

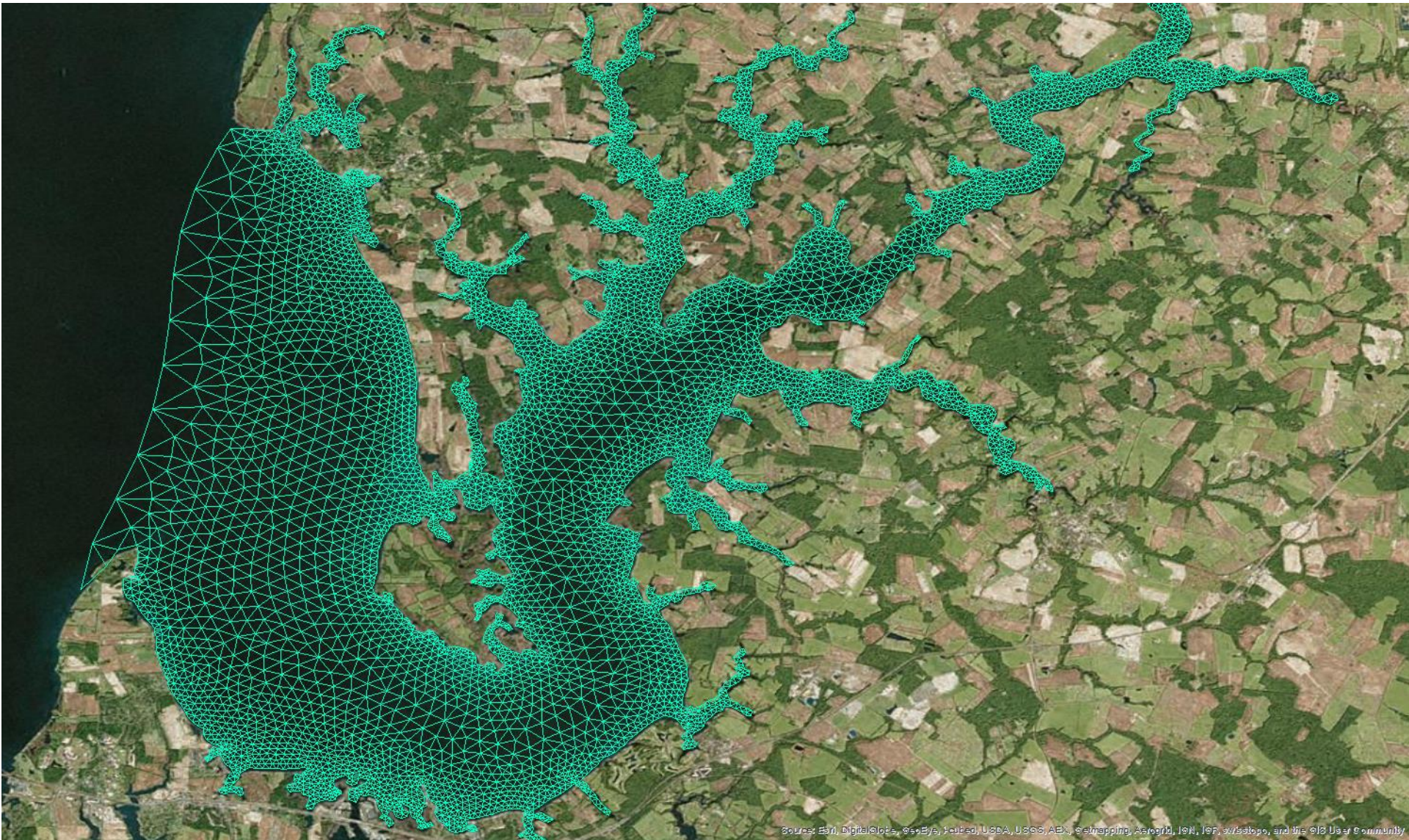
# **Progress report on FVCOM-ICM application in the Chester River**

Richard Tian & modeling team  
UMCES/CBPO

Modeling Quarterly Review Meeting  
Nov. 04 2015



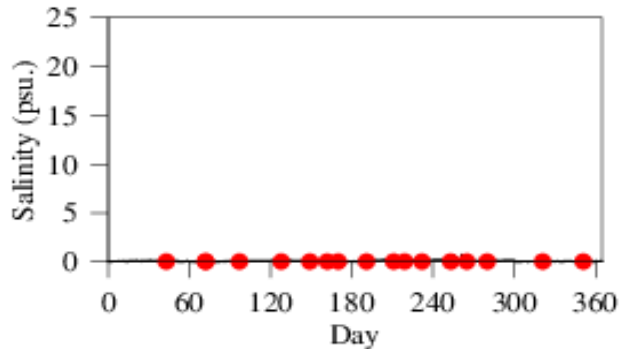
# FVCOM grid



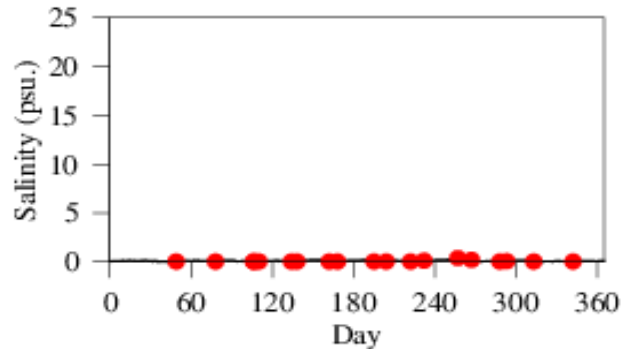


# Surface S at ET4.1 (Tidal fresh)

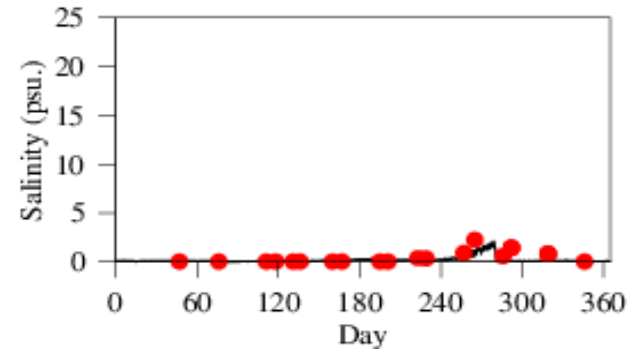
ET4.1\_L\_0 2003



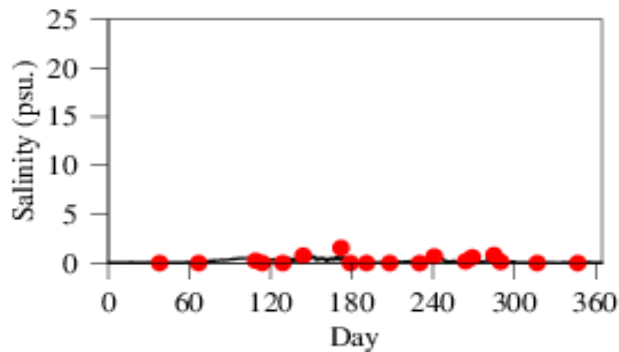
ET4.1\_L\_0 2004



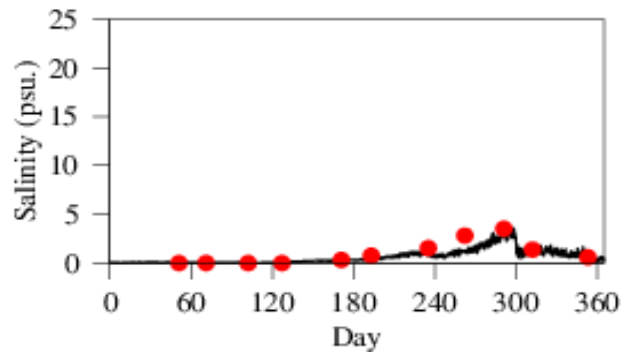
ET4.1\_L\_0 2005



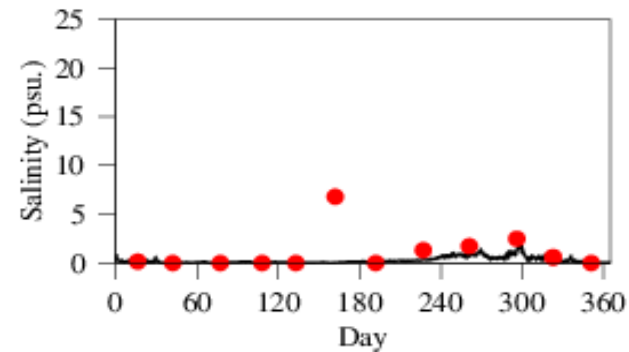
ET4.1\_L\_0 2006



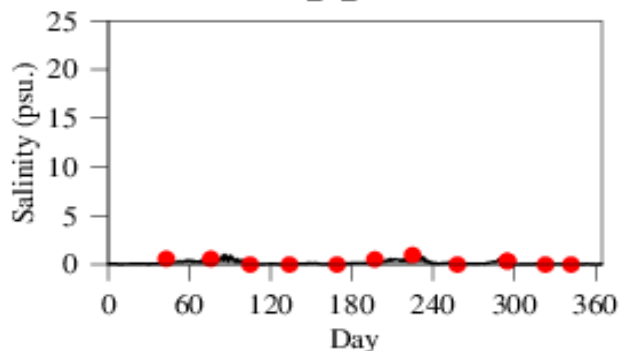
ET4.1\_L\_0 2007



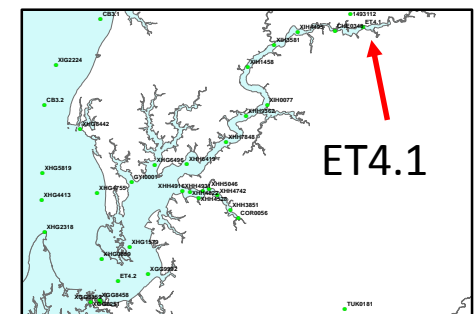
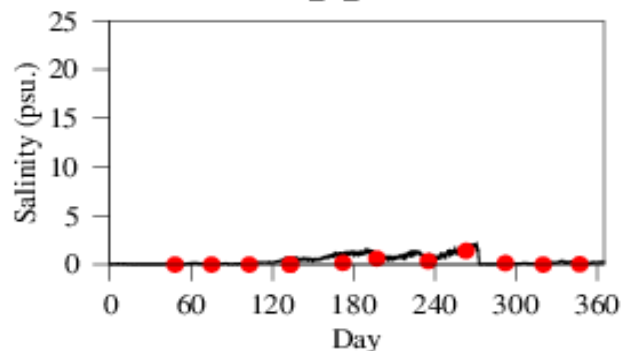
ET4.1\_L\_0 2008



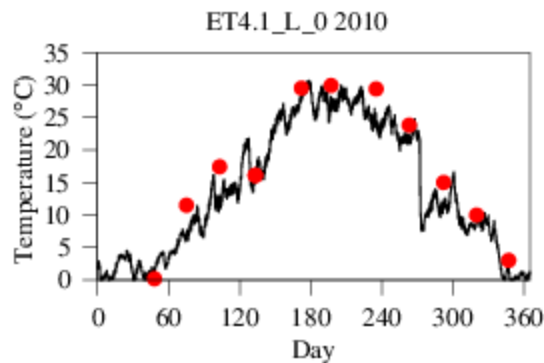
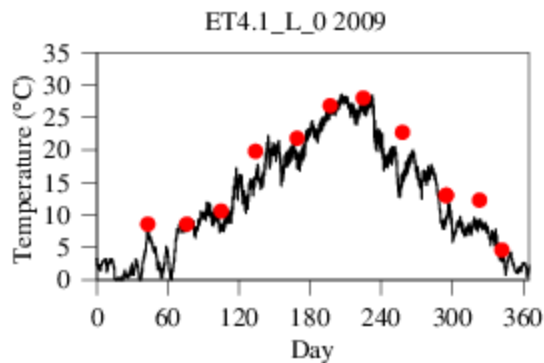
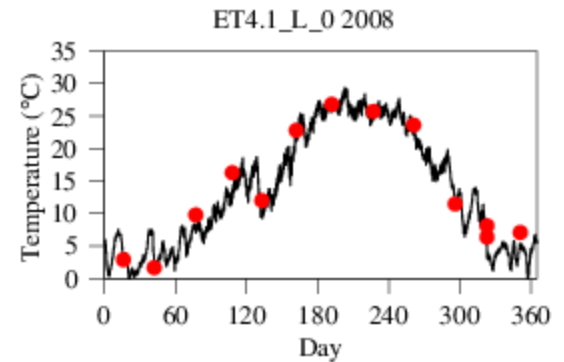
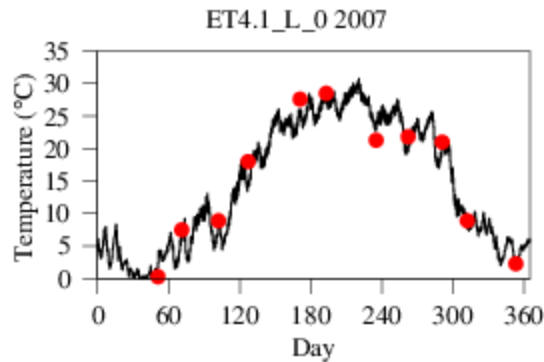
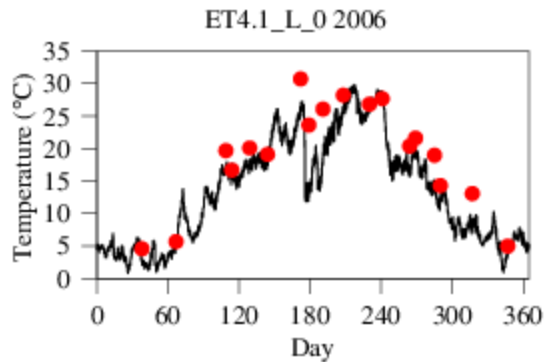
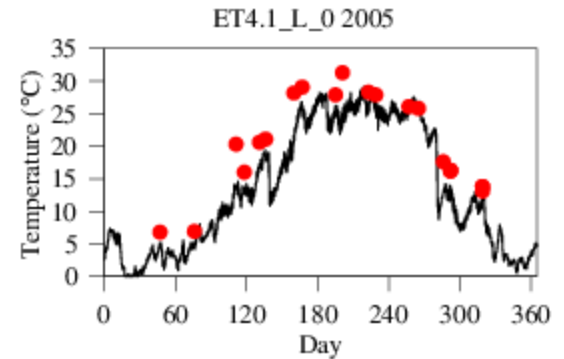
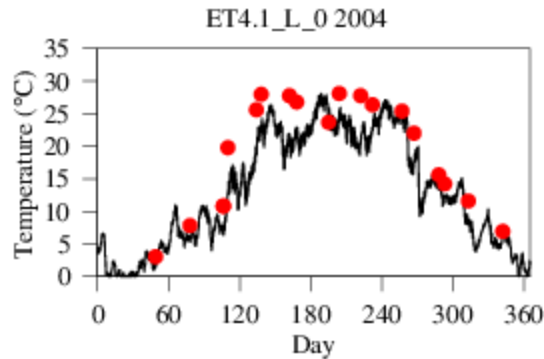
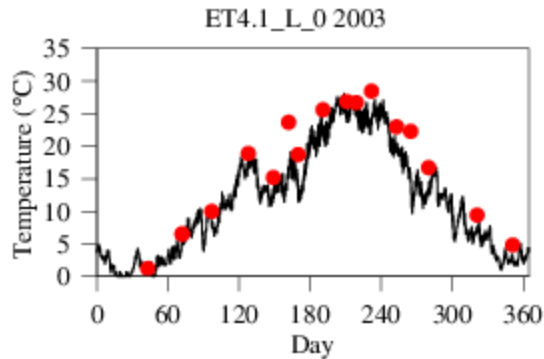
ET4.1\_L\_0 2009



