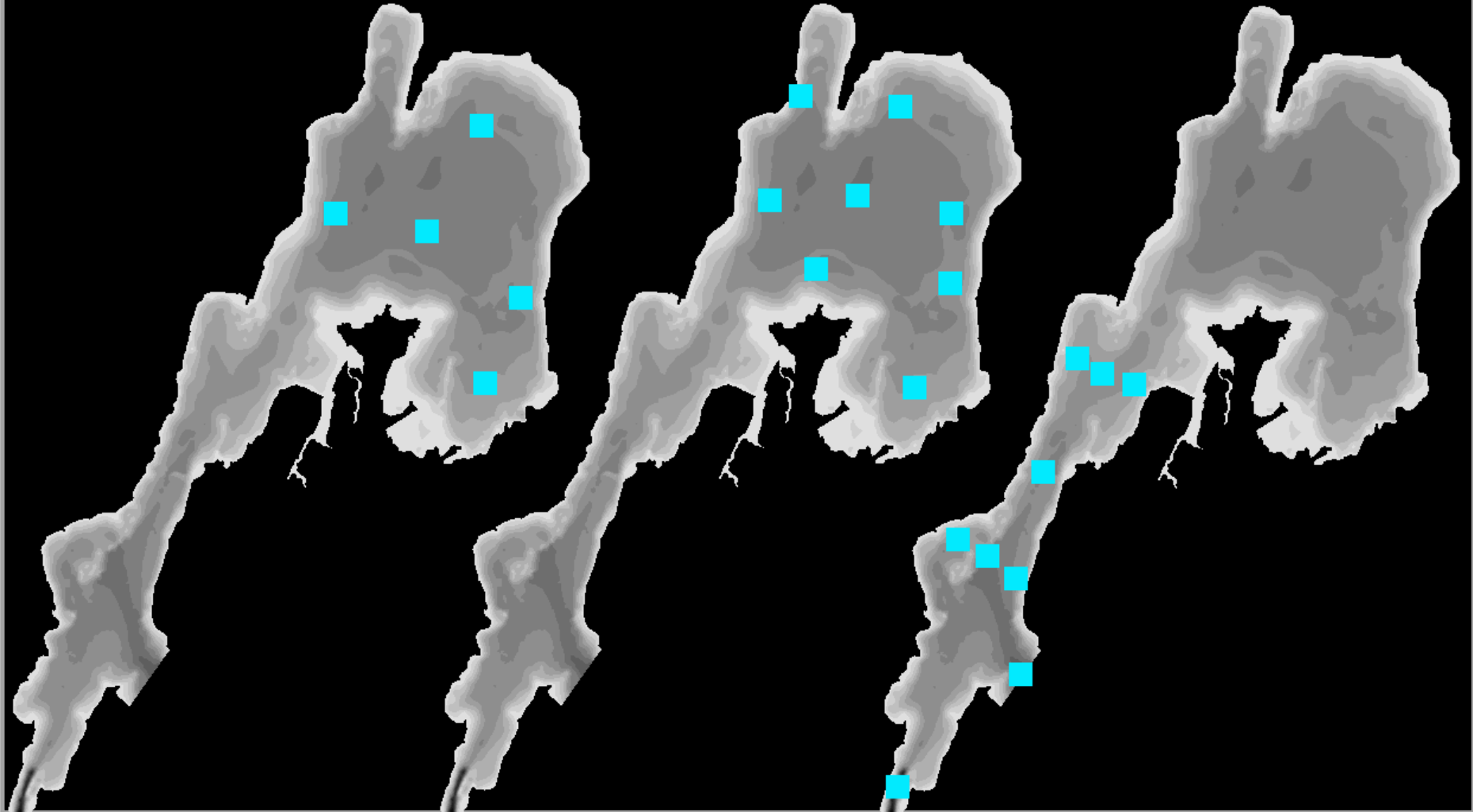


# Instrumentation - ADCPs

Summer 2012

May 2013-May 2014

May 2014-Present



