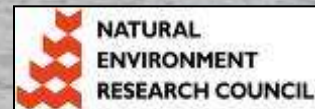


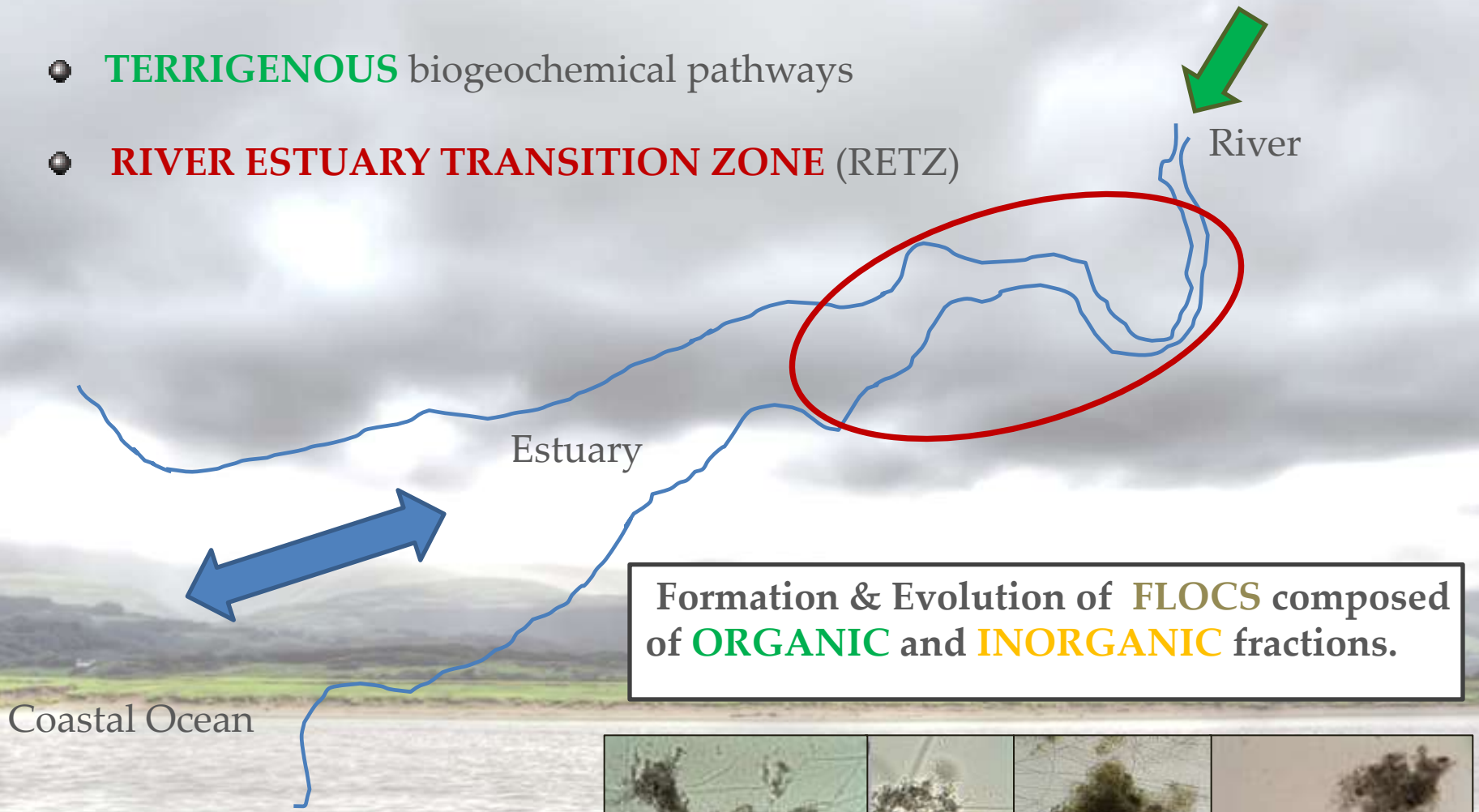
Turbulence control of Floc size in Suspended Particulate Matter (SPM) in the River Estuary Transition Zone (RETZ)



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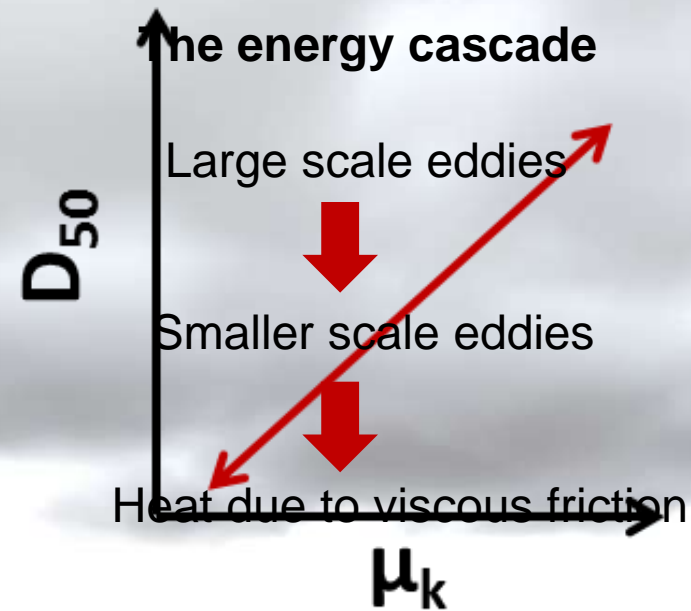
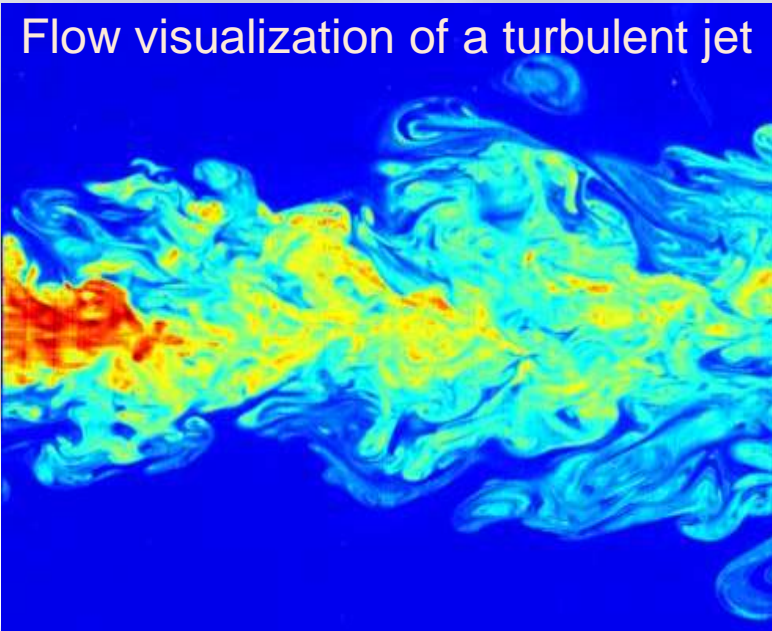
- **TERRIGENOUS** biogeochemical pathways
- **RIVER ESTUARY TRANSITION ZONE (RETZ)**