ET4.1\_L\_0 2010

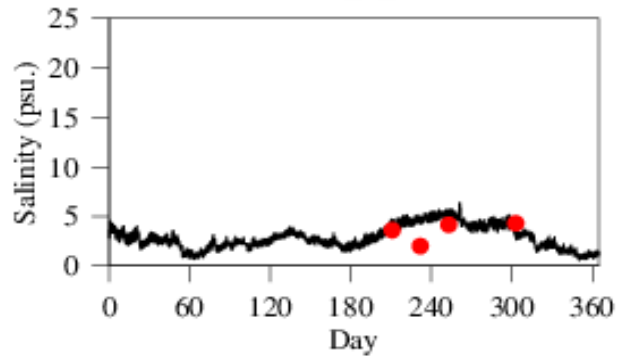


# Surface T at ET4.1 (Tidal fresh)

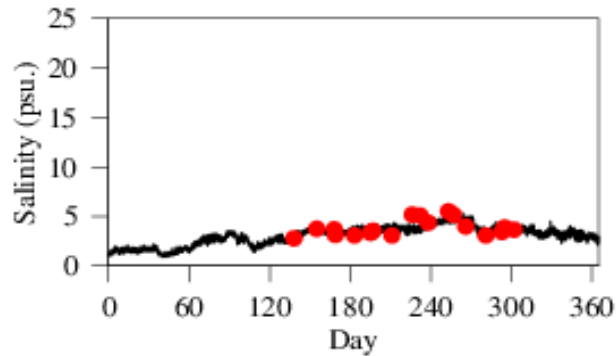


# Surface S at XIH0077

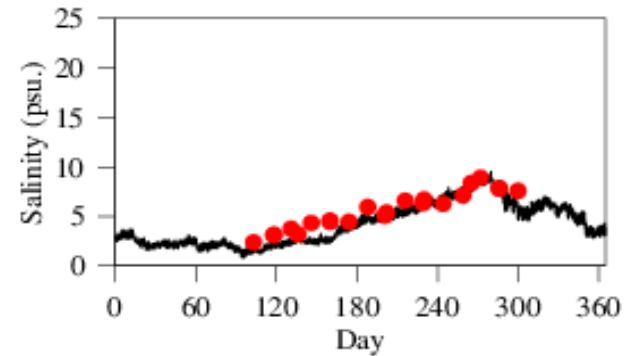
XIH0077\_L\_0 2003



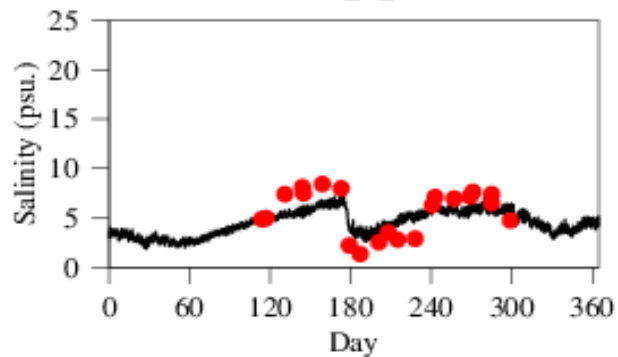
XIH0077\_L\_0 2004



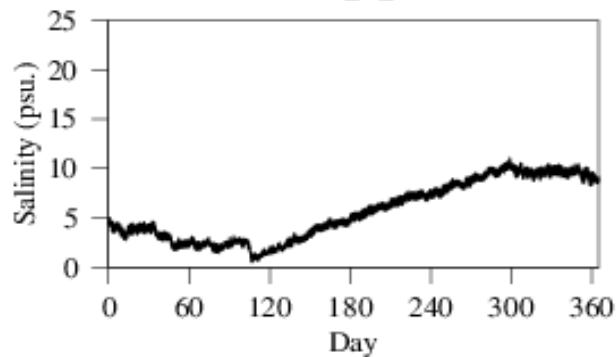
XIH0077\_L\_0 2005



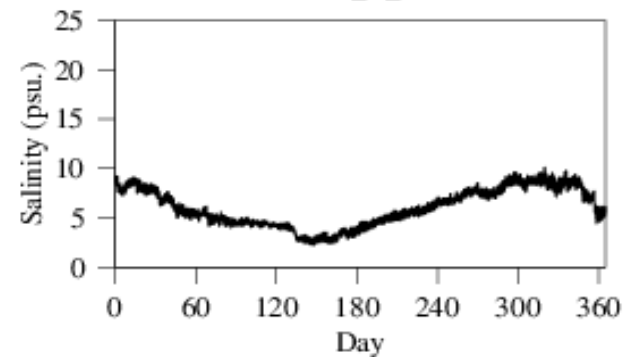
XIH0077\_L\_0 2006



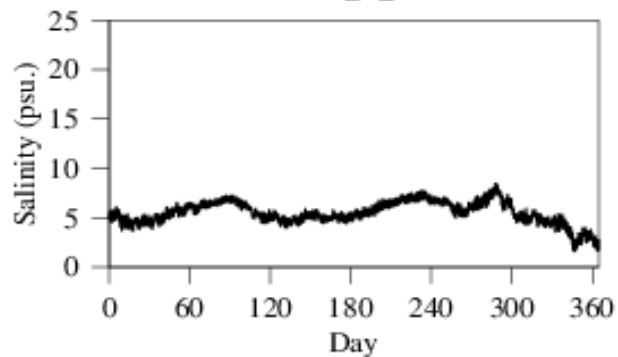
XIH0077\_L\_0 2007



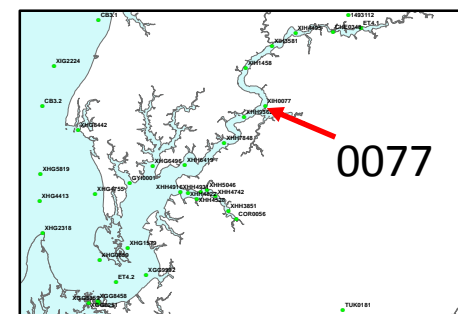
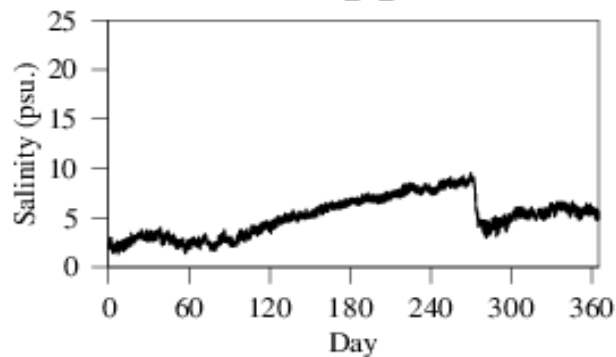
XIH0077\_L\_0 2008