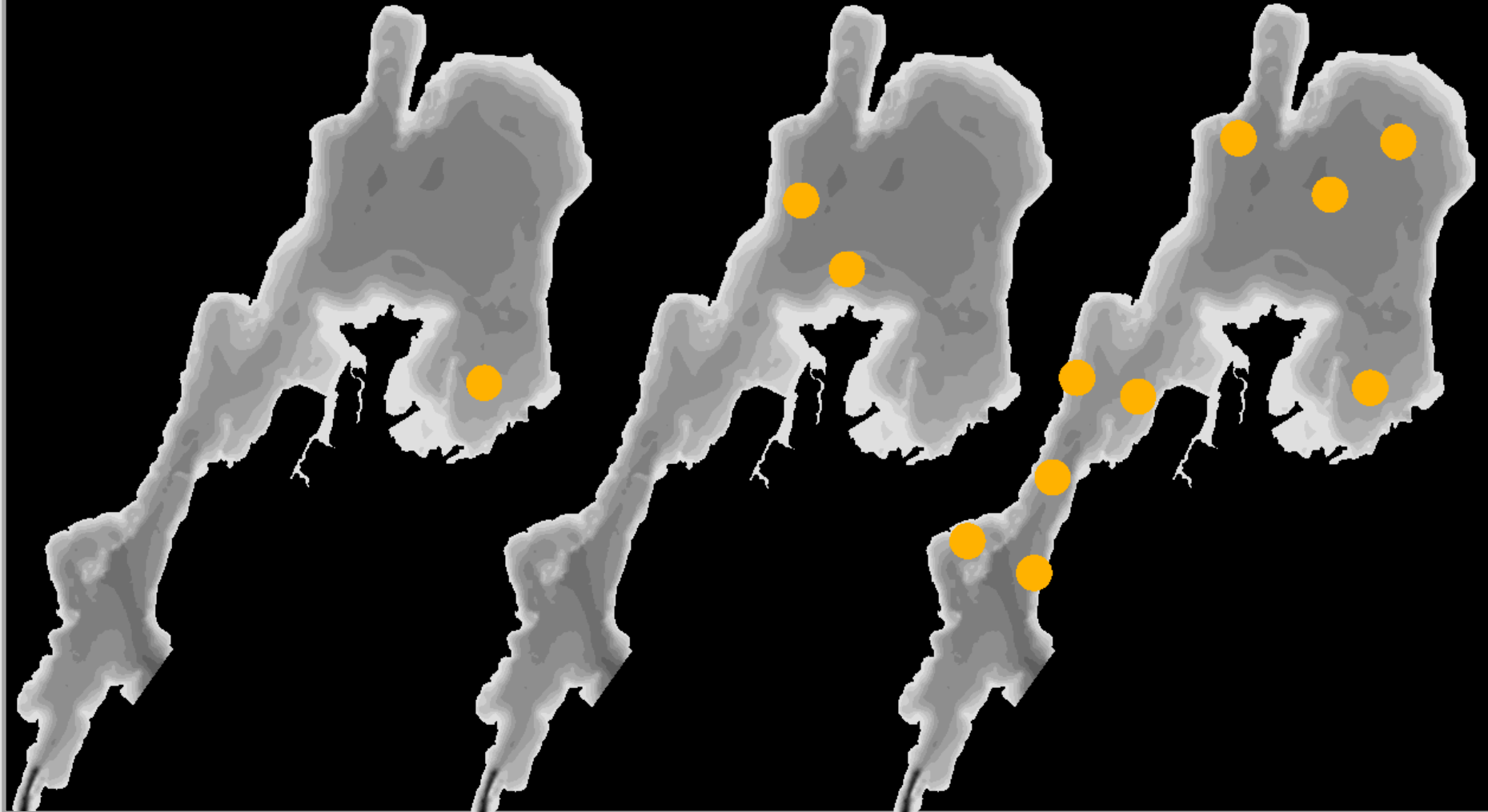
# Instrumentation - Temperature

## Temperature Chains

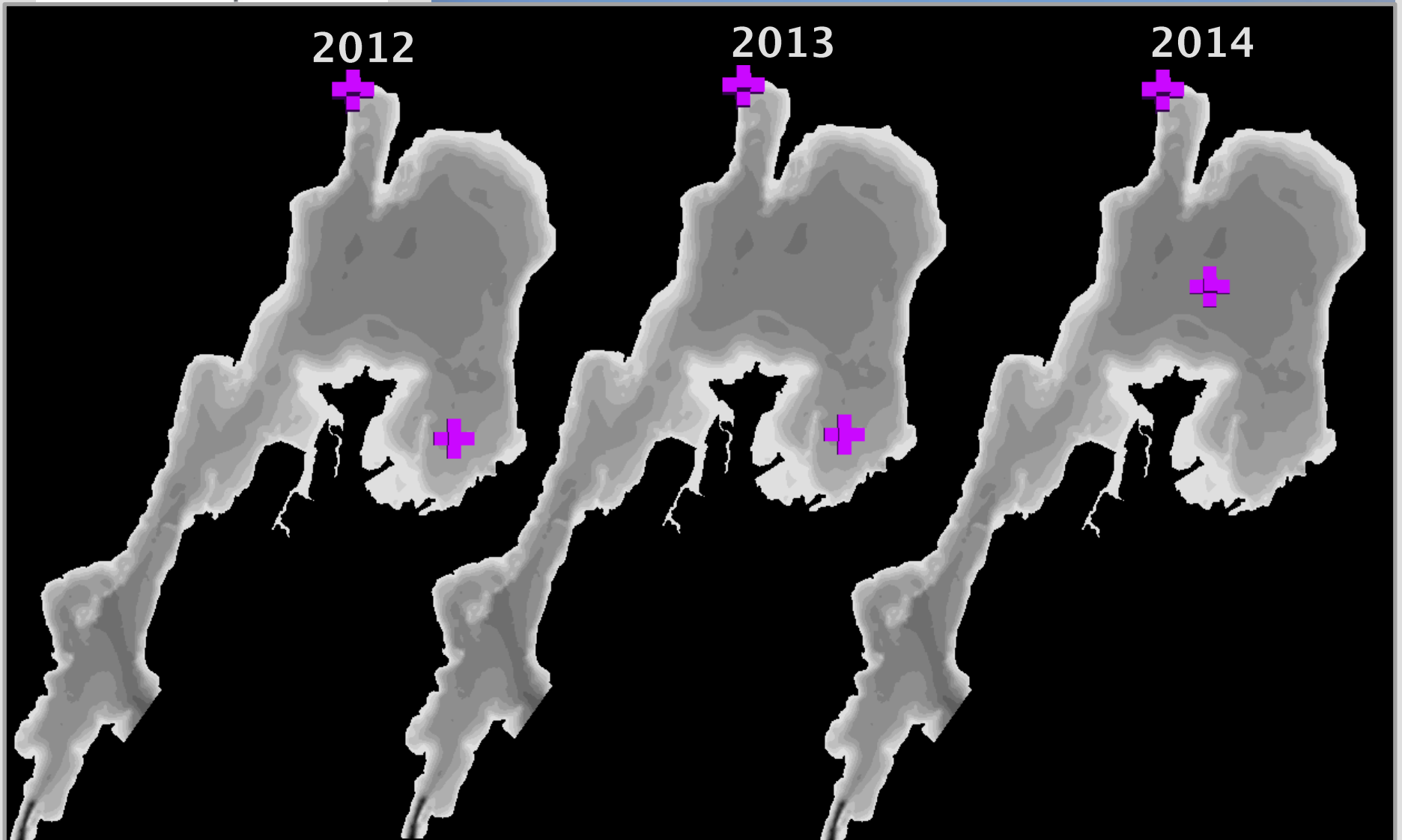