Formation & Evolution of **FLOCS** composed of **ORGANIC** and **INORGANIC** fractions.



Flow visualization of a turbulent jet



$$\mu_k = \left(\frac{u^3}{\varepsilon} \right)^{1/4} = \left(\frac{\text{Viscosity}^3}{\text{TKE dissipation}} \right)^{1/4}$$

Kolmogorov microscale refers to the length scale of the smallest eddies in a turbulent fluid.

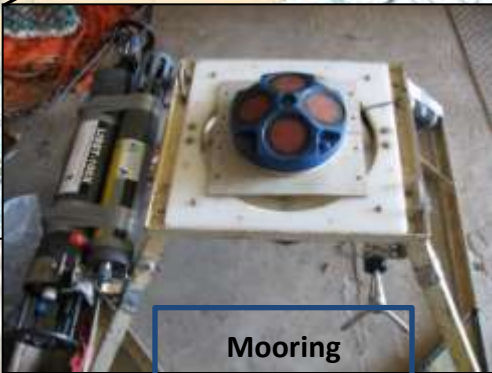


Study area: the Dyfi system in West Wales



Mouth

RETZ



Mooring B

Mooring A

**CTD and
Fluorometer**

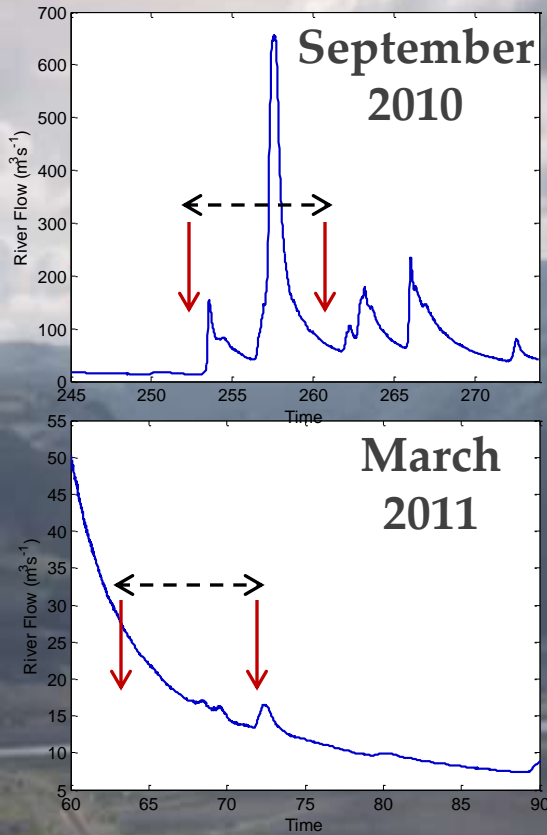
**ADCP
1228.8 kHz
Burst mode**



**ADV
32 Hz
Burst mode**

**LISST 100X type C
30cm above bed
Continuous
sampling**

Bed-mounted mooring configuration



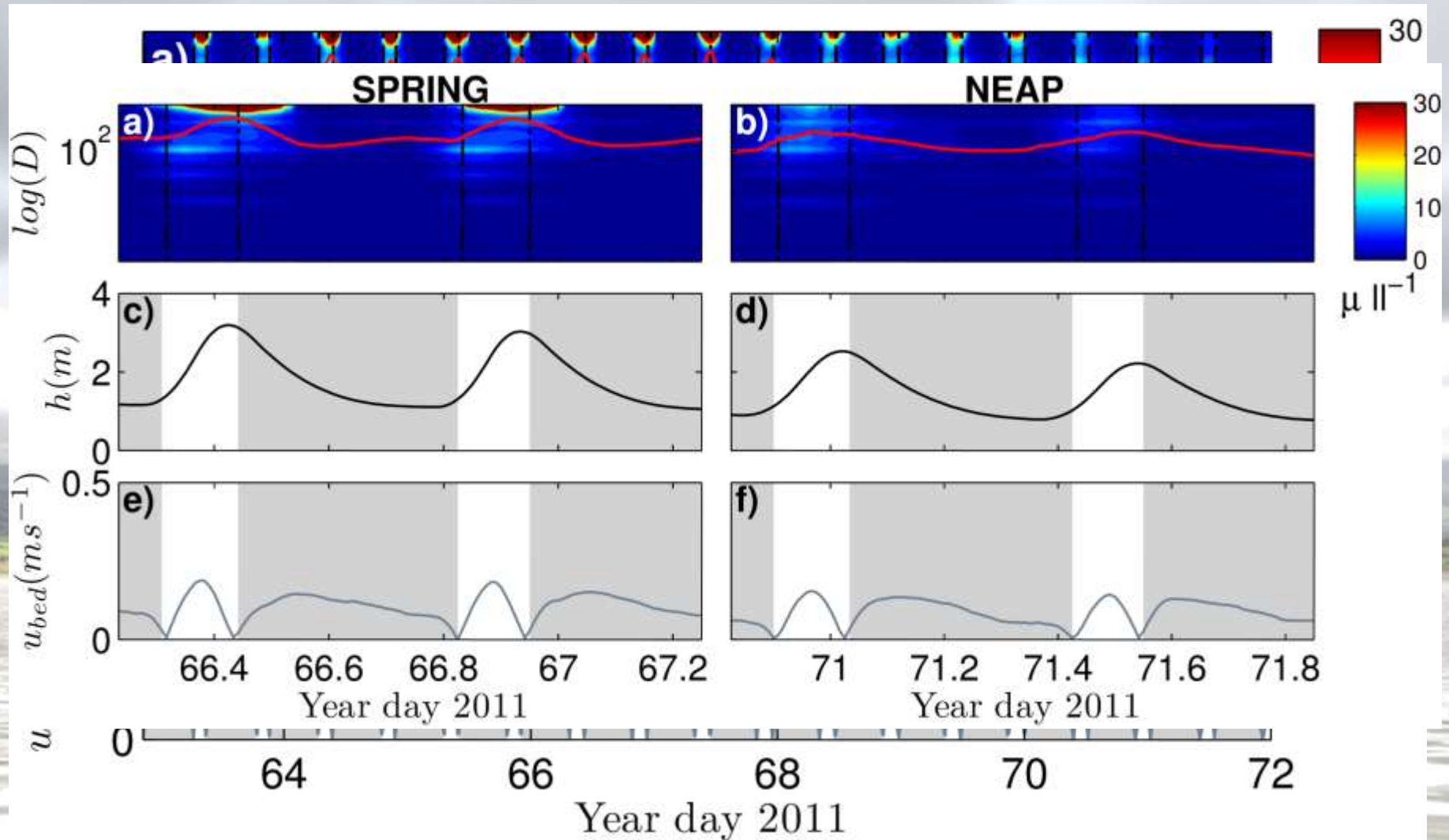
MOORING A
Tidally Influenced
River (TIR)



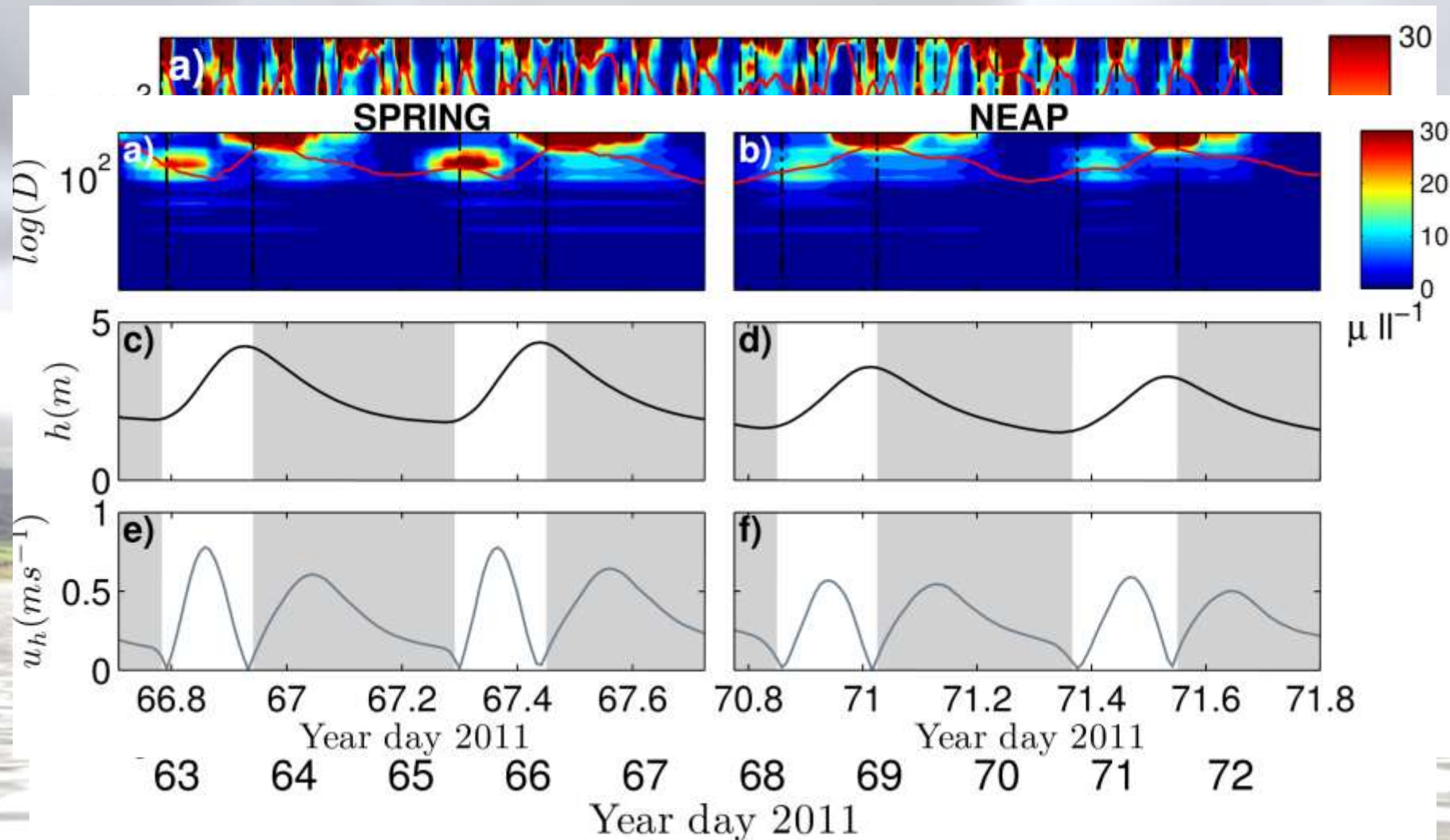
MOORING B
River Estuary
Transition Zone
(RETZ)