XIH0077\_L\_0 2009

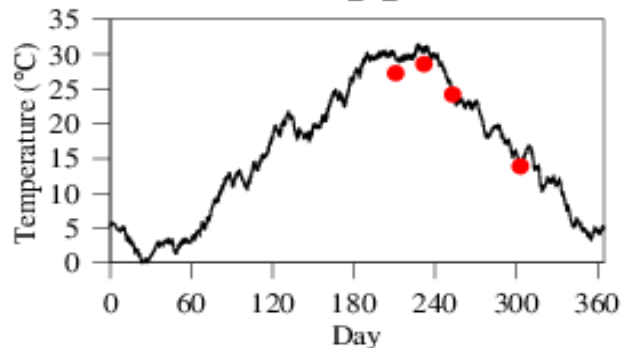


XIH0077\_L\_0 2010

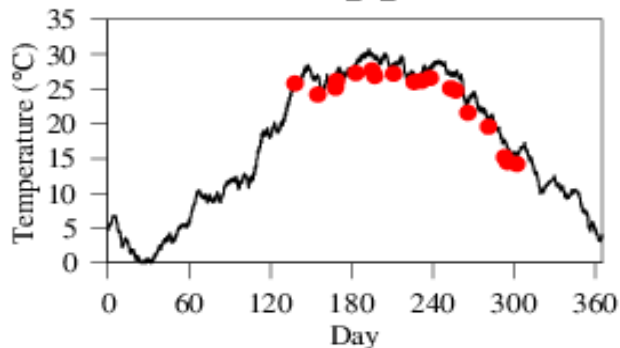


# Surface T at XIH0077 (oligohaline)

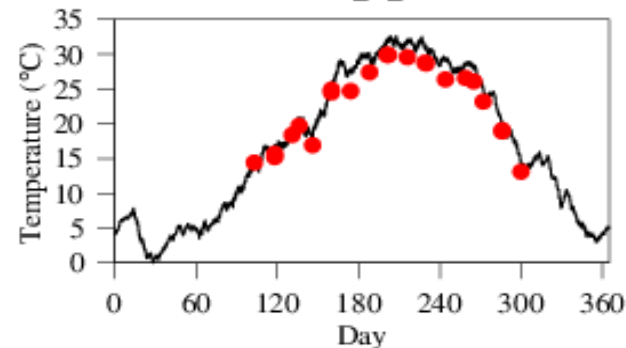
XIH0077\_L\_0 2003



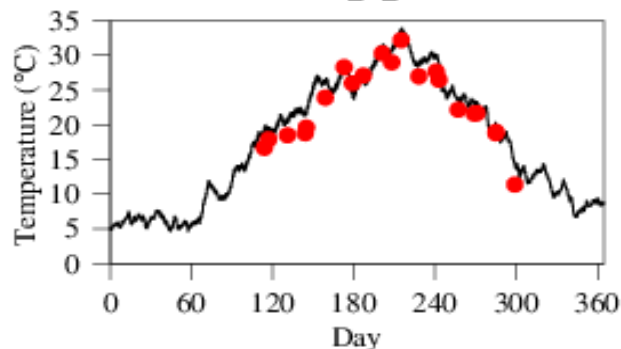
XIH0077\_L\_0 2004



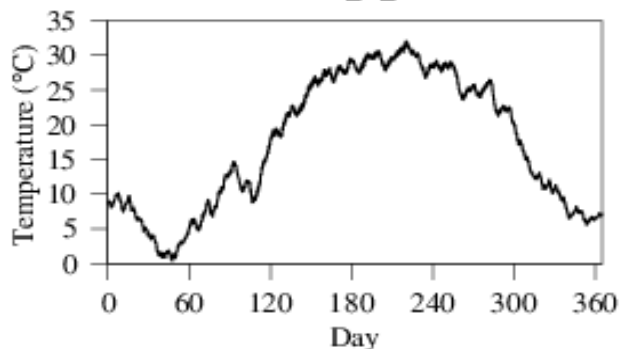
XIH0077\_L\_0 2005



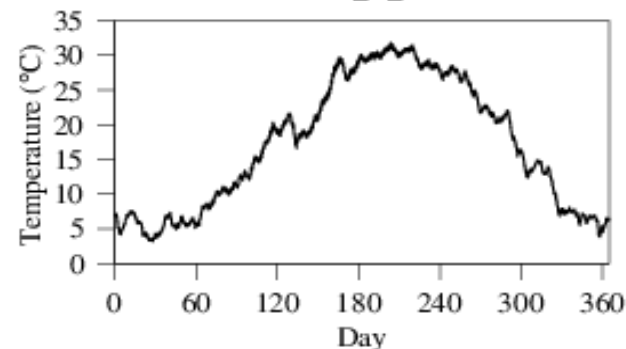
XIH0077\_L\_0 2006



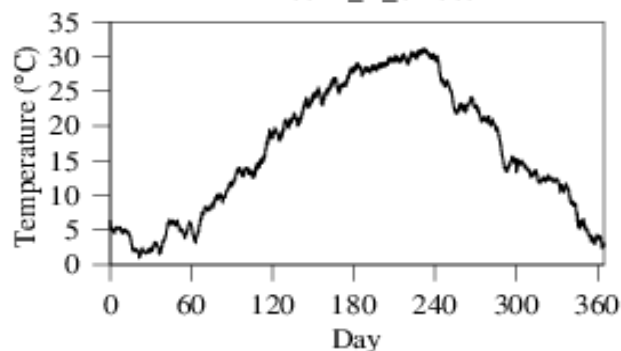
XIH0077\_L\_0 2007



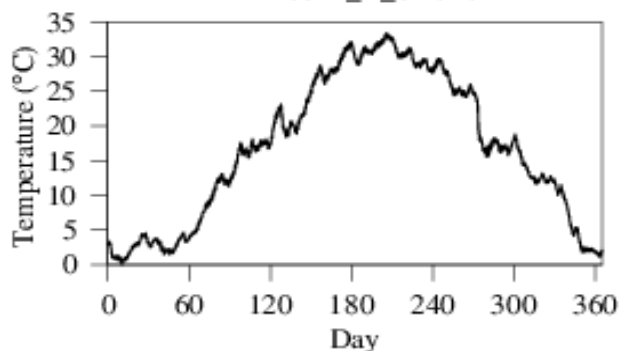
XIH0077\_L\_0 2008



XIH0077\_L\_0 2009

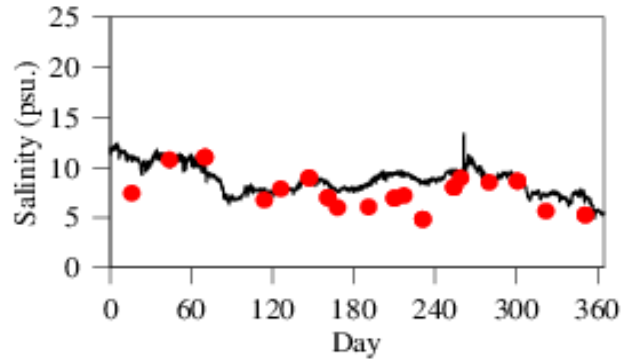


XIH0077\_L\_0 2010

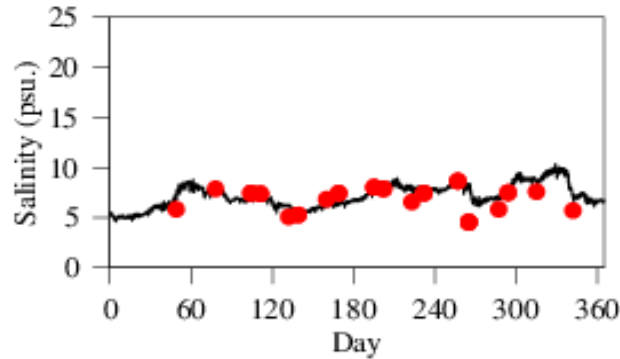


# Surface S at ET4.2

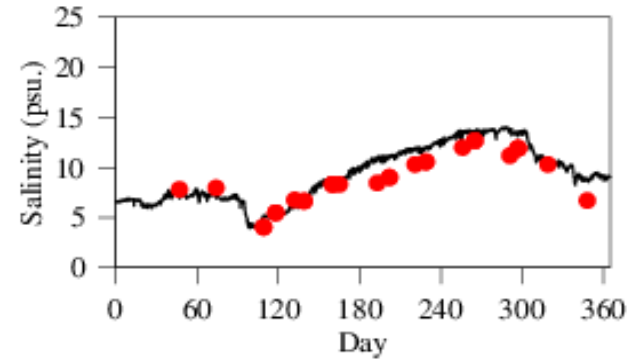
ET4.2\_L\_0 2003



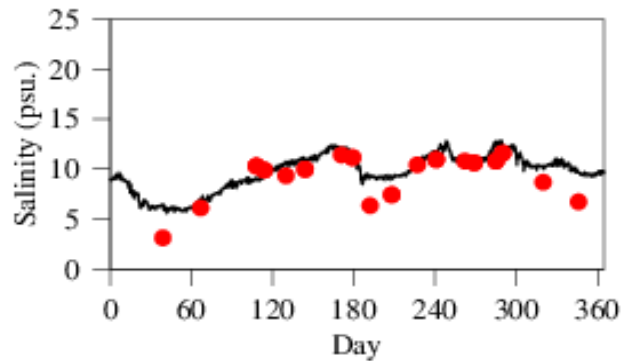
ET4.2\_L\_0 2004



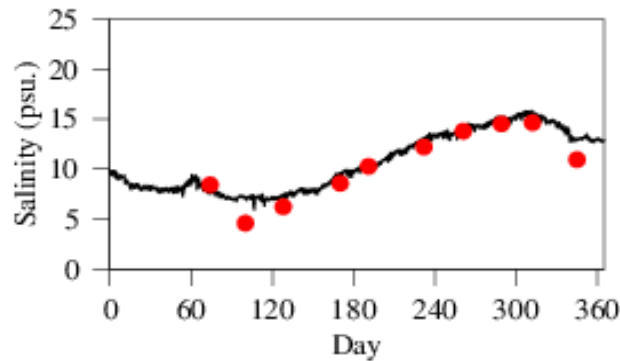
ET4.2\_L\_0 2005



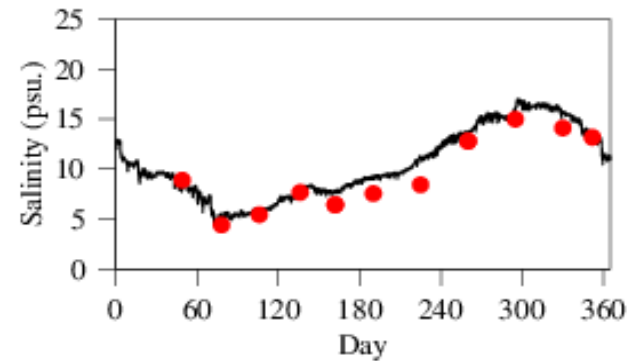
ET4.2\_L\_0 2006



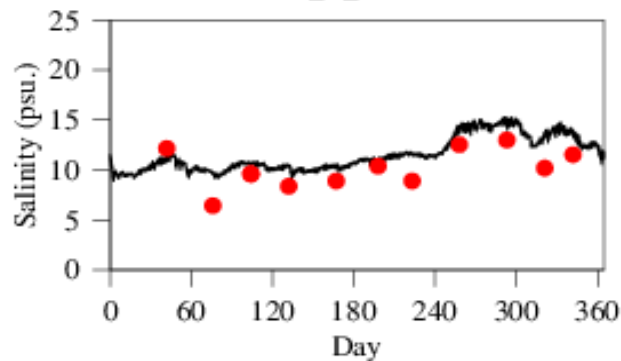
ET4.2\_L\_0 2007



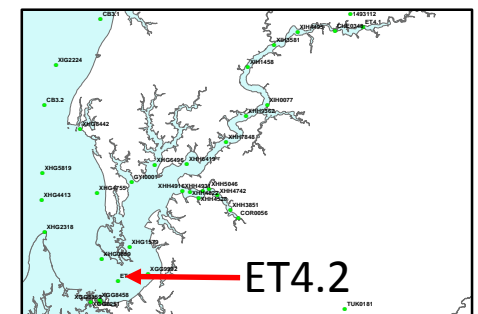
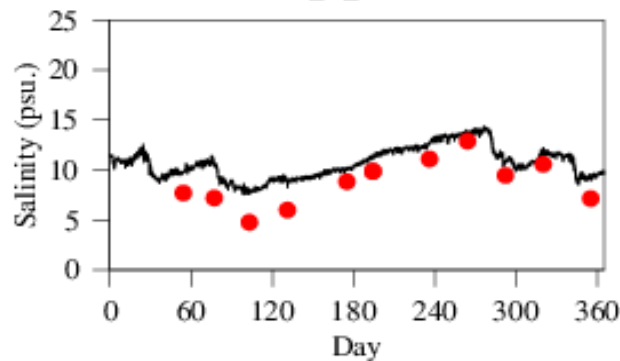
ET4.2\_L\_0 2008



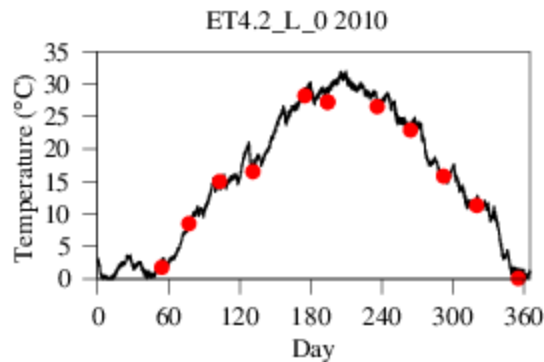
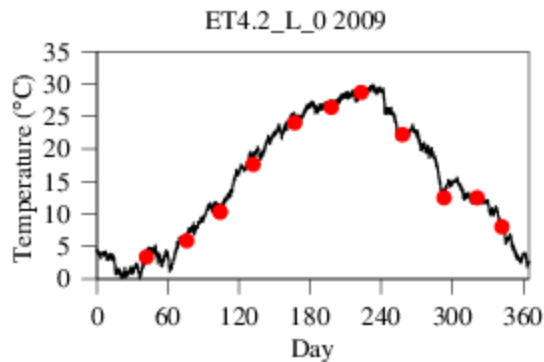
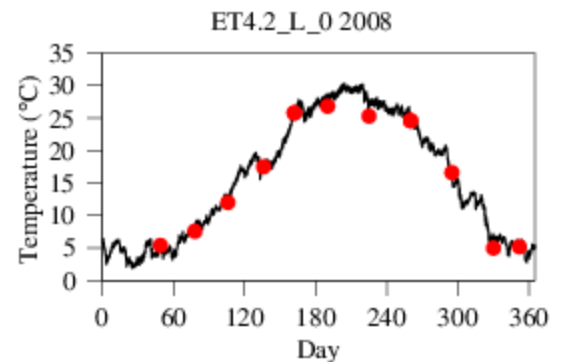
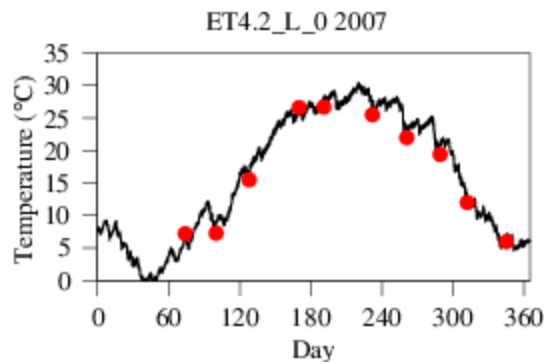
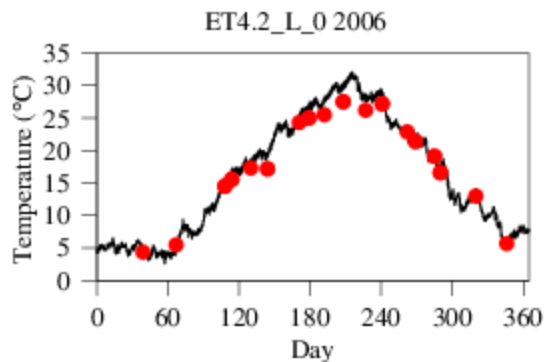
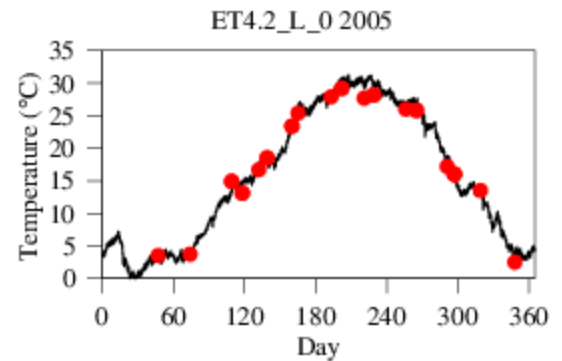
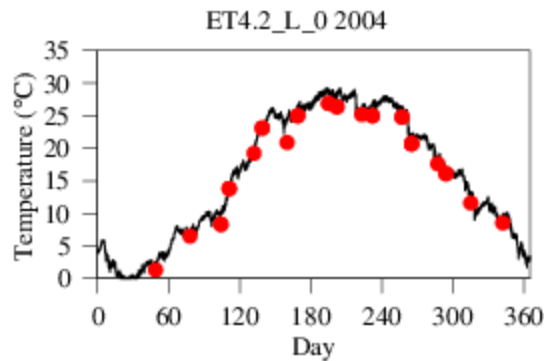
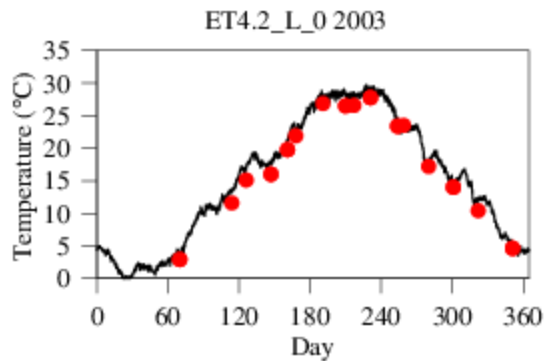
ET4.2\_L\_0 2009