Summer 2012

Summer 2013

Summer 2014

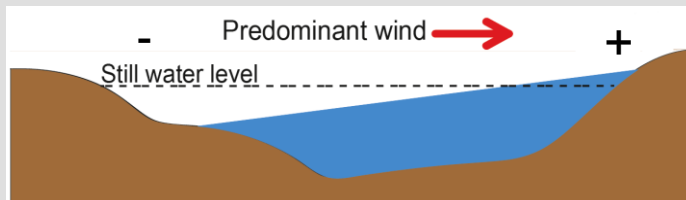
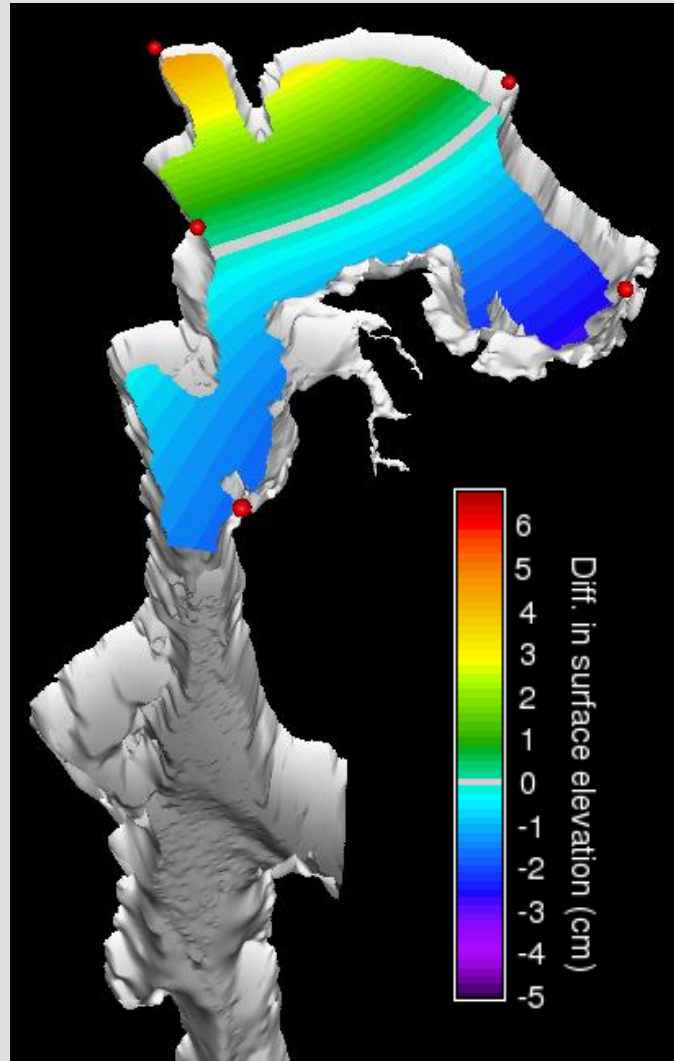