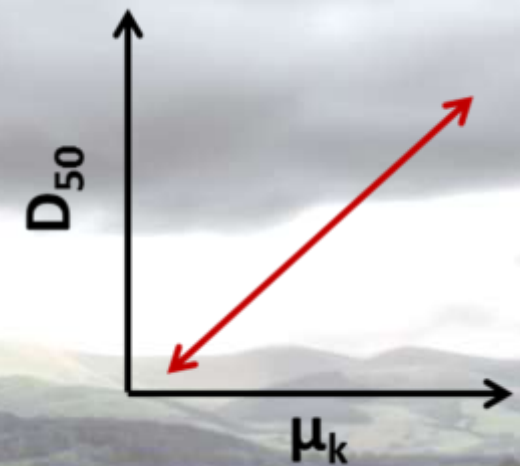
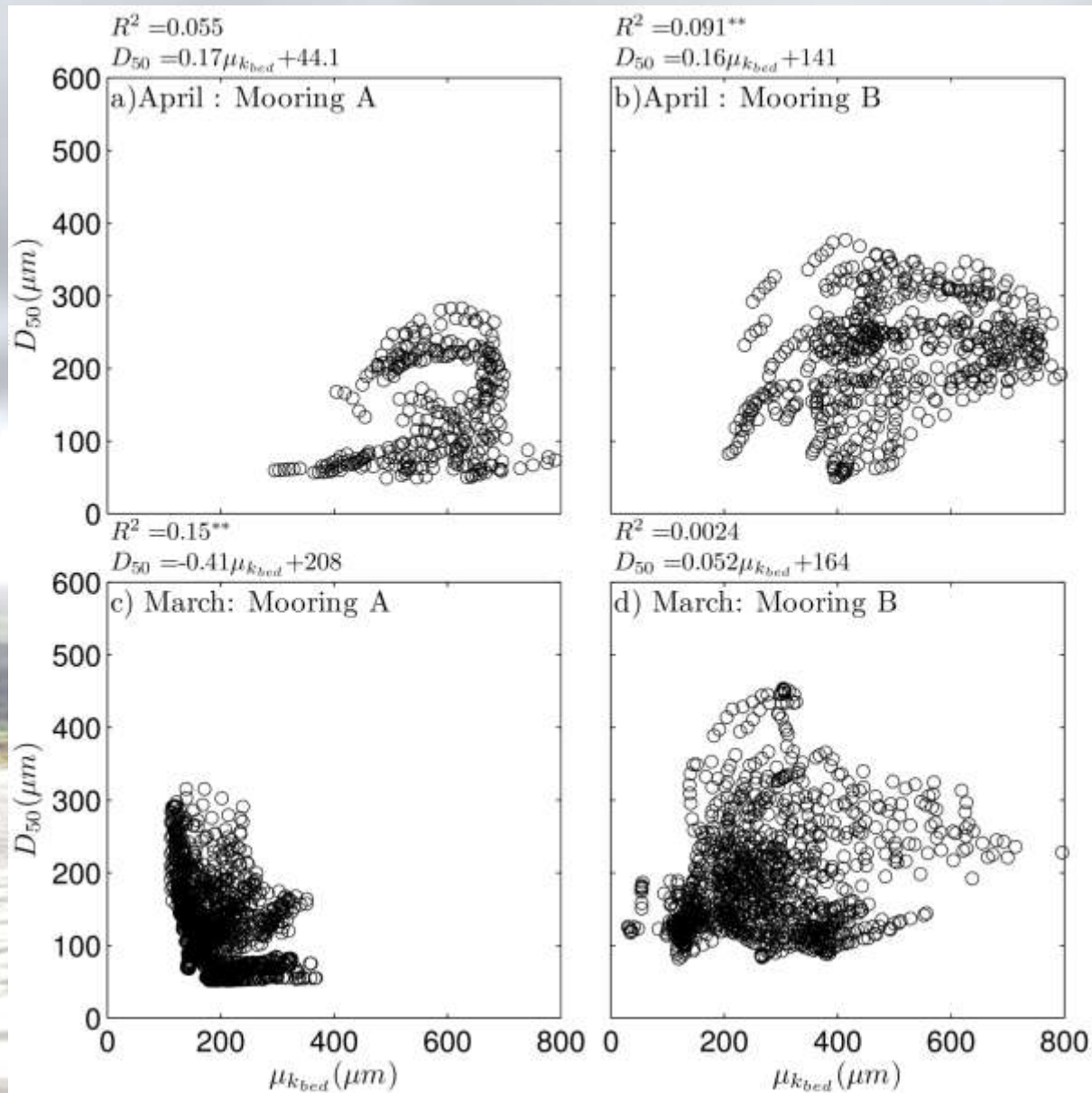