ET4.2\_L\_0 2010

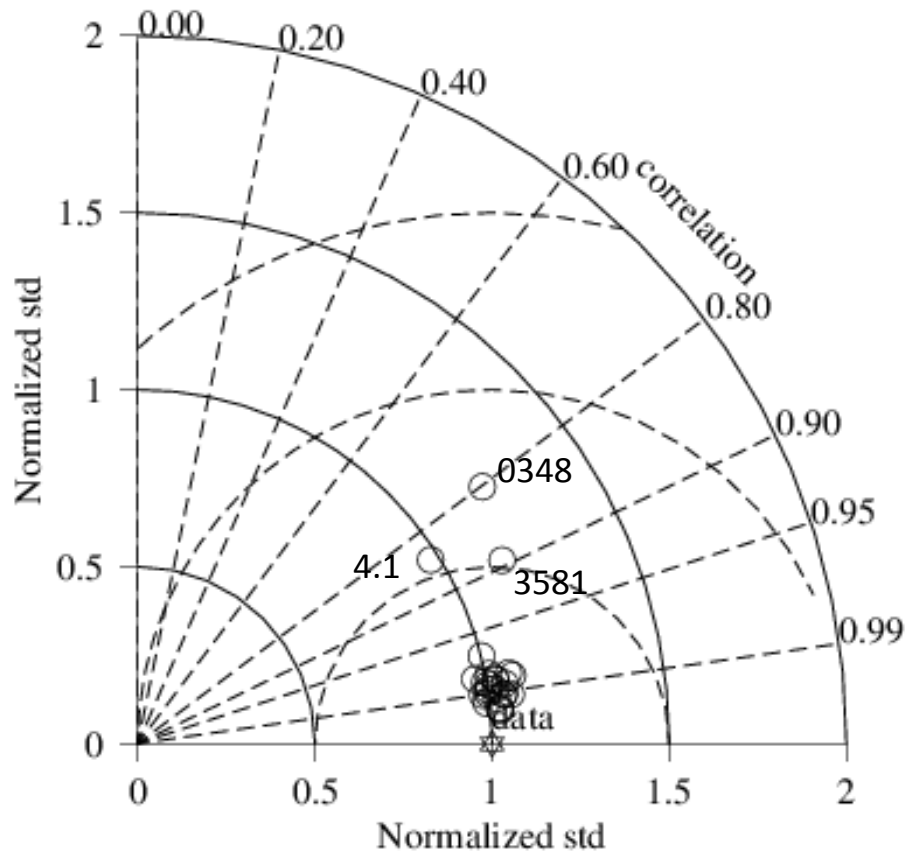


# Surface T at ET4.2 (Mesohaline)

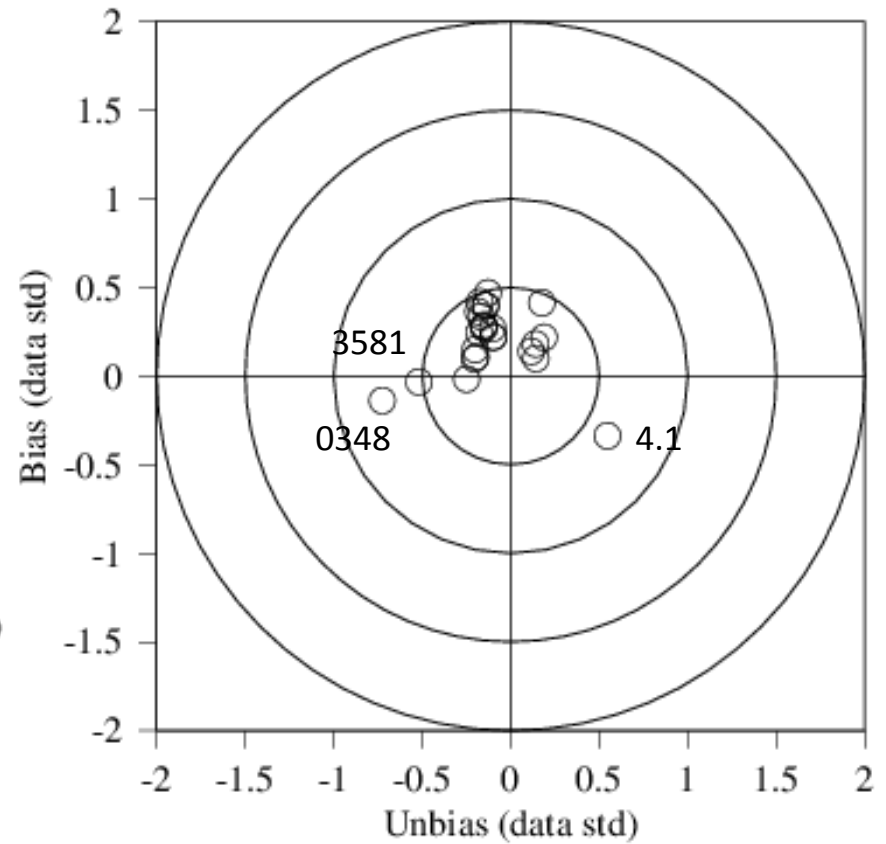




# Surface T

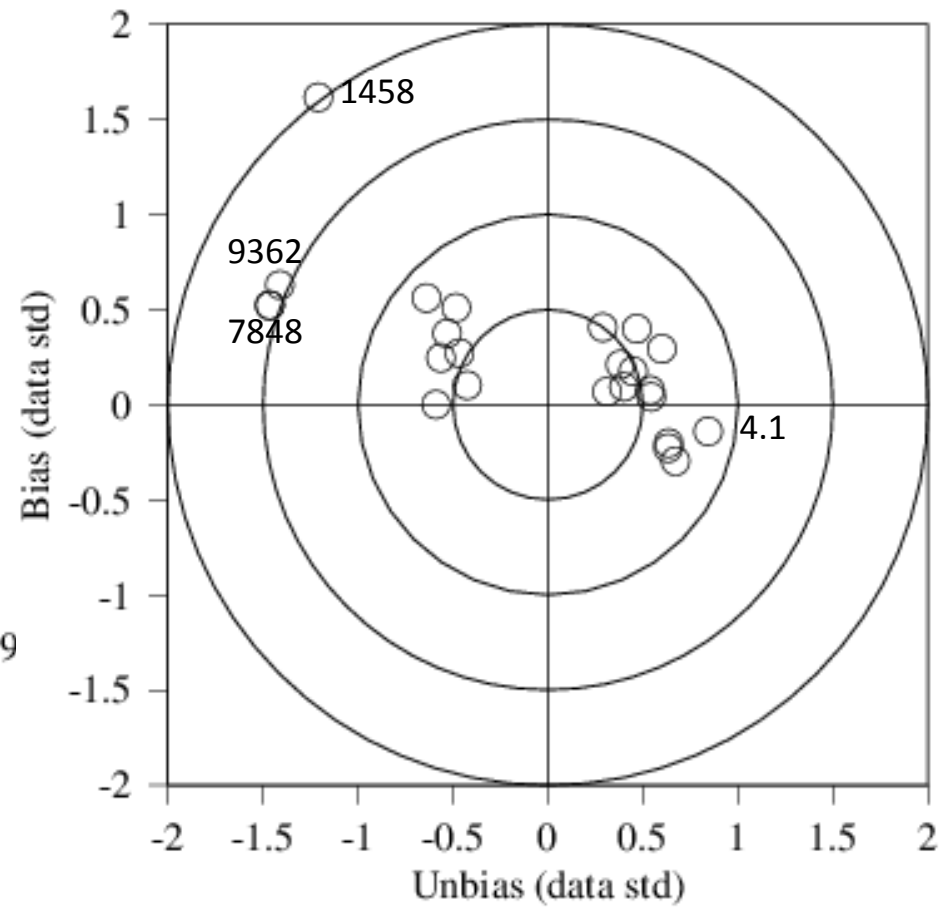
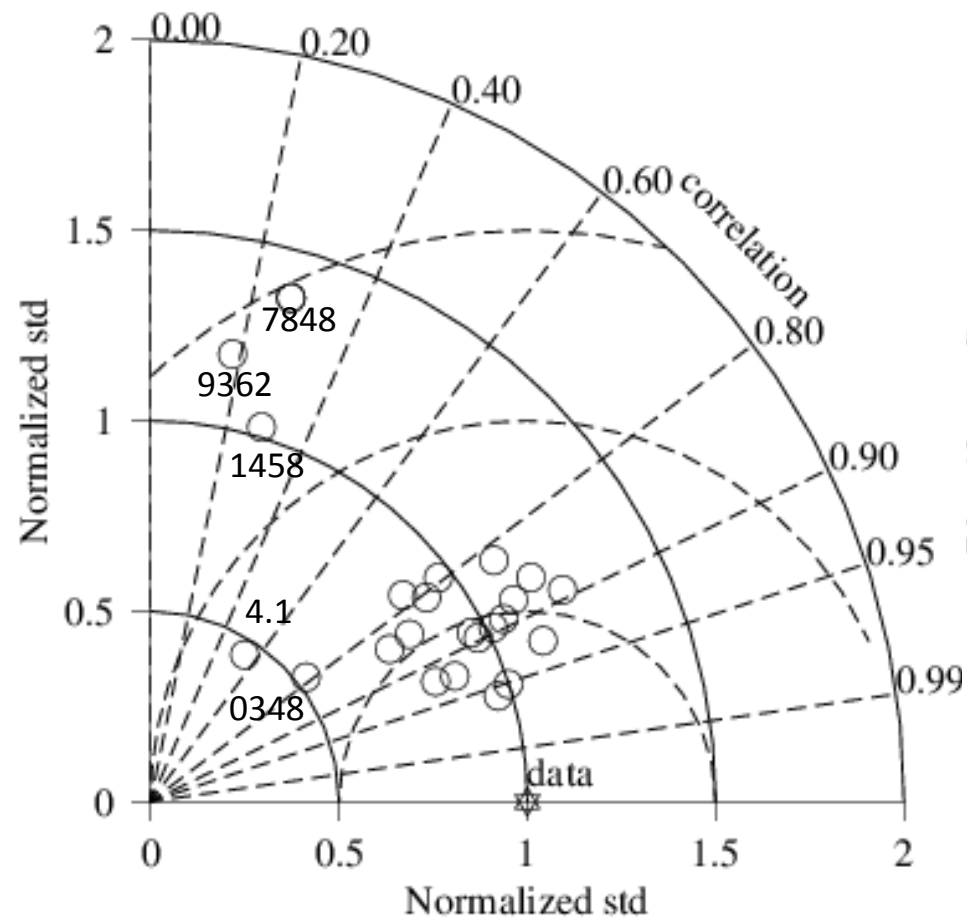


$$cRMSE^2 = \sigma_d^2 + \sigma_m^2 - \sigma_d^2 \sigma_m^2 R$$



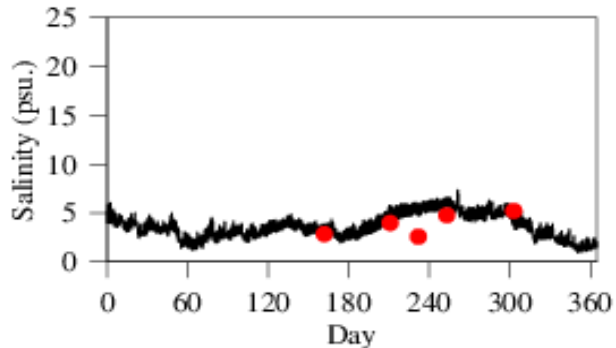
$$\text{Total RMSE}^2 = \text{BIAS}^2 + \text{UNBIAS}^2$$

# Surface S

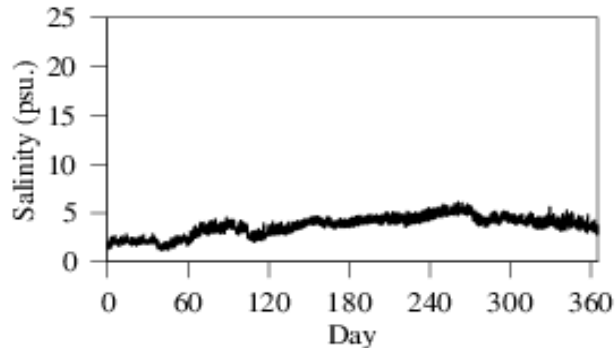


# Surface S at XHH9362 (oligohaline)

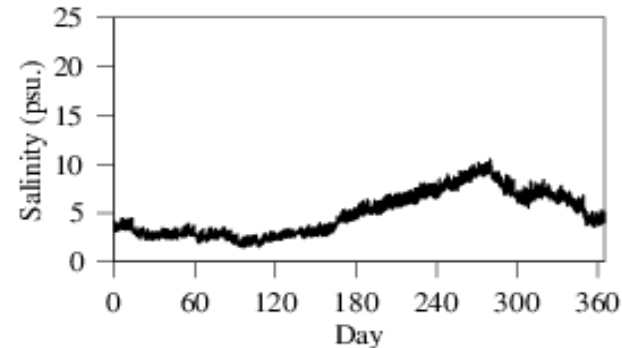
XHH9362\_L\_0 2003



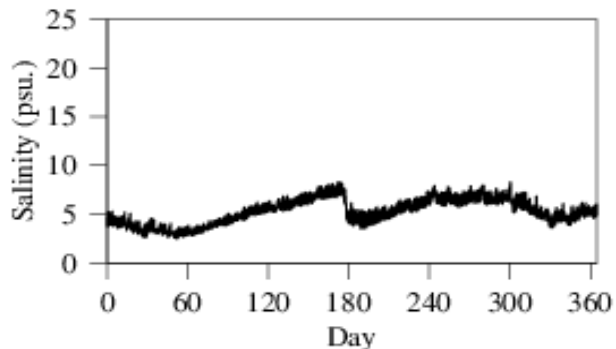
XHH9362\_L\_0 2004



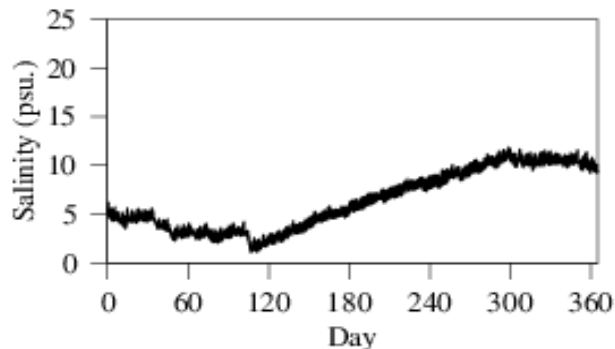
XHH9362\_L\_0 2005



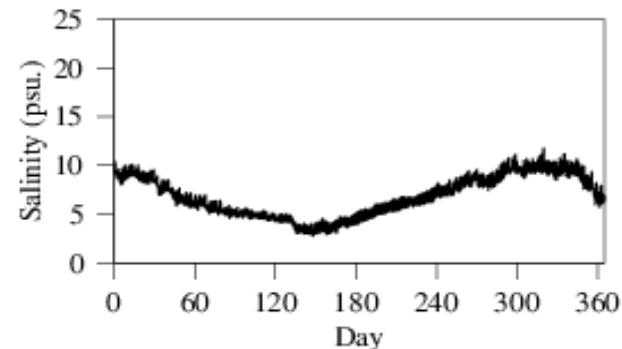
XHH9362\_L\_0 2006



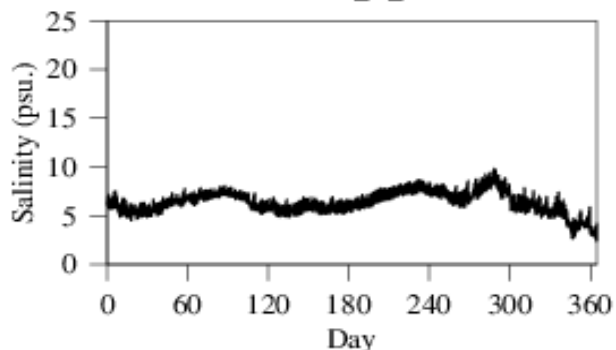
XHH9362\_L\_0 2007



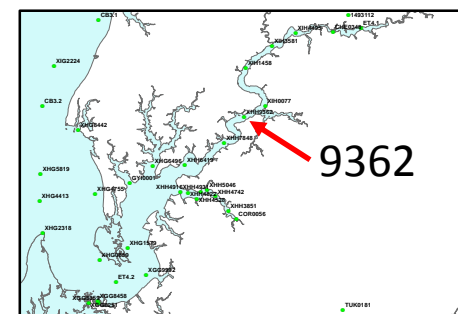
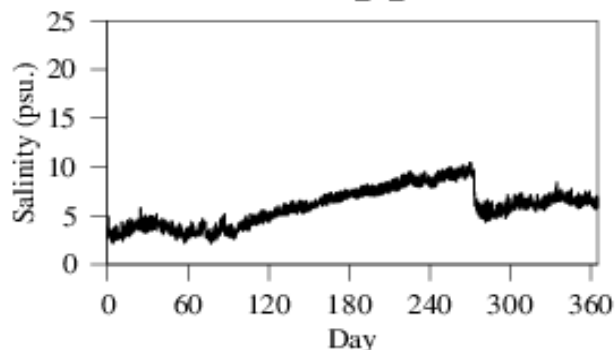
XHH9362\_L\_0 2008