# Instrumentation - Meteorological Data





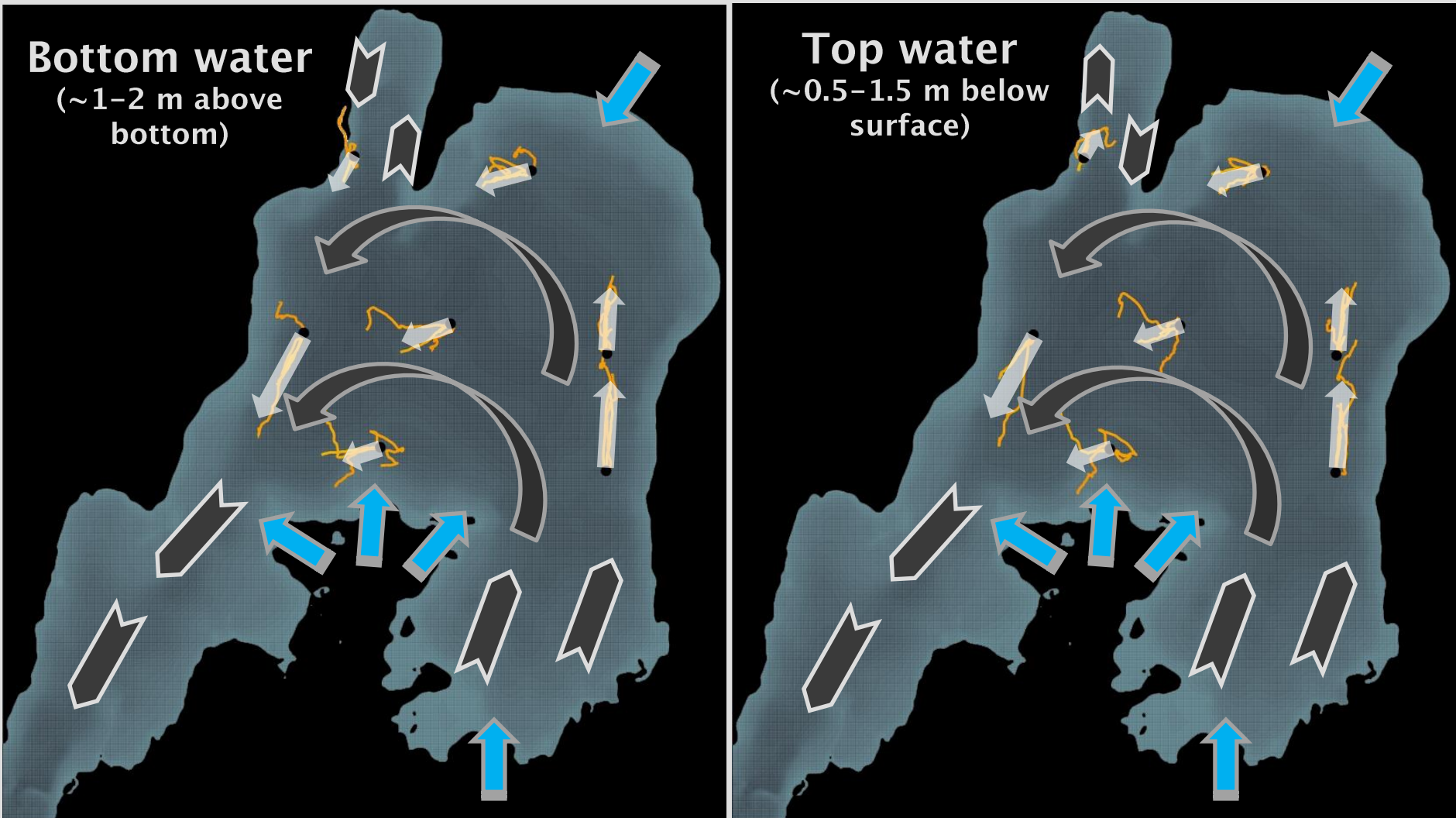
# Instrumentation – Water Level



What's the "mean"  
circulation pattern?