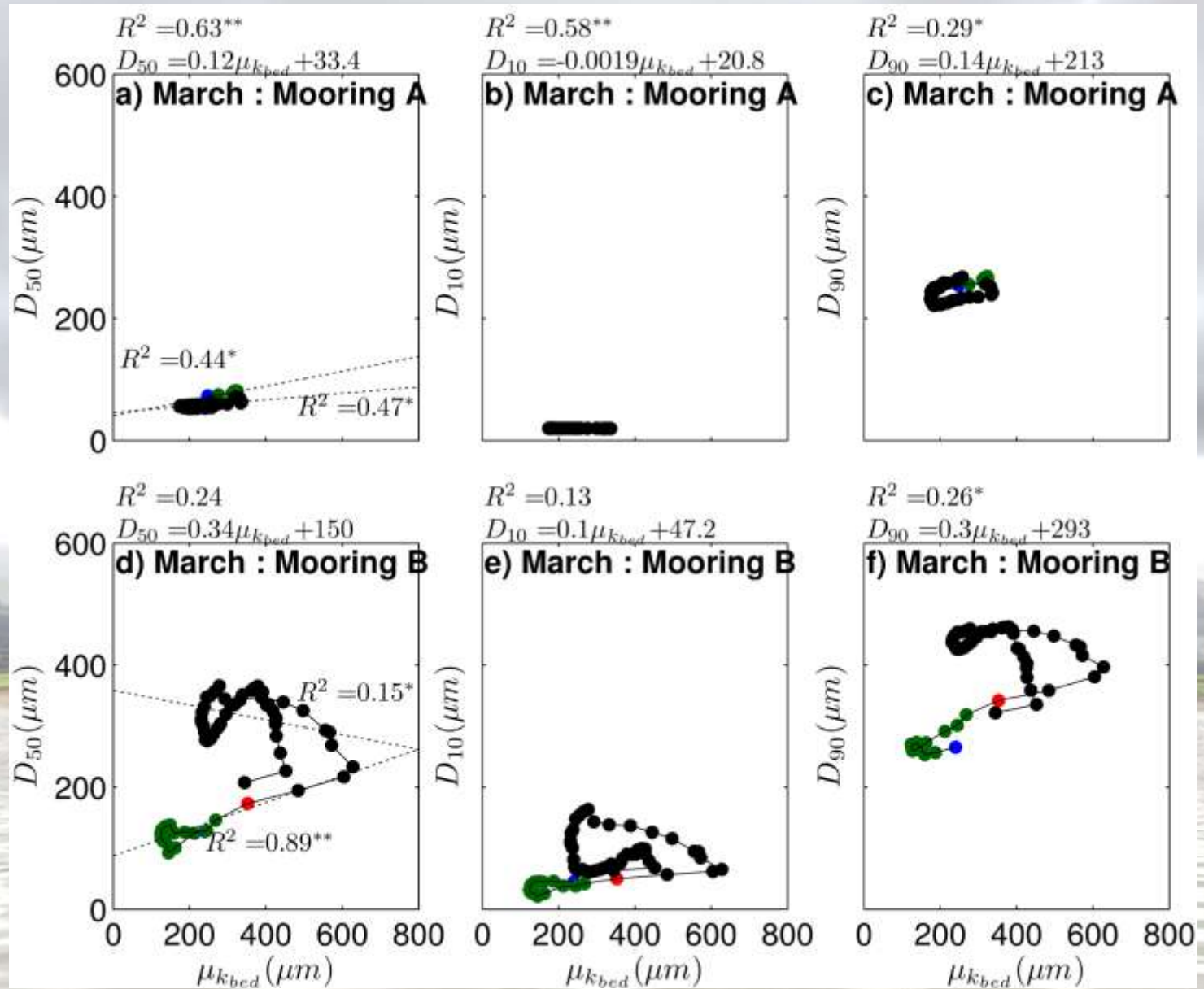
March 2011: TIR Mooring A

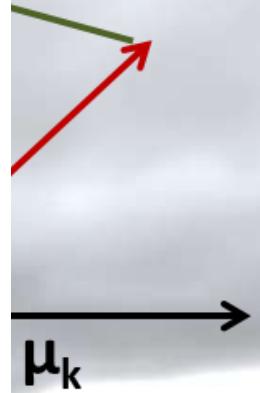
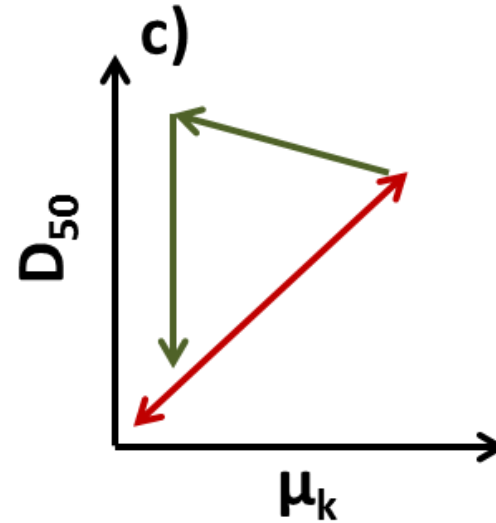
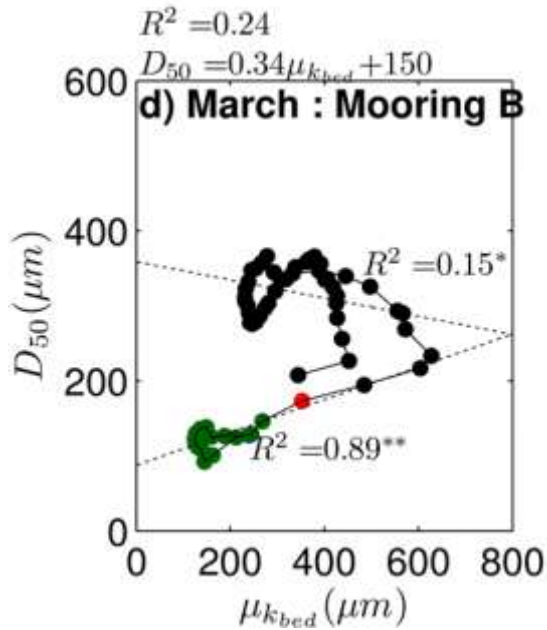
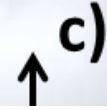
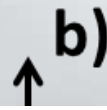


March 2011: RETZ Mooring B









3:

/ derived

Scenario

Both μ_{kbed} and D_{50} are derived from SPM and SPM of a marine origin scale with turbulence regime.