XHH9362\_L\_0 2009

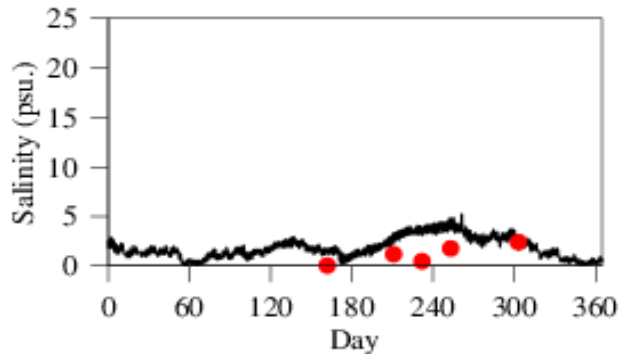


XHH9362\_L\_0 2010

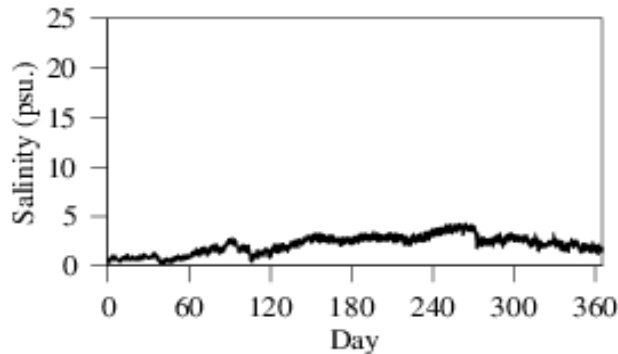


# Surface S at XIH1458 (oligohaline)

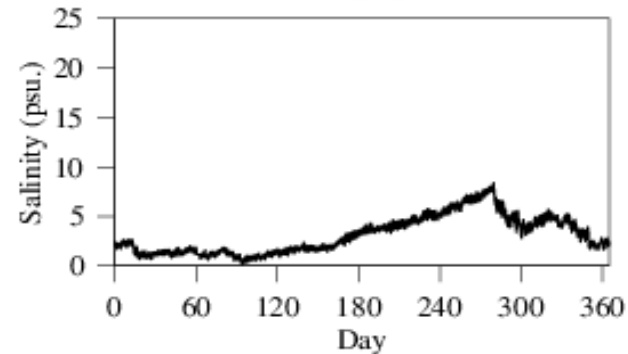
XIH1458\_L\_0 2003



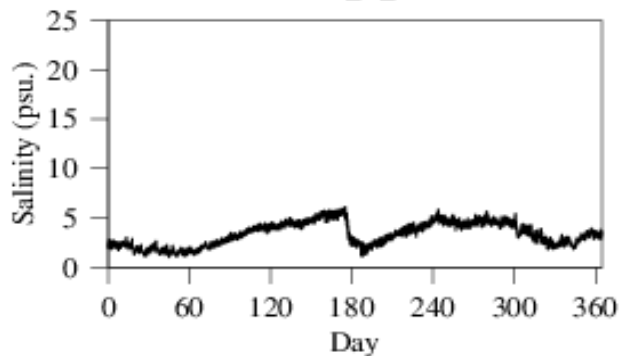
XIH1458\_L\_0 2004



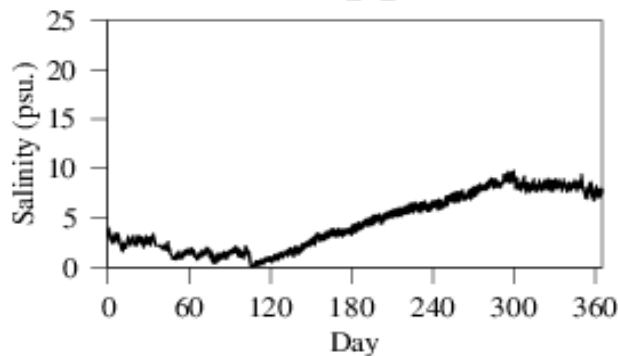
XIH1458\_L\_0 2005



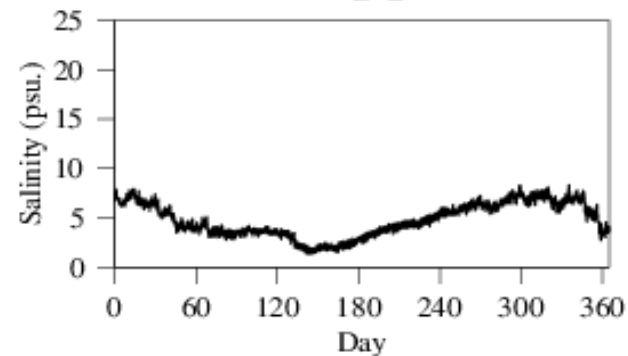
XIH1458\_L\_0 2006



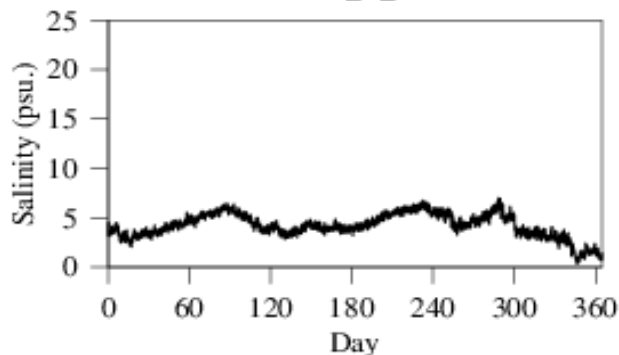
XIH1458\_L\_0 2007



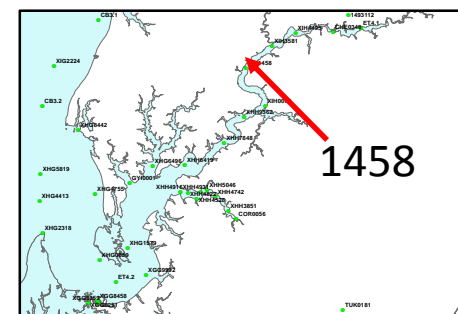
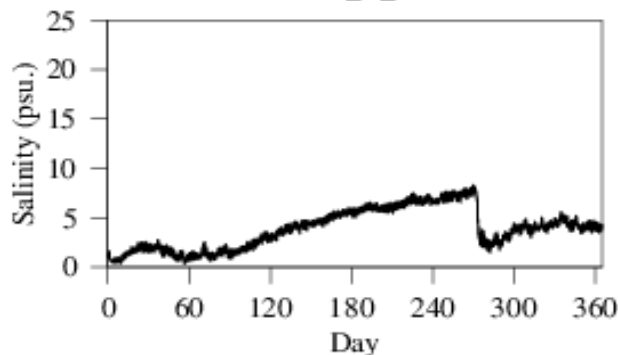
XIH1458\_L\_0 2008



XIH1458\_L\_0 2009

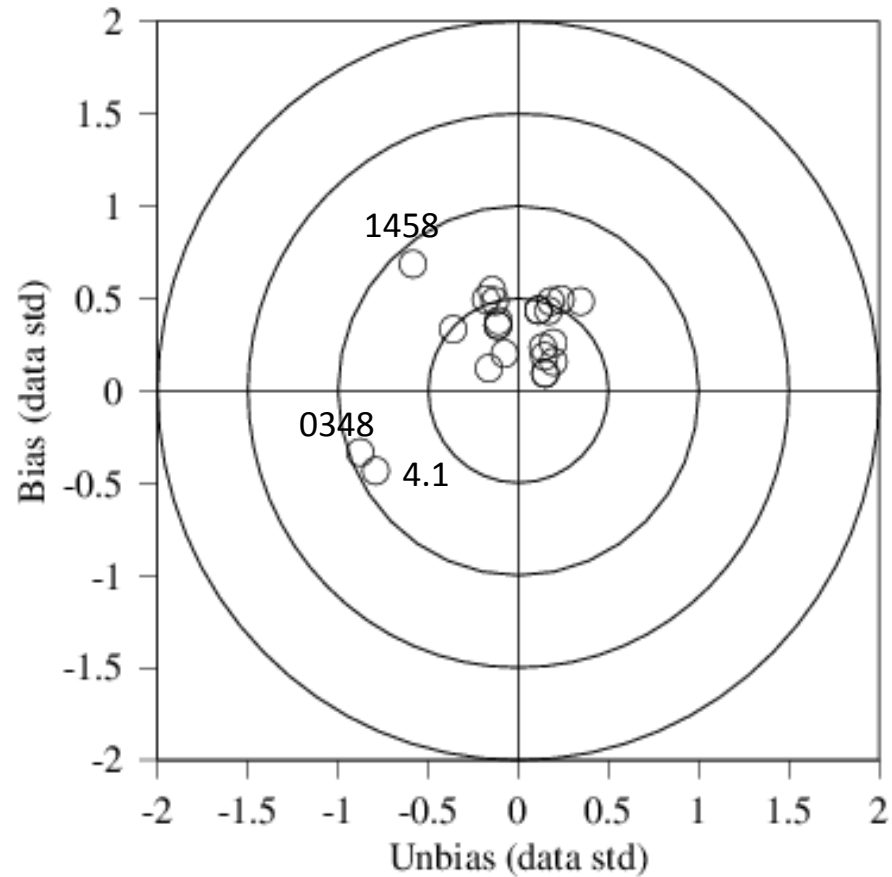
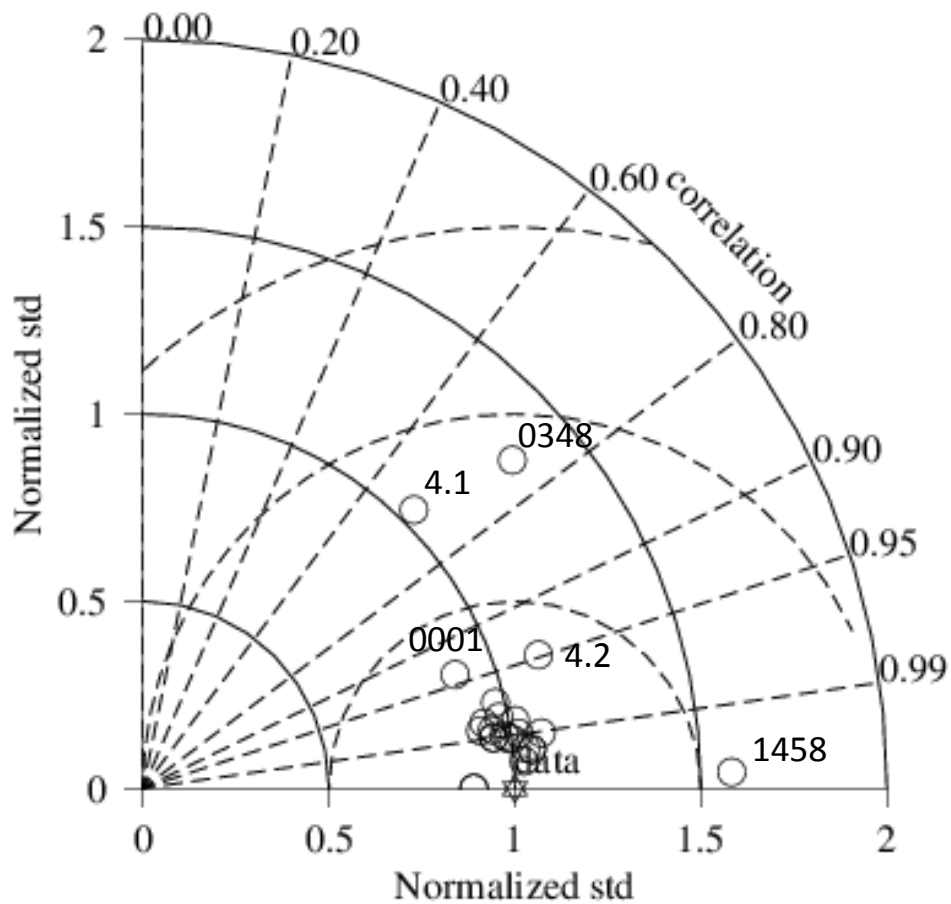


XIH1458\_L\_0 2010

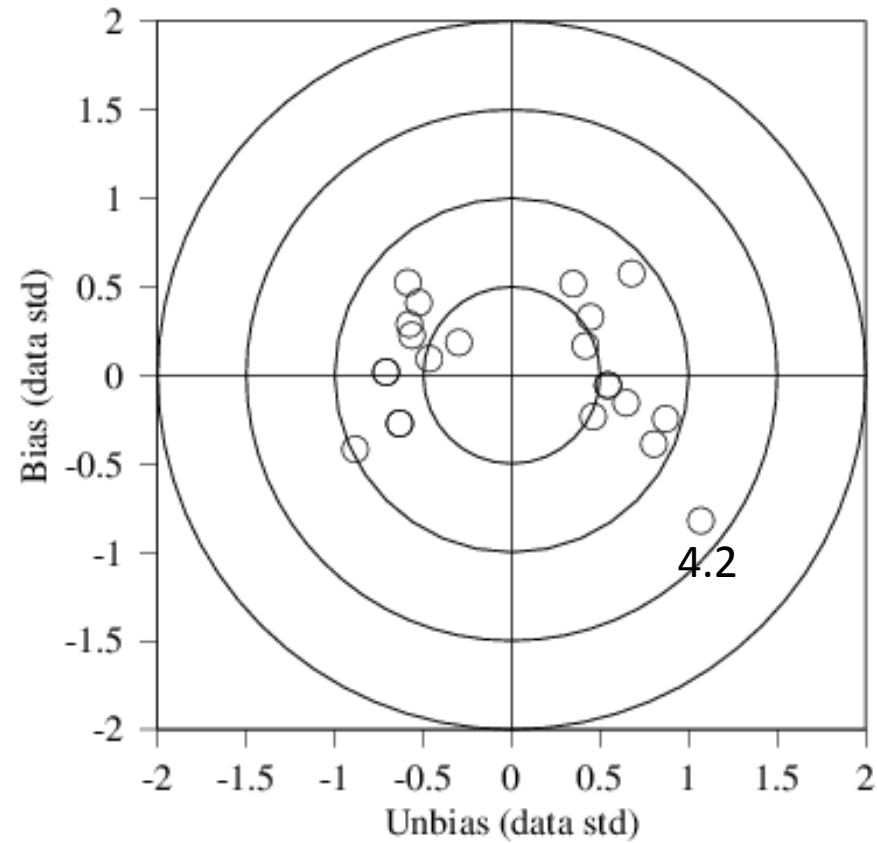
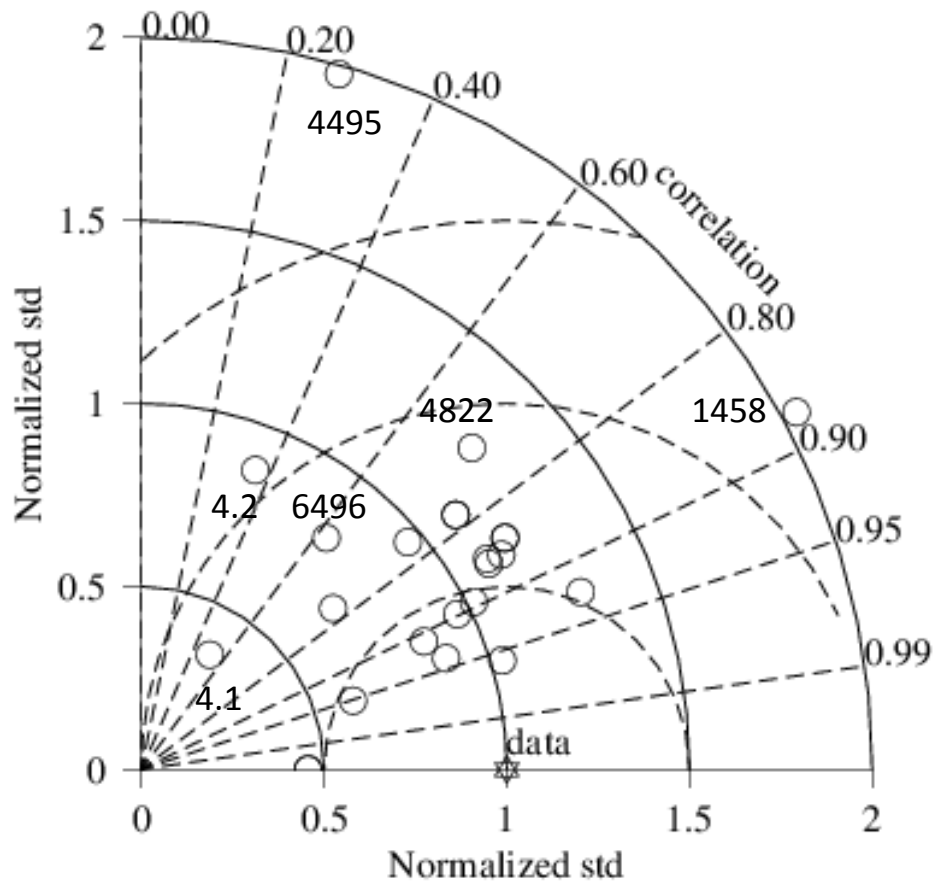