# Spring discharge events

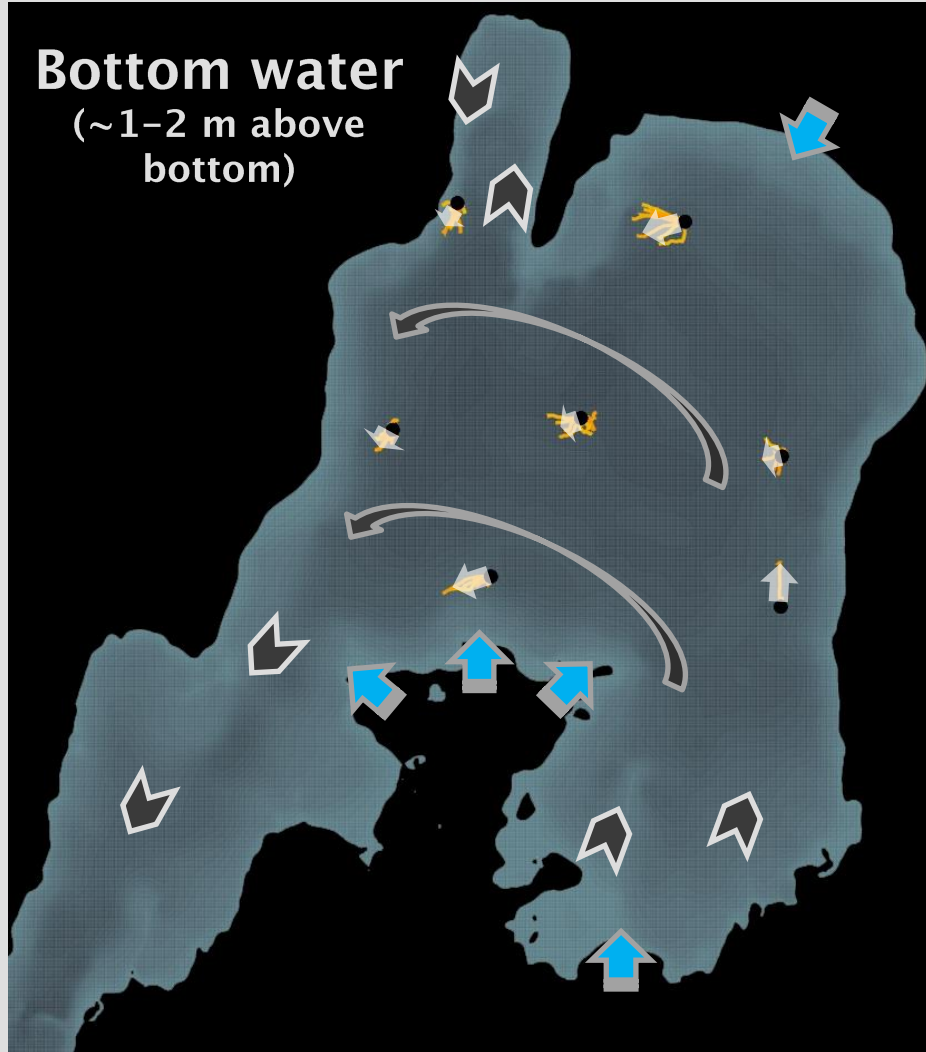
April 2014, 1-week PVDs



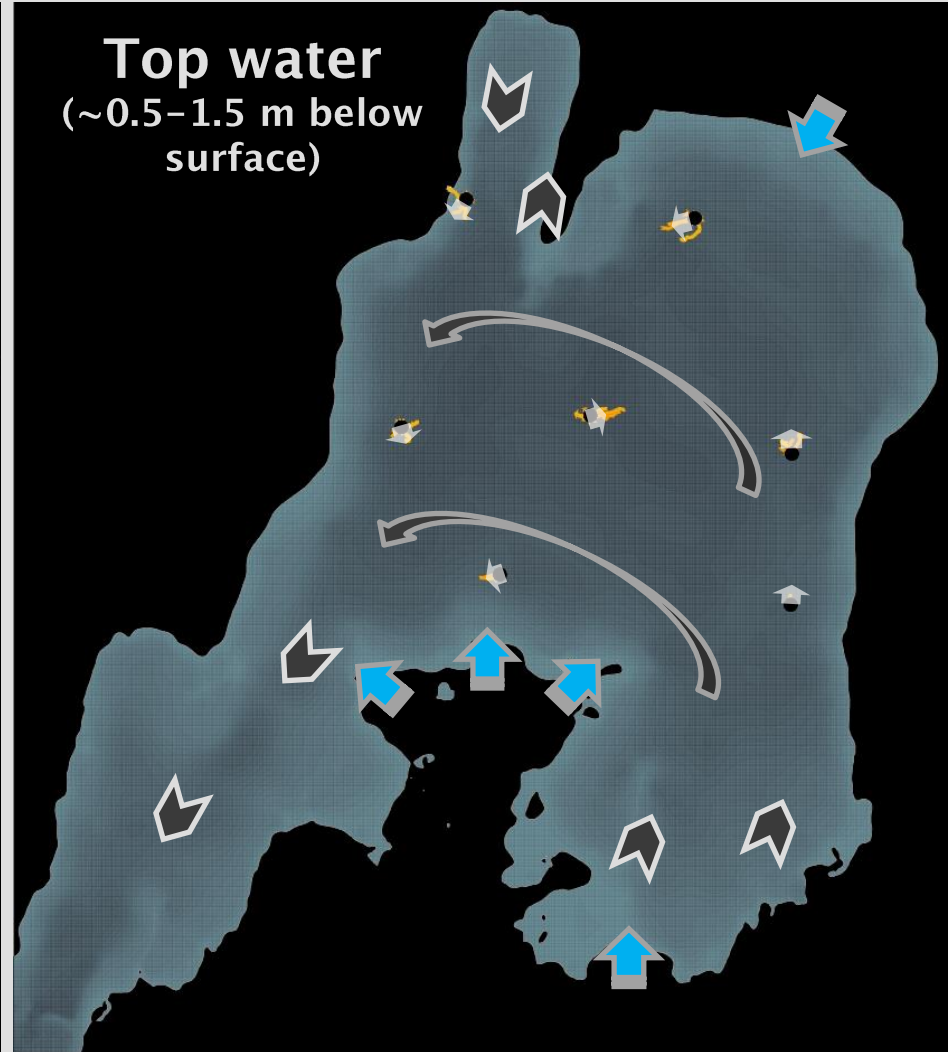
# Winter circulation – ice covered

Dec. 2013 