SPM does not respond to the local turbulence regime whereas SPM of a marine origin does.

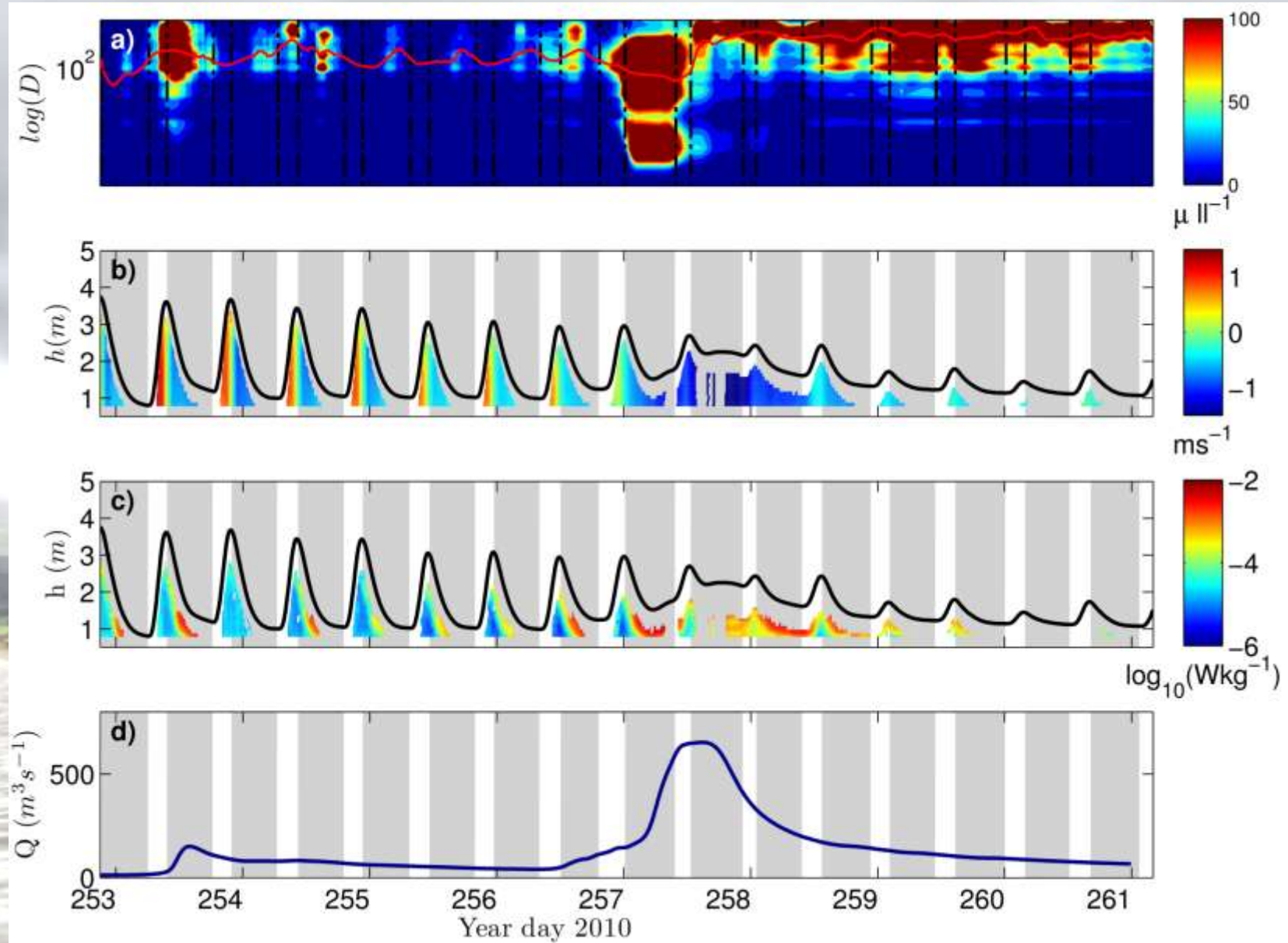
SPM continues to grow as eddy length scales decrease until a critical point is reached and the positive linear relationship is restored.