# Bottom T

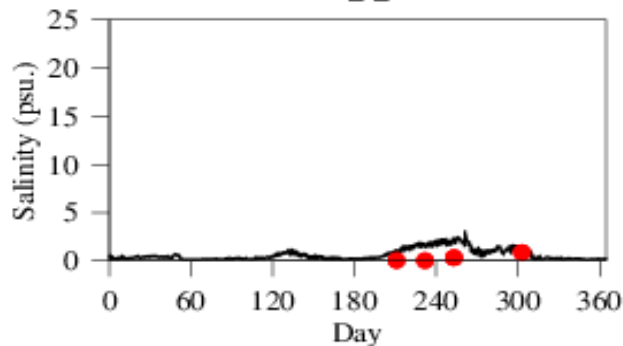


# Bottom S

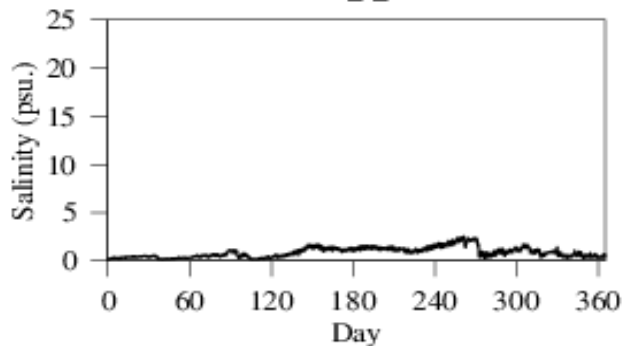


# Surface S at XIH4495 (oligohaline)

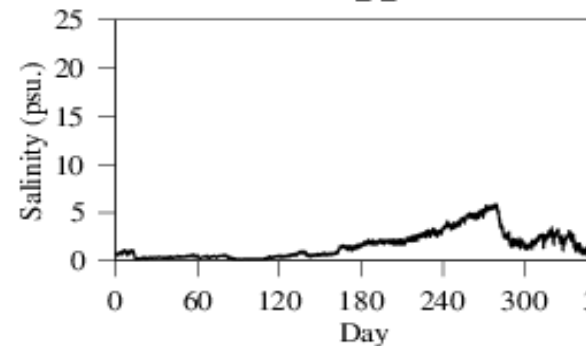
XIH4495\_1\_9 2003



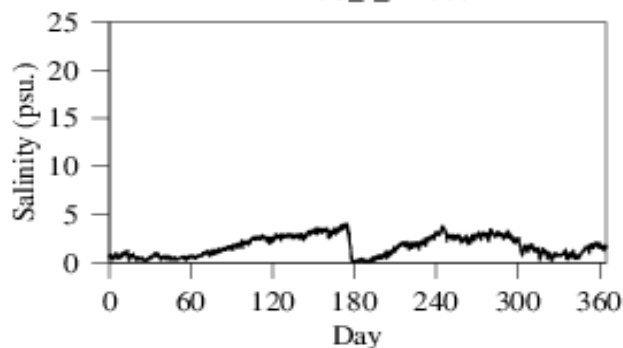
XIH4495\_1\_9 2004



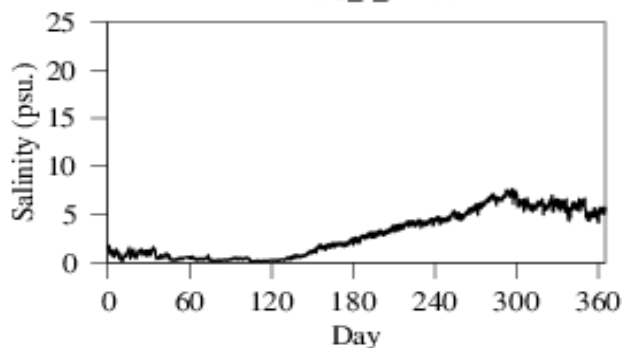
XIH4495\_1\_9 2005



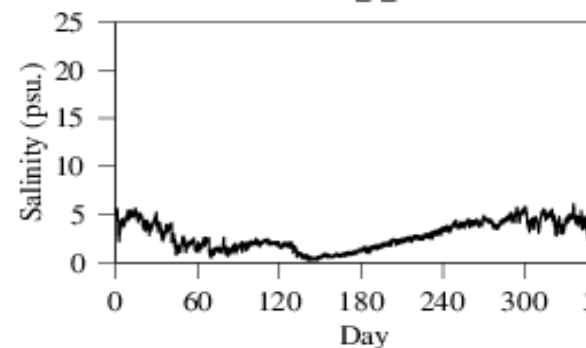
XIH4495\_1\_9 2006



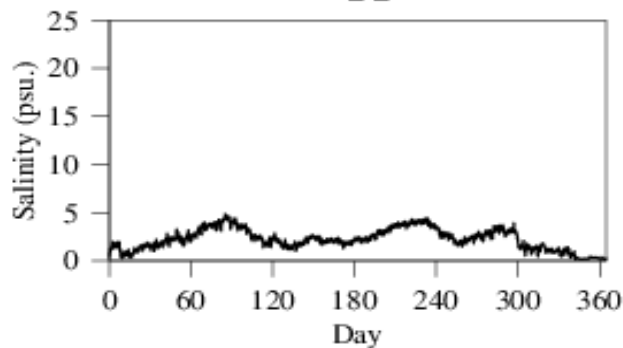
XIH4495\_1\_9 2007



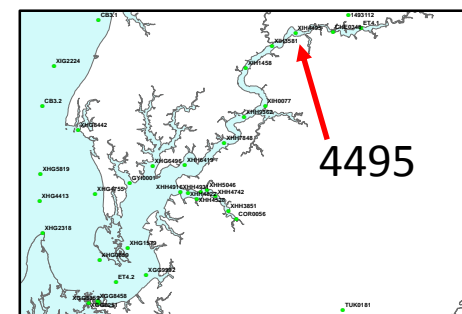
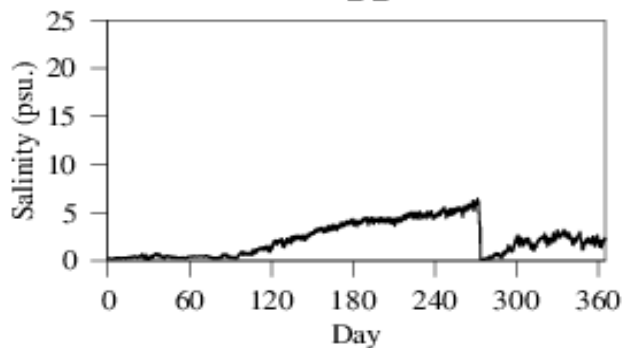
XIH4495\_1\_9 2008



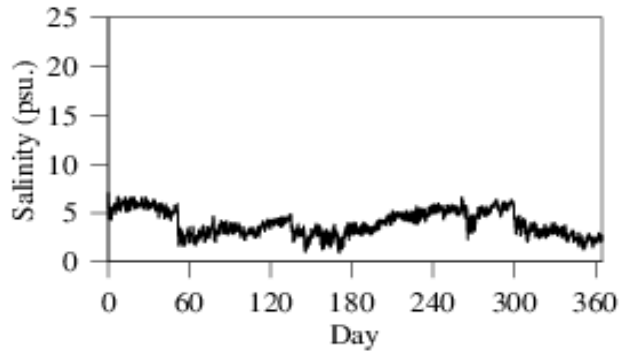
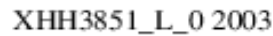
XIH4495\_1\_9 2009



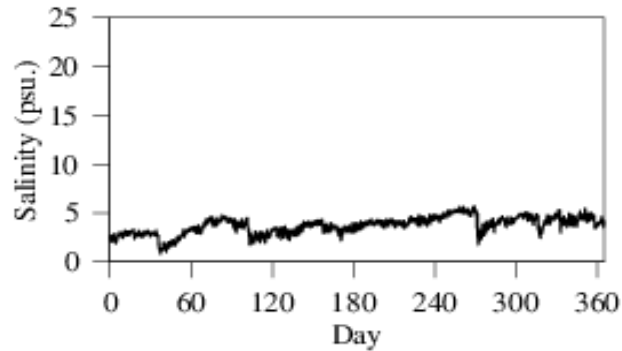
XIH4495\_1\_9 2010



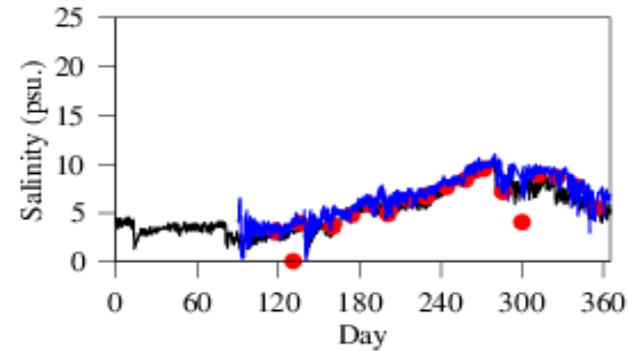
# CMON S at XHH3851 (Corsica)



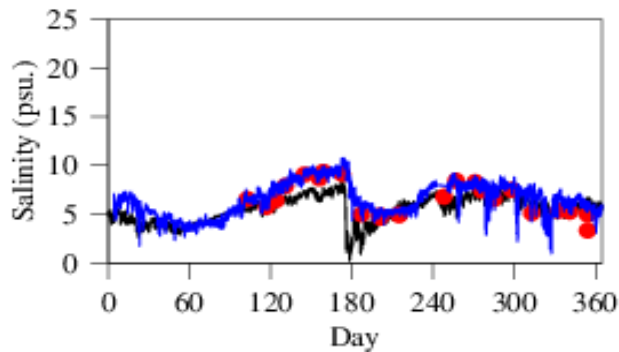
XHH3851\_L\_0 2004



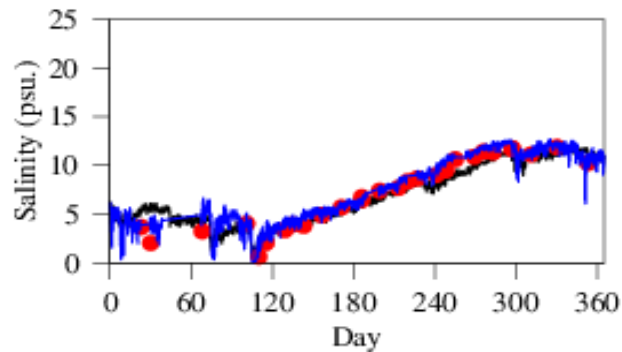
XHH3851\_L\_0 2005



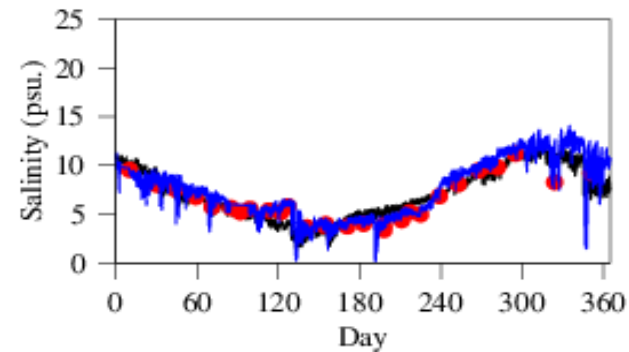
XHH3851\_L\_0 2006



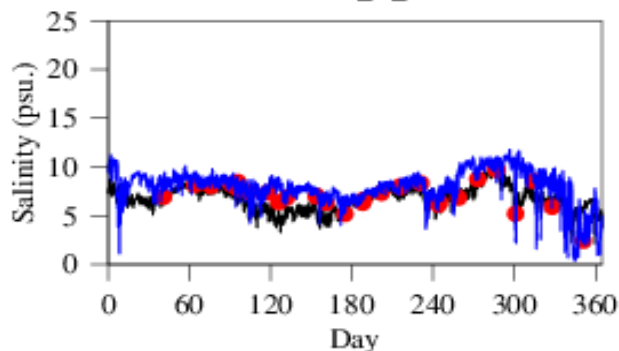
XHH3851\_L\_0 2007



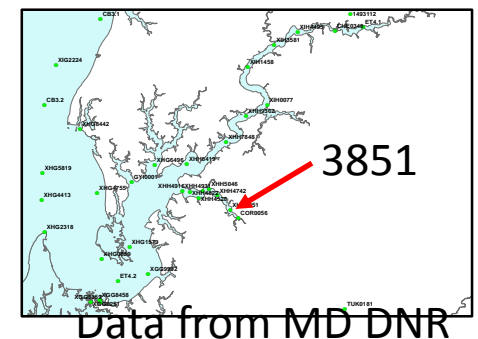
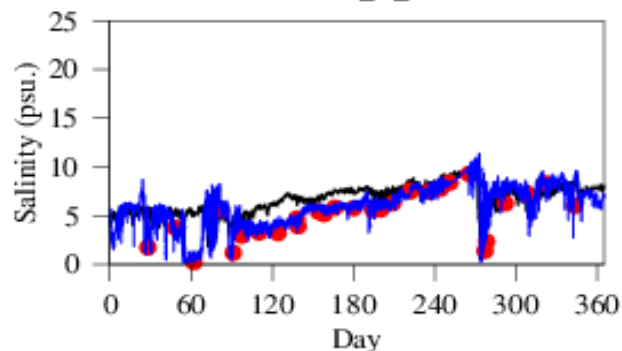
XHH3851\_L\_0 2008



XHH3851\_L\_0 2009



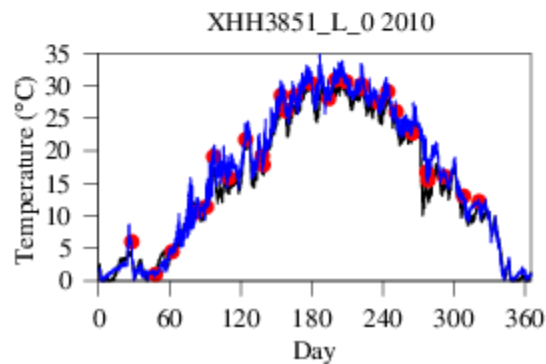
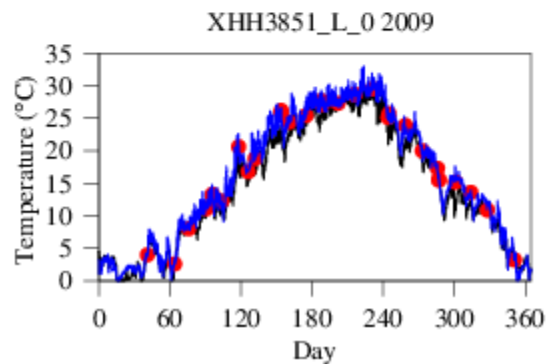
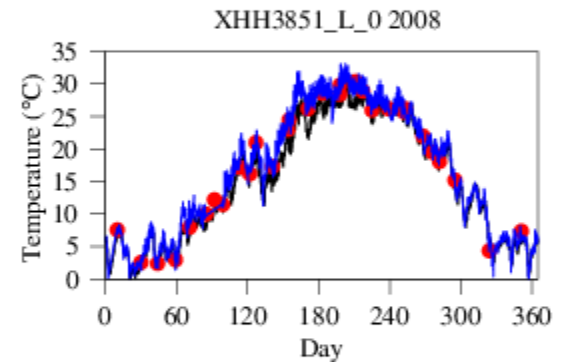
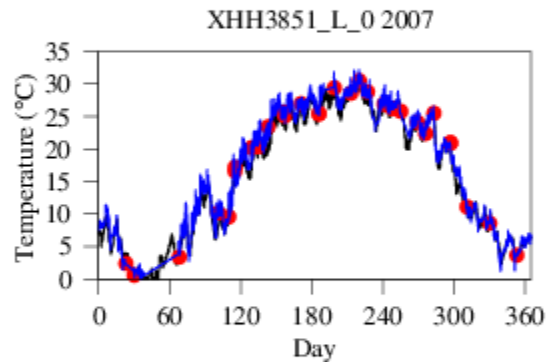
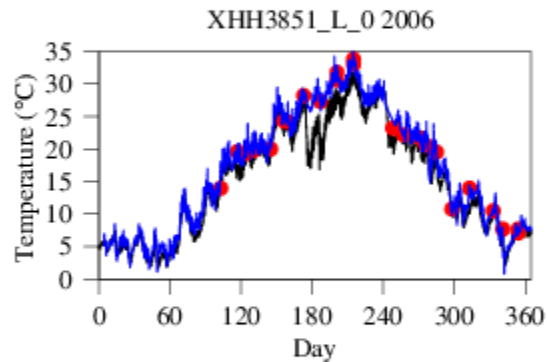
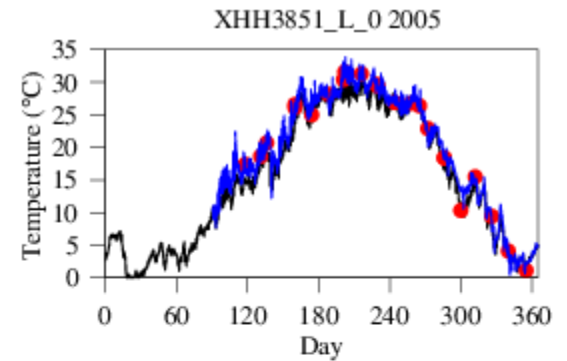
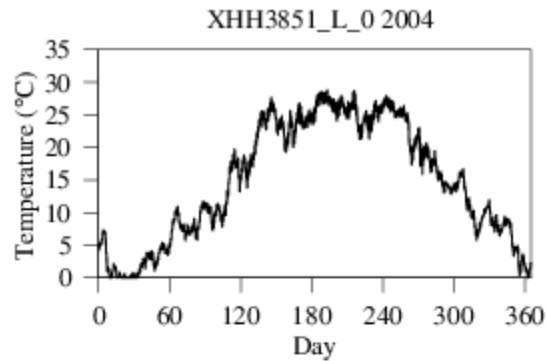
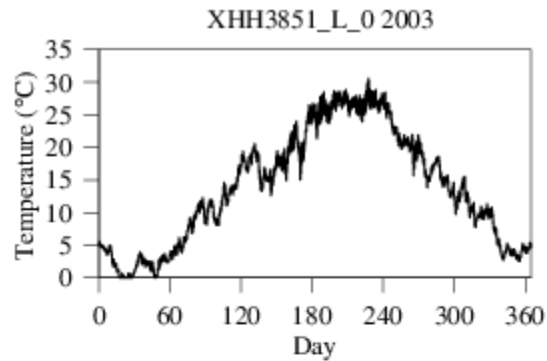
XHH3851\_L\_0 2010