to Mar. 2014, 1-week PVDs

**Bottom water**  
(~1-2 m above  
bottom)



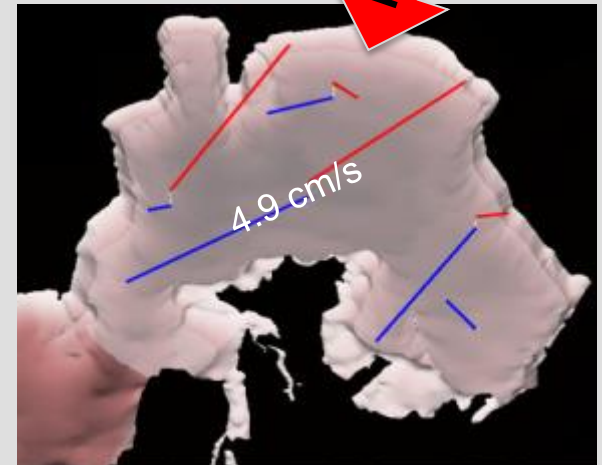
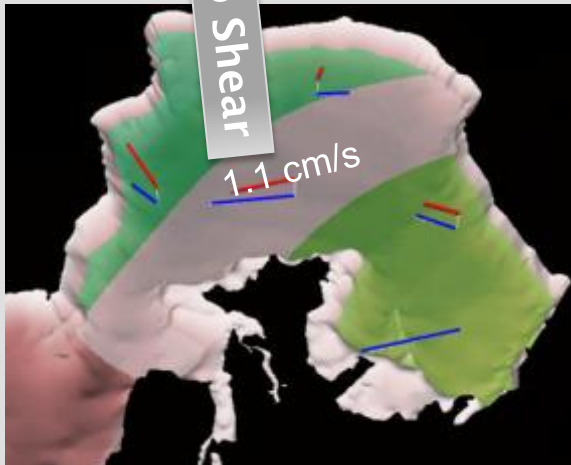
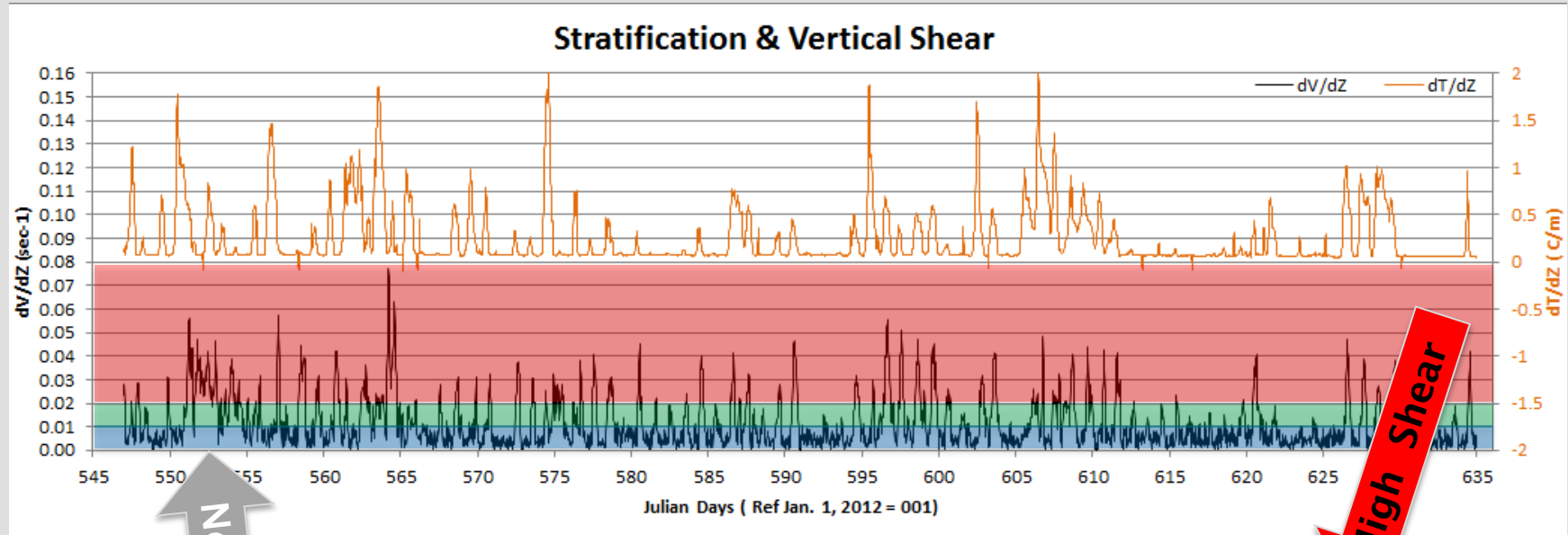
**Top water**  
(~0.5-1.5 m below  
surface)



# Vertical shear events

Requirements:

- (1) Wind-forced setup
- (2) Stratification ( $> 0.04^{\circ}\text{C}$ )