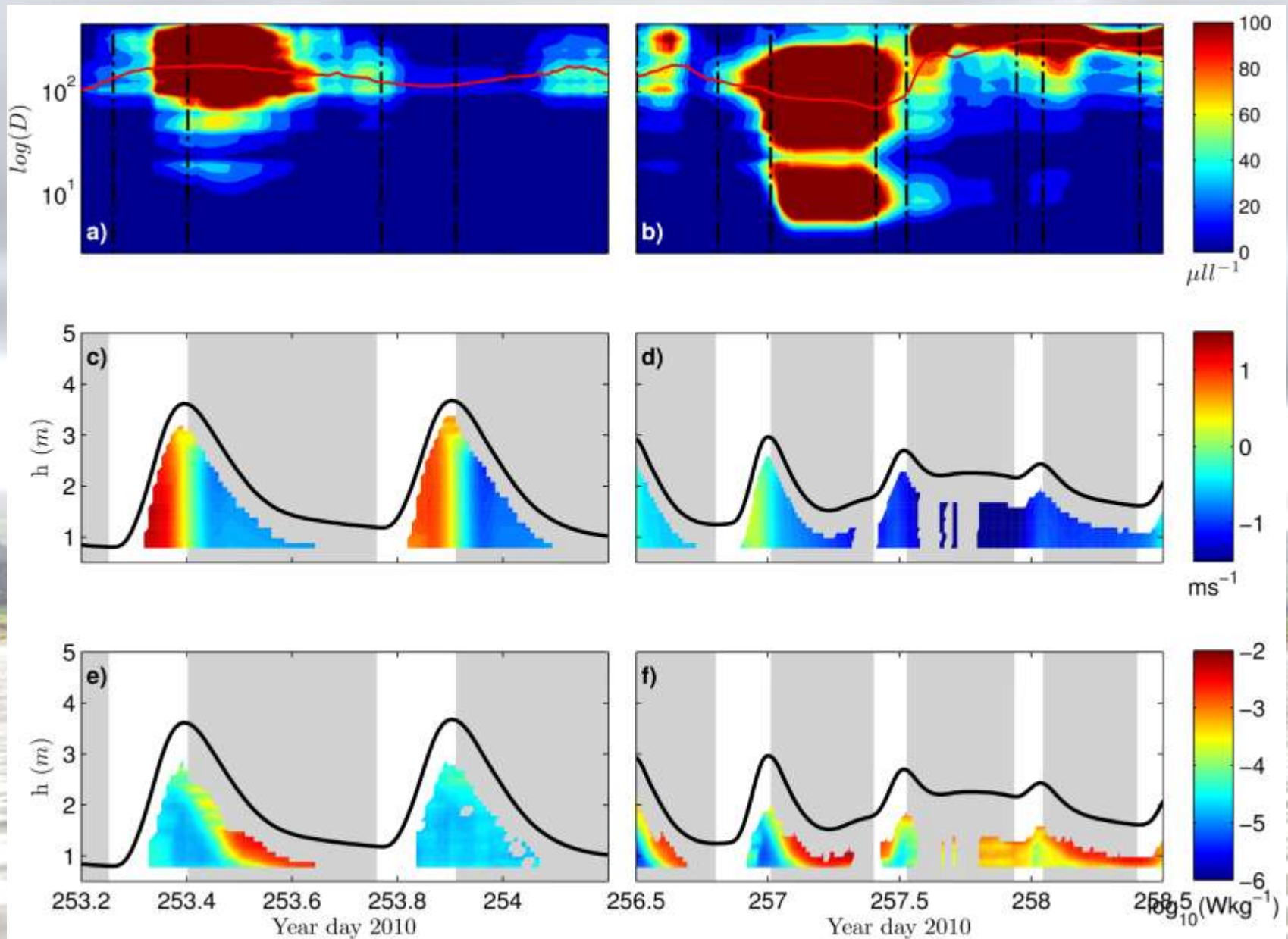
SEPTEMBER MOORING : IN TIDALLY INFLUENCED RIVER:

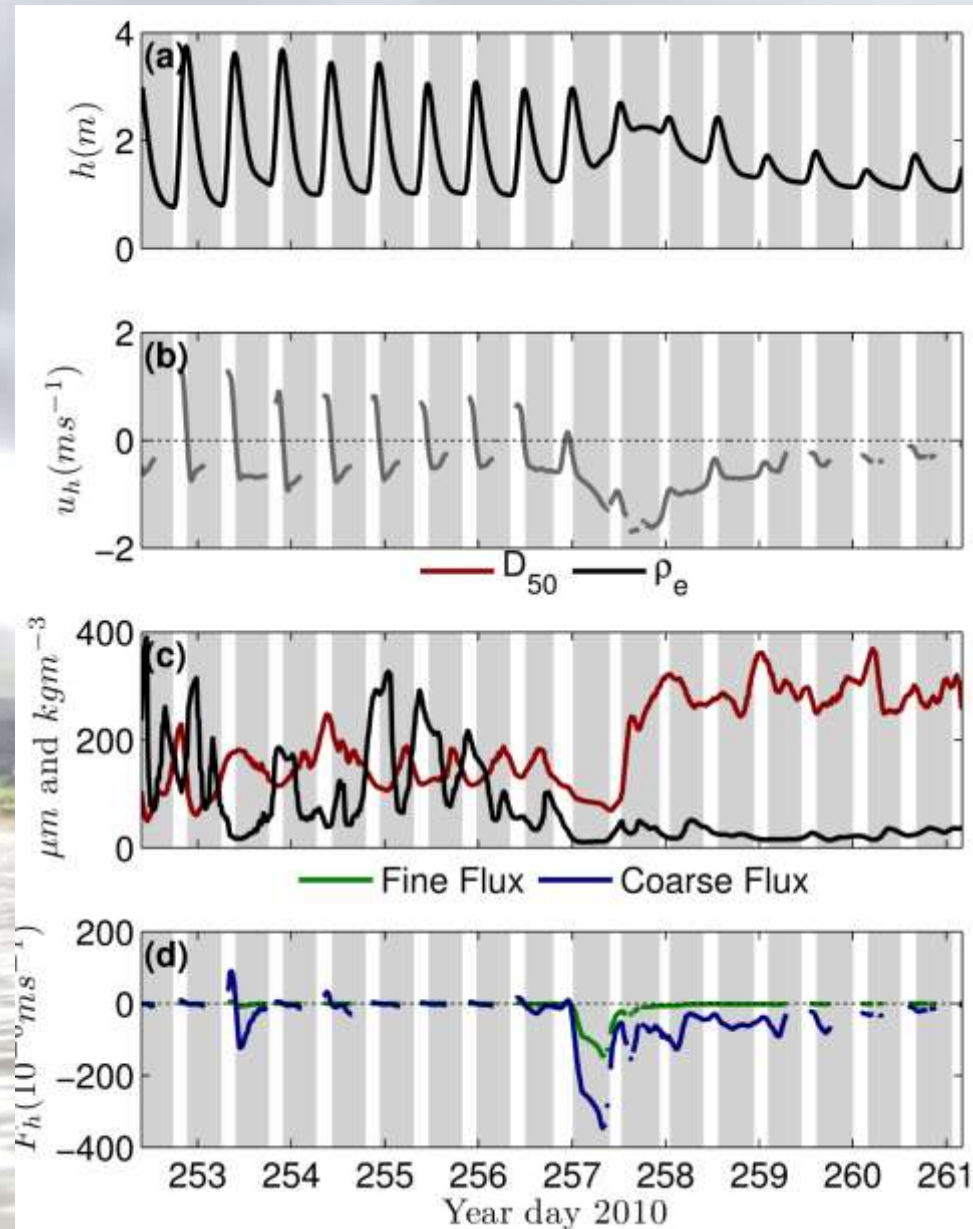


FLOOD EVENT

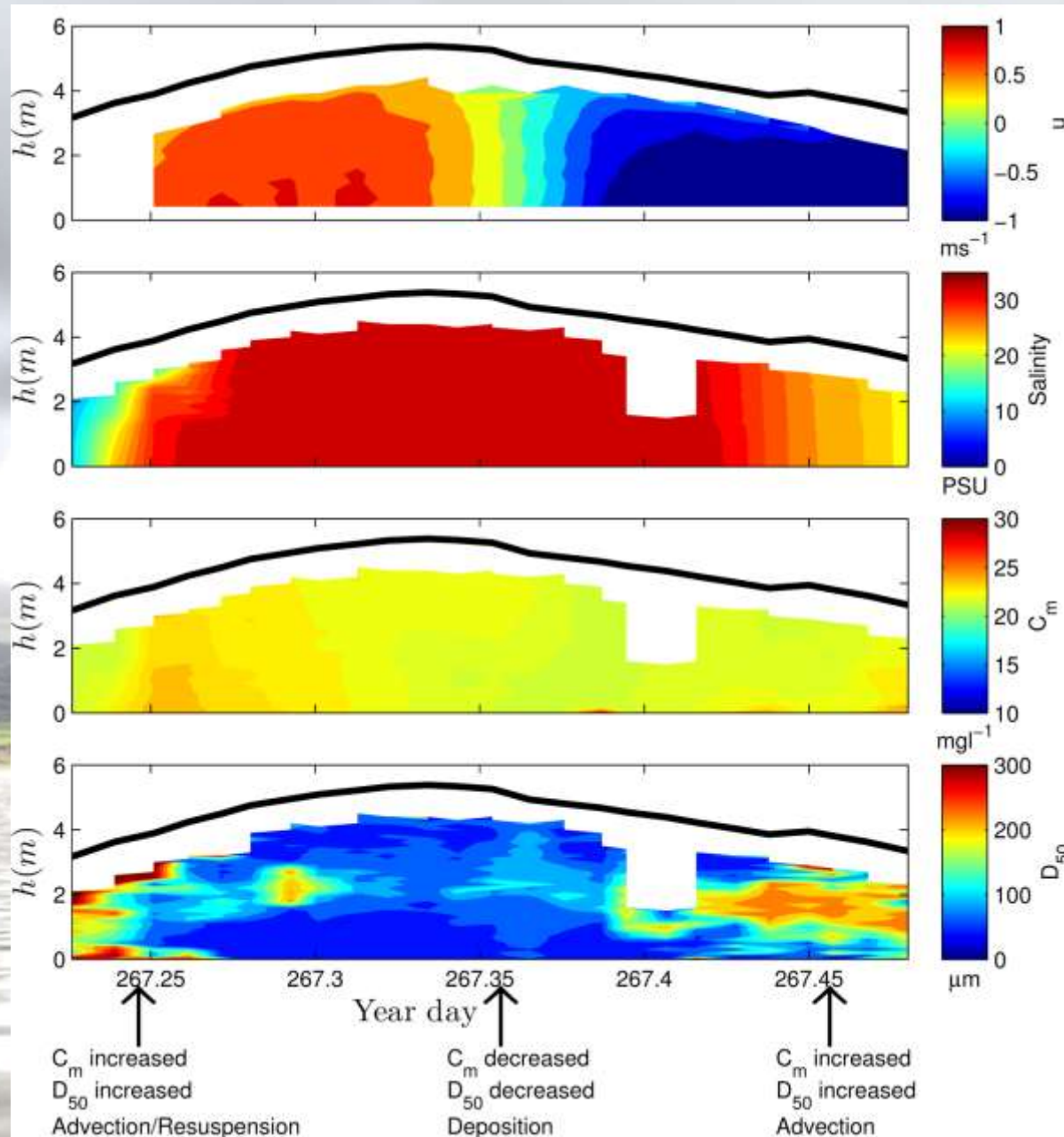








- Tidal range reduced.
- Current velocities remain negative throughout major river flood event.
- Large particles exported from the RETZ.
- Distinct particle properties during river flood event, low density particles.



Estuary mouth: Post flood event

- Potential evidence of material advected from TIR during the ebb.
- During a river flood event what goes in must come out?

In summary:

- A simple linear relationship between Kolmogorov microscale and median particle size was not observed in the RETZ.
- The origin of SPM can affect the relationship with the local turbulence.
- River flood events gave rise to disruption of tidal currents and the export of large low density particles observed at the mouth of the estuary.