Data from MD DNR

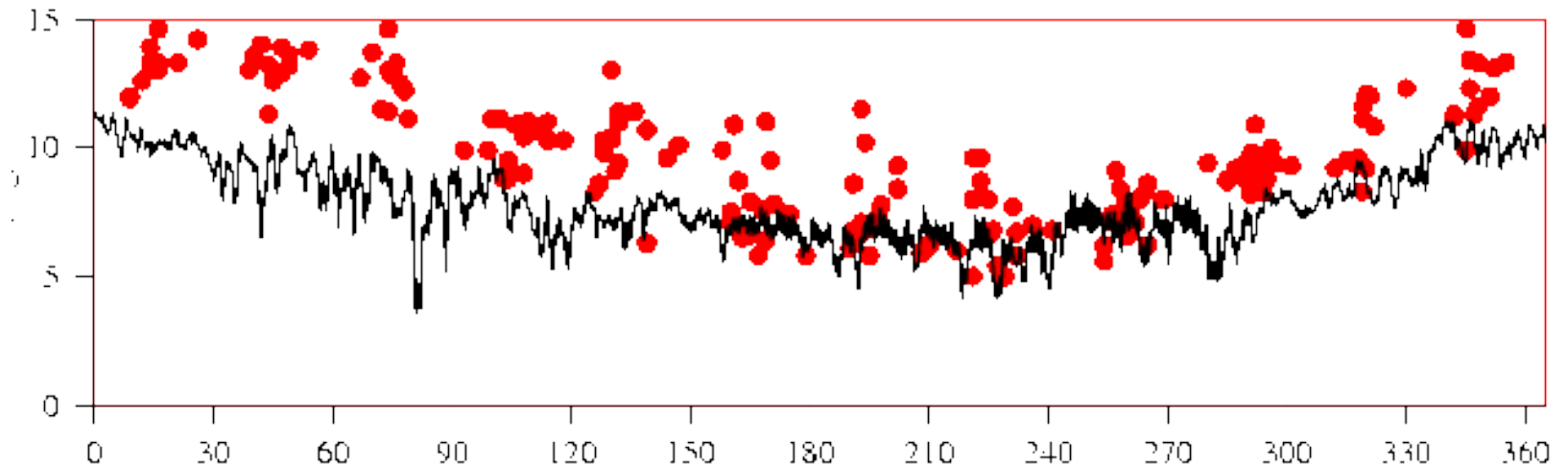


# CMON T at XHH3851 (Corsica)

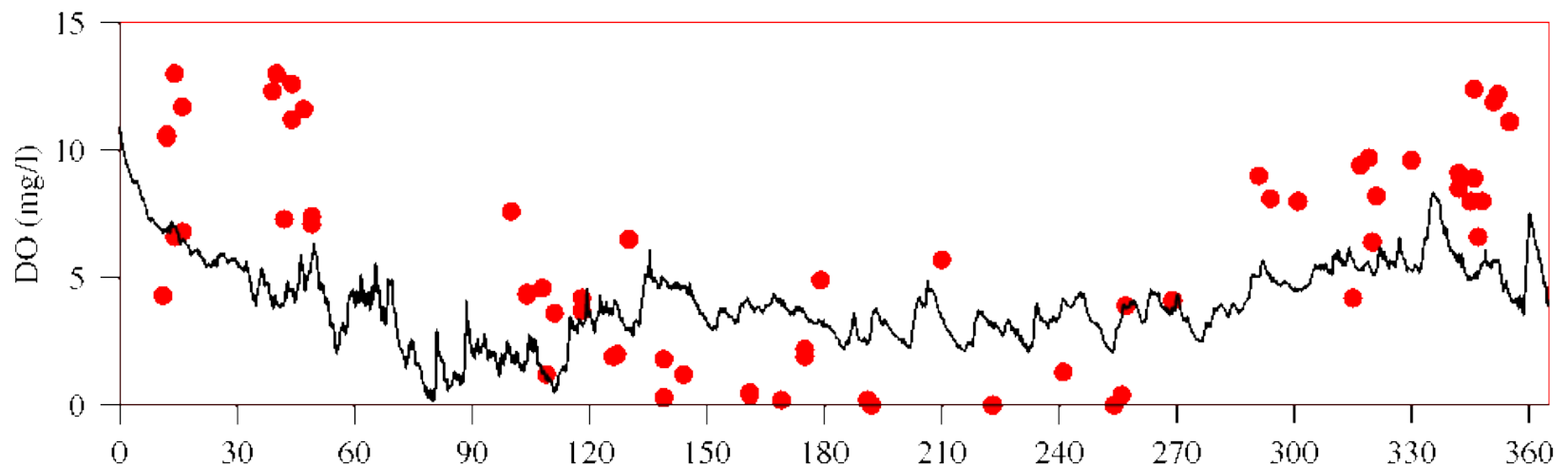


Data from Gopal MD DNR

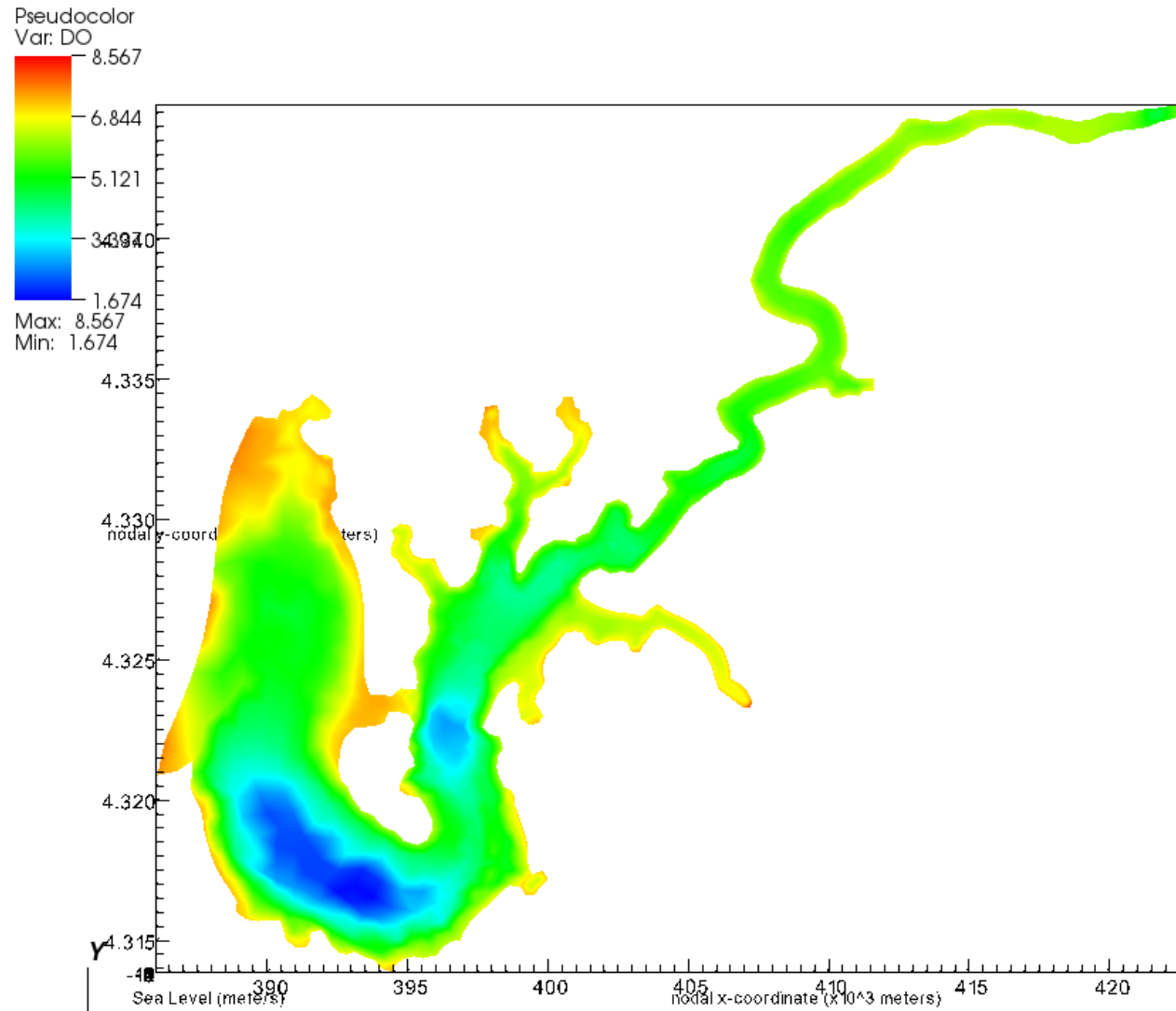
## Surface DO at ET4.2



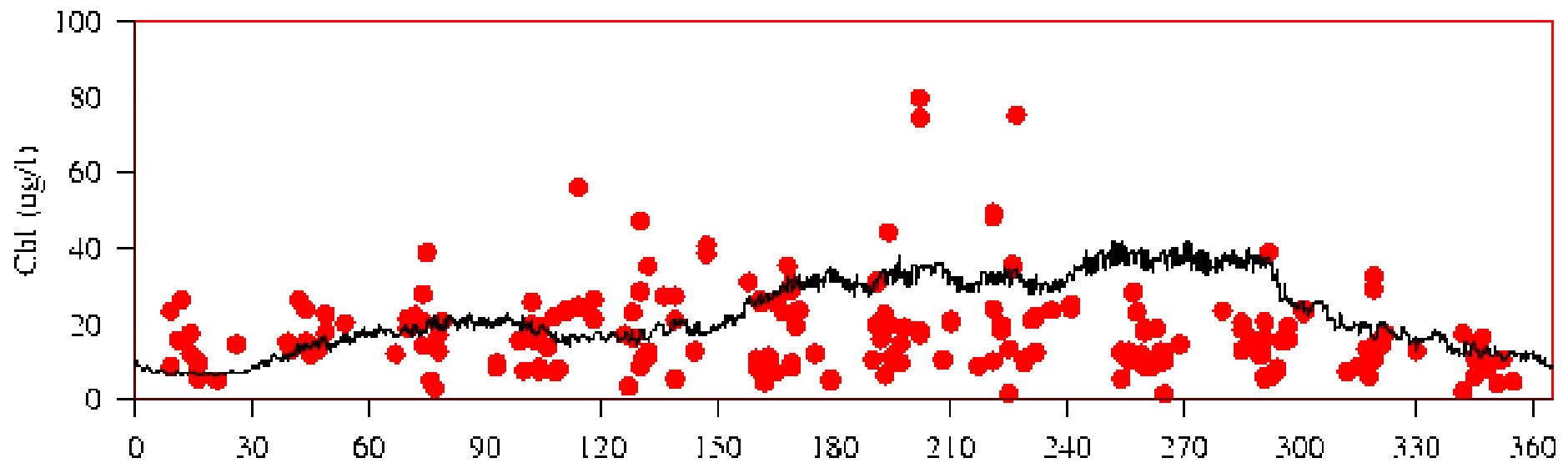
## Bottom DO at ET4.2



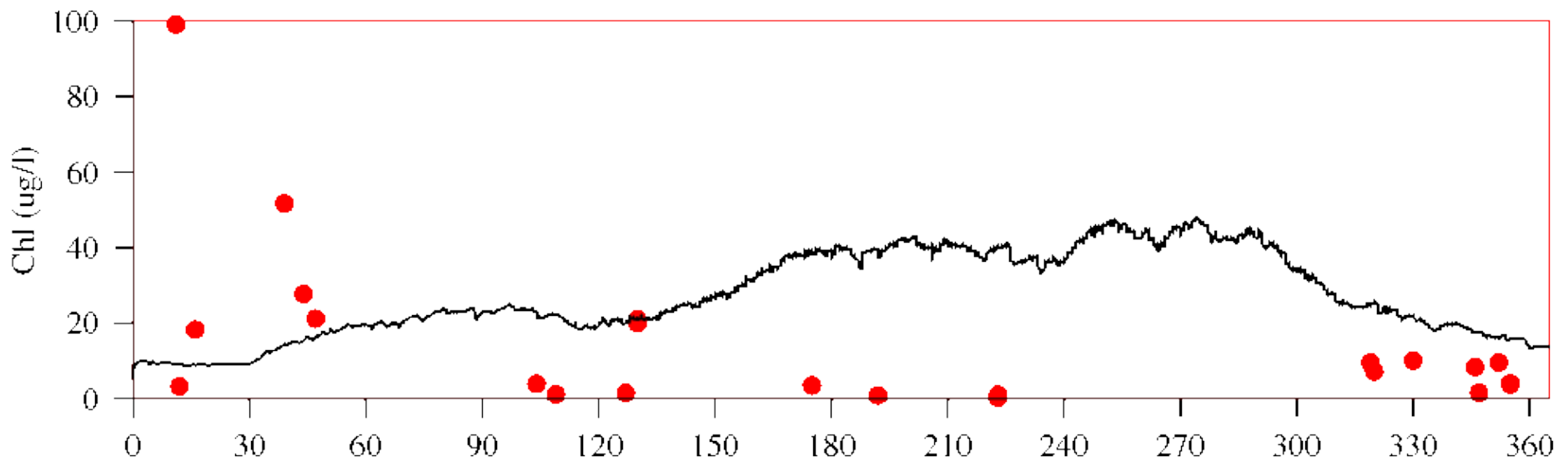
# Bottom DO on July 4th



## Surface Chl at ET4.2

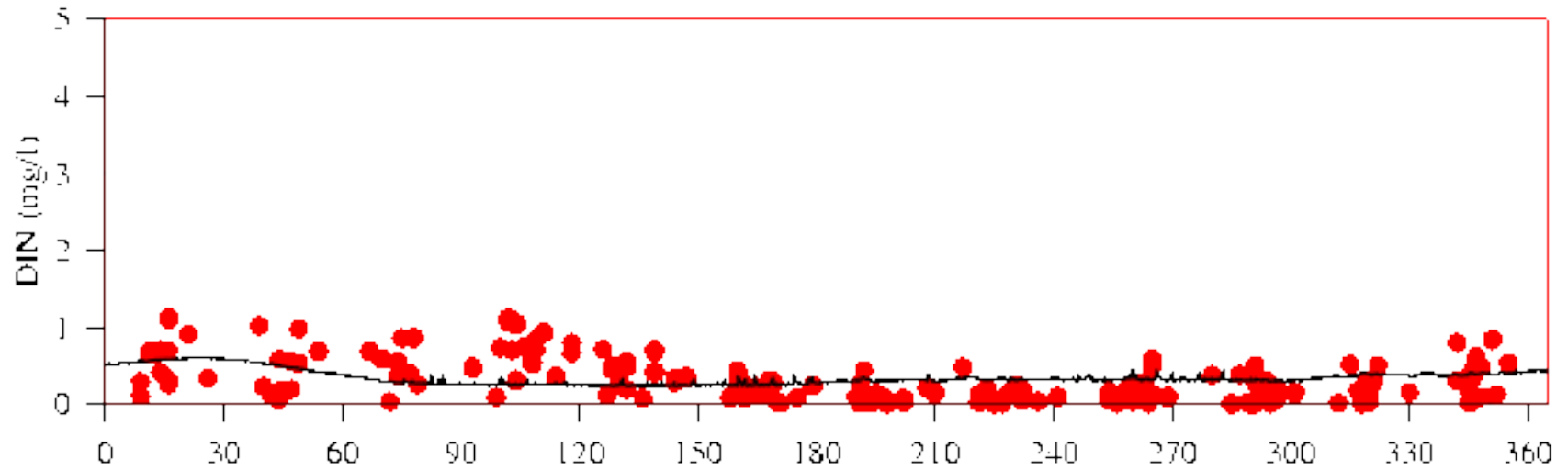


## Bottom Chl at ET4.2

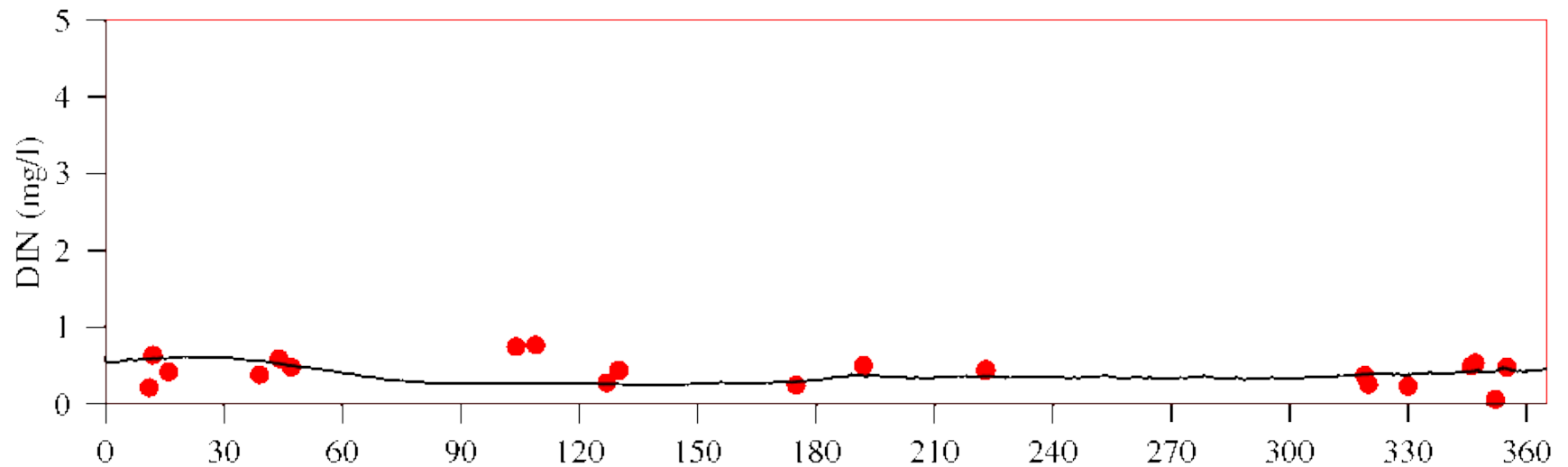




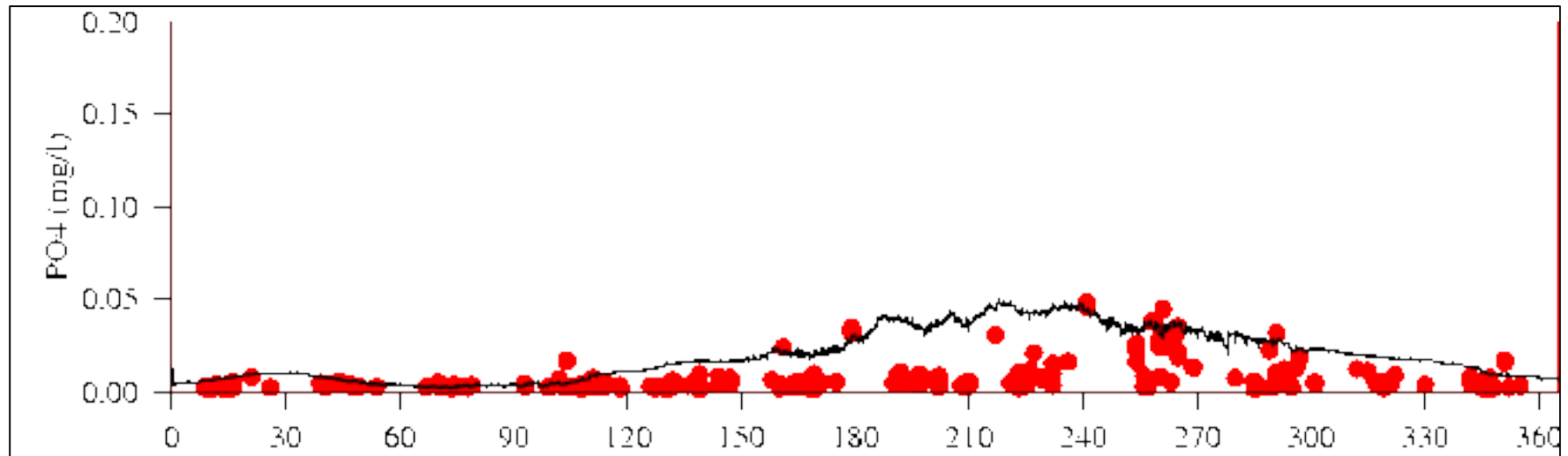
## Surface DIN at ET4.2



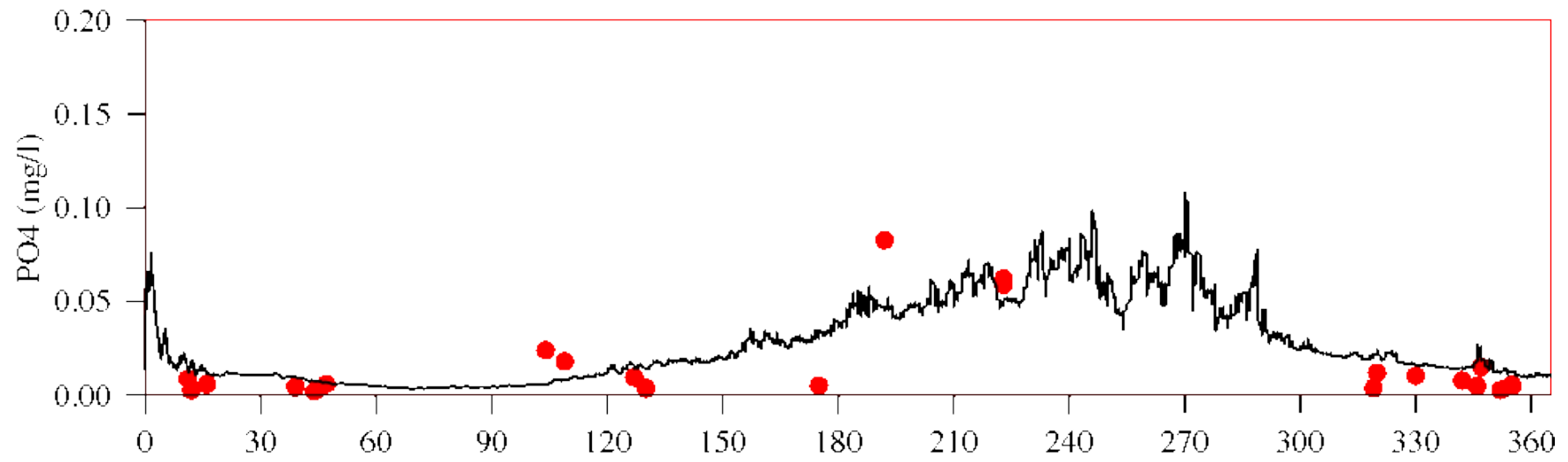
## Bottom DIN at ET4.2



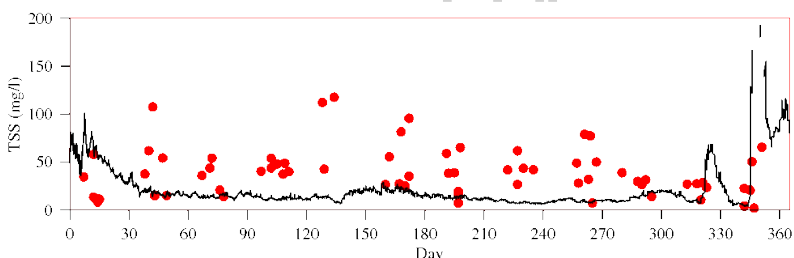