# Movi under

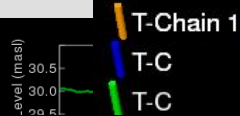
## Missisquoi Bay

June 20, 2014 00:00  
JD 902.00000

# deeper iminations

## Missisquoi Bay

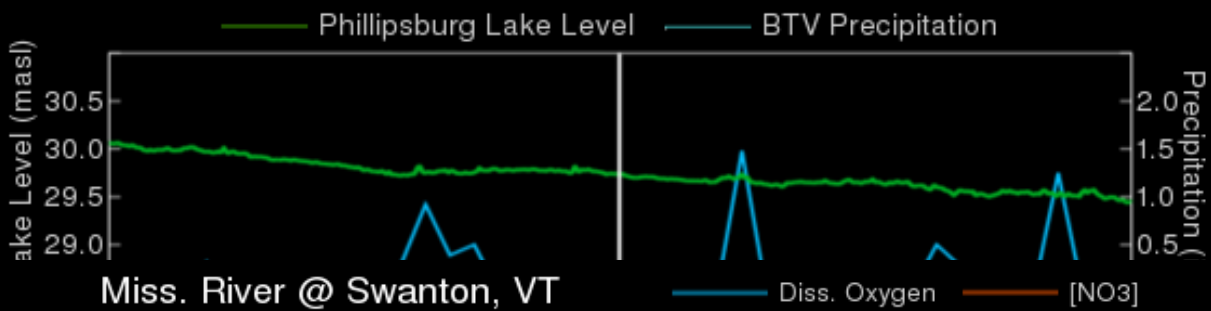
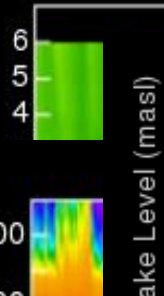
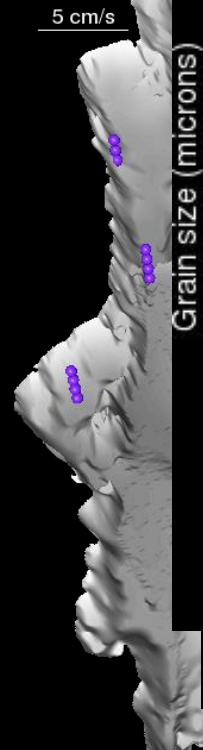
June 20, 2014 00:00  
JD 902.00000



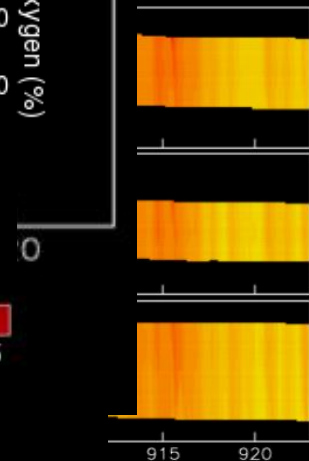
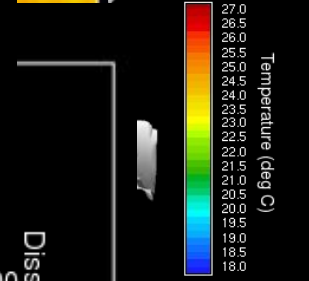
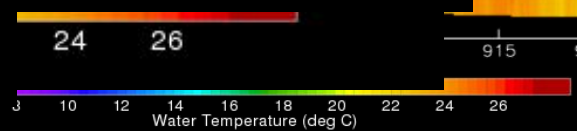
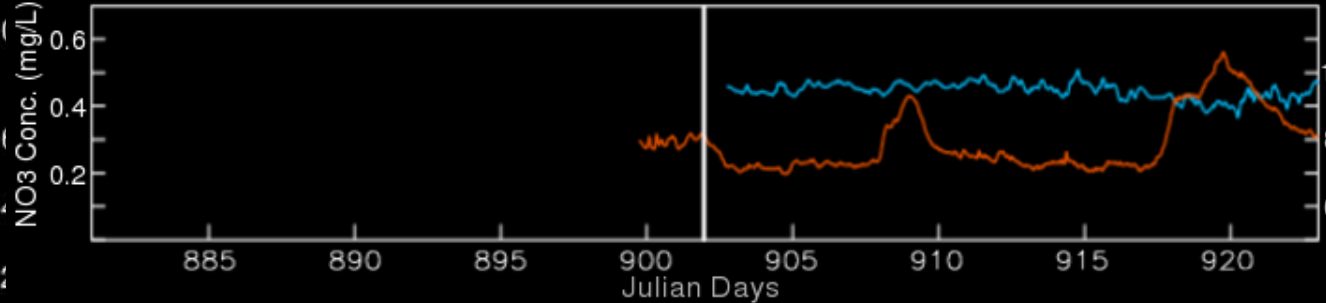
## Delta Water Level

Level Backscatterance Temperature

- T-Chain 1
- T-Chain 2
- T-Chain 3
- LISST
- S2 Buoy
- Temperature measurement



## Miss. River @ Swanton, VT



# Questions?