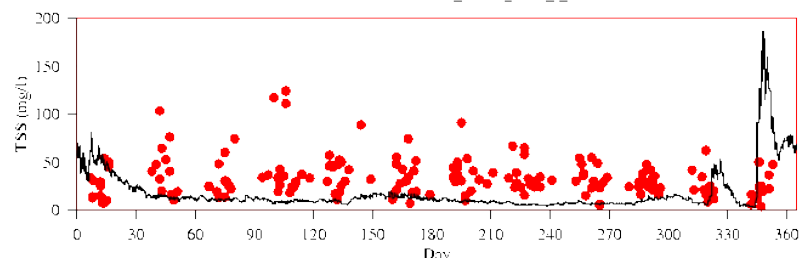
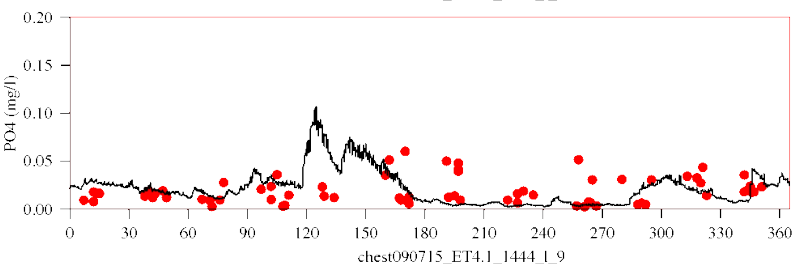
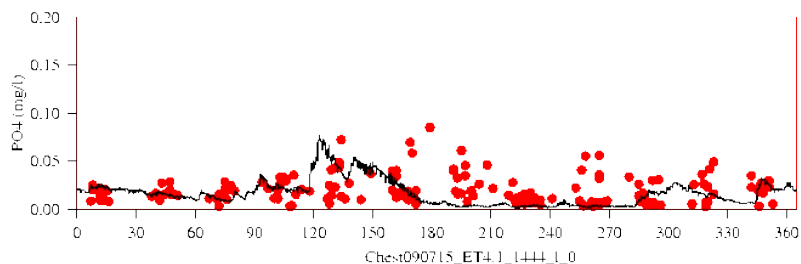
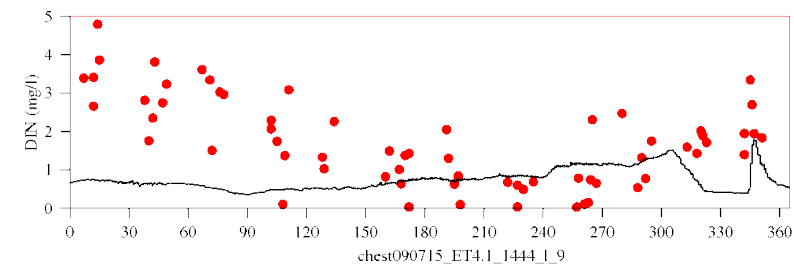
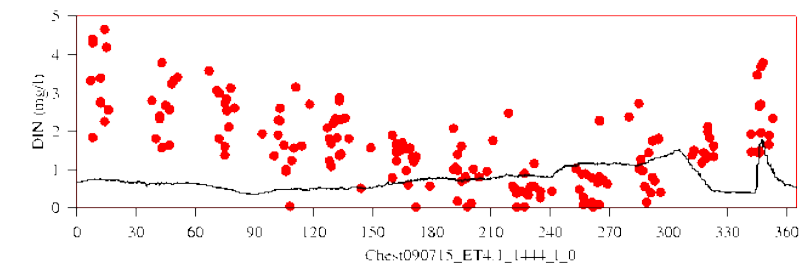
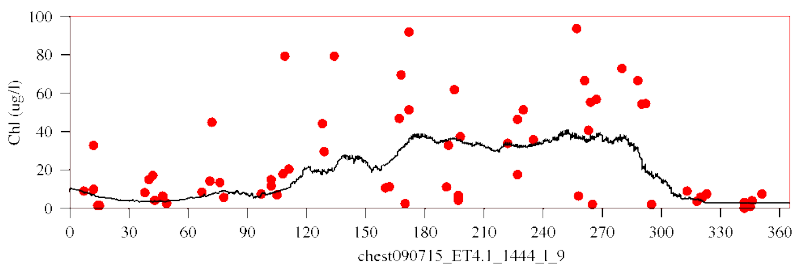
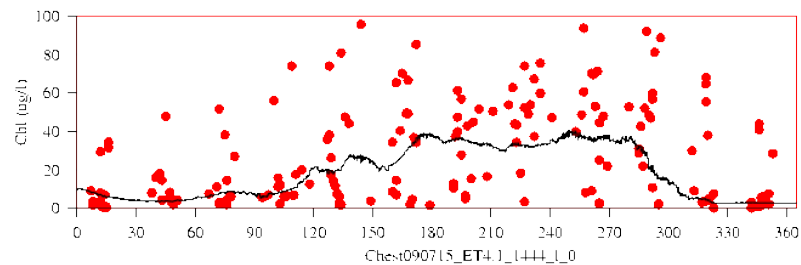
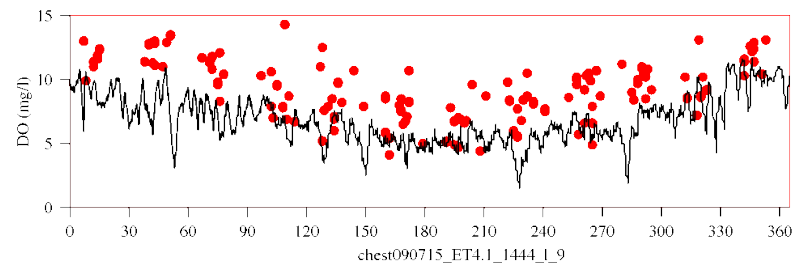
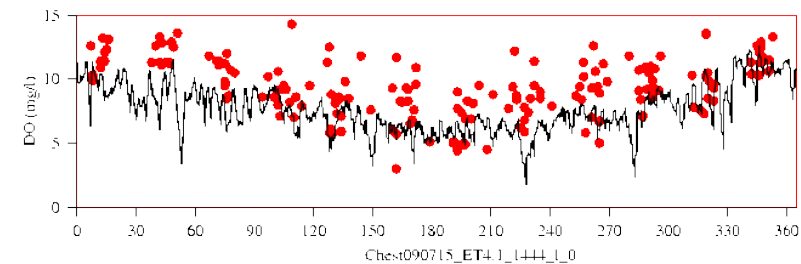
## Surface PO4 at ET4.2



## Bottom PO4 at ET4.2



# Simulation at ET4.1



# Message

- **Physical simulation seems OK, thanks to reasonable open boundary from CH3D and HSPF.**
- **Water quality simulation needs further calibration, spin up and multi-year simulation.**