

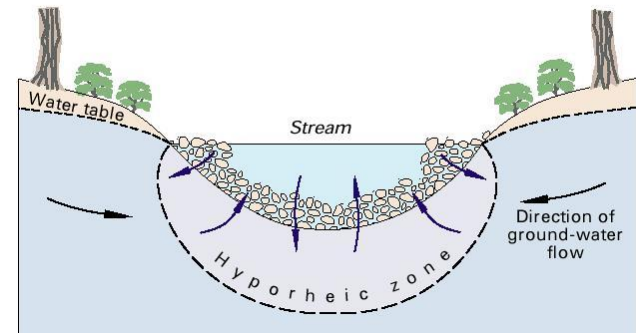


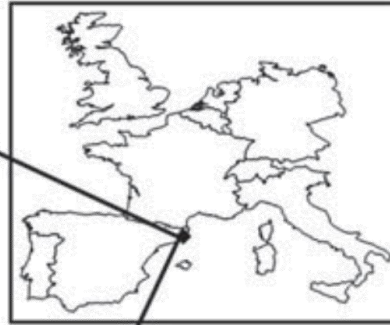
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Changes in DOM
quantity and
quality in the
hyporheic zone
during drought

- Context
- Study site
- Hypothesis and research questions
- Methodology: Fluorescent properties of DOM
- Results and Discussion
- Conclusions
- Outlook

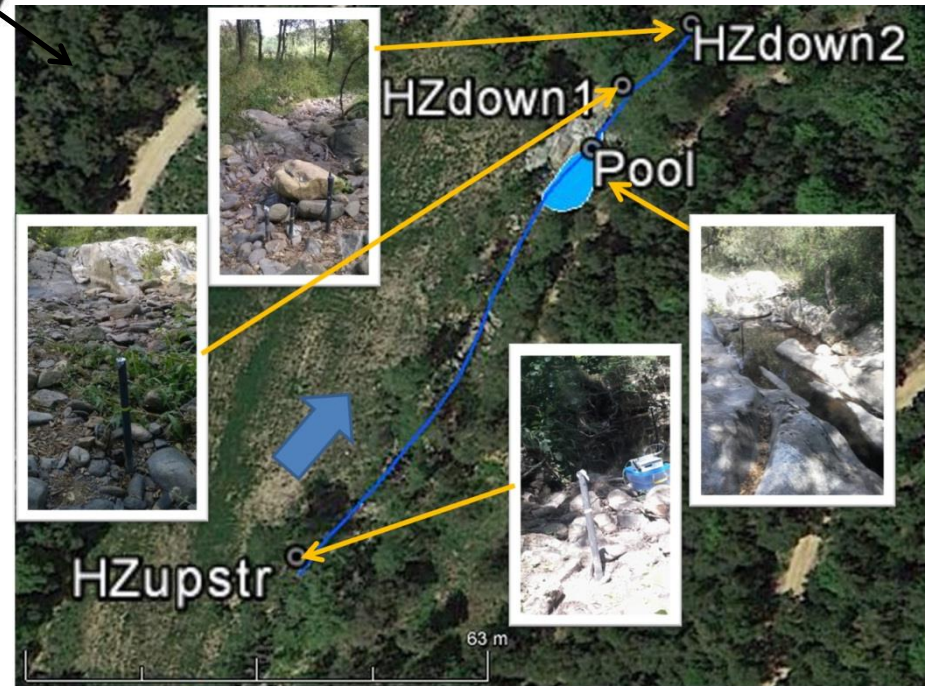
- The **fate of allochthonous OM in head waters** has profound implications for **water quality** downstream.
- **Intermittent rivers and streams** are among the most **common and dynamic** freshwater ecosystems. Flow intermittency **increases** in with climatic drying trends or water abstractions.
- The **Hyporheic Zone (HZ)** is a **biogeochemical Hot Spot**, where allochthonous material meets autochthonous inputs from benthic community.

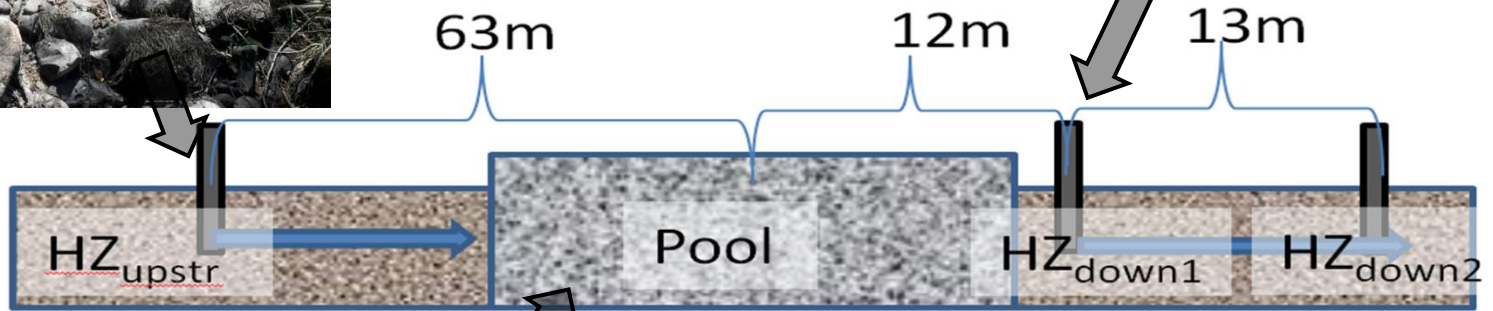
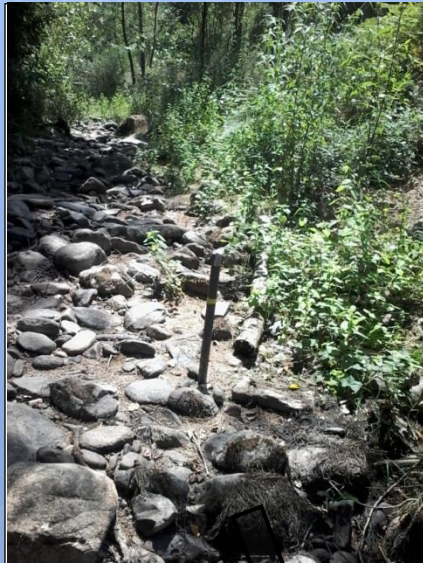




- North-east of Spain
- Pristine catchment 13km²
- Mediterranean climate
- Temperature normally not below 0

- Average annual precipitation: 750mm
- Average annual potential evapotranspiration: 975mm
- Completely dry during 2-3 months in summer



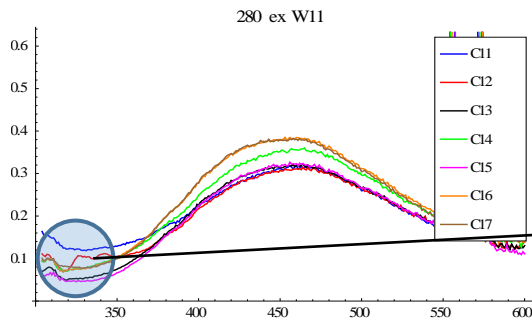


- **The HZ is a Hot Spot of DOM transformation.**
 - What hydrological and geomorphological conditions drive these transformations?
- **The drought**, will enhance the transformation of DOM inside the pool and the hyporheic zone.
 - When is the “Hot moment” of these transformations?
- These transformations have effects on the **Net Ecosystem Production (NEP)** inside the pool.
 - Which ones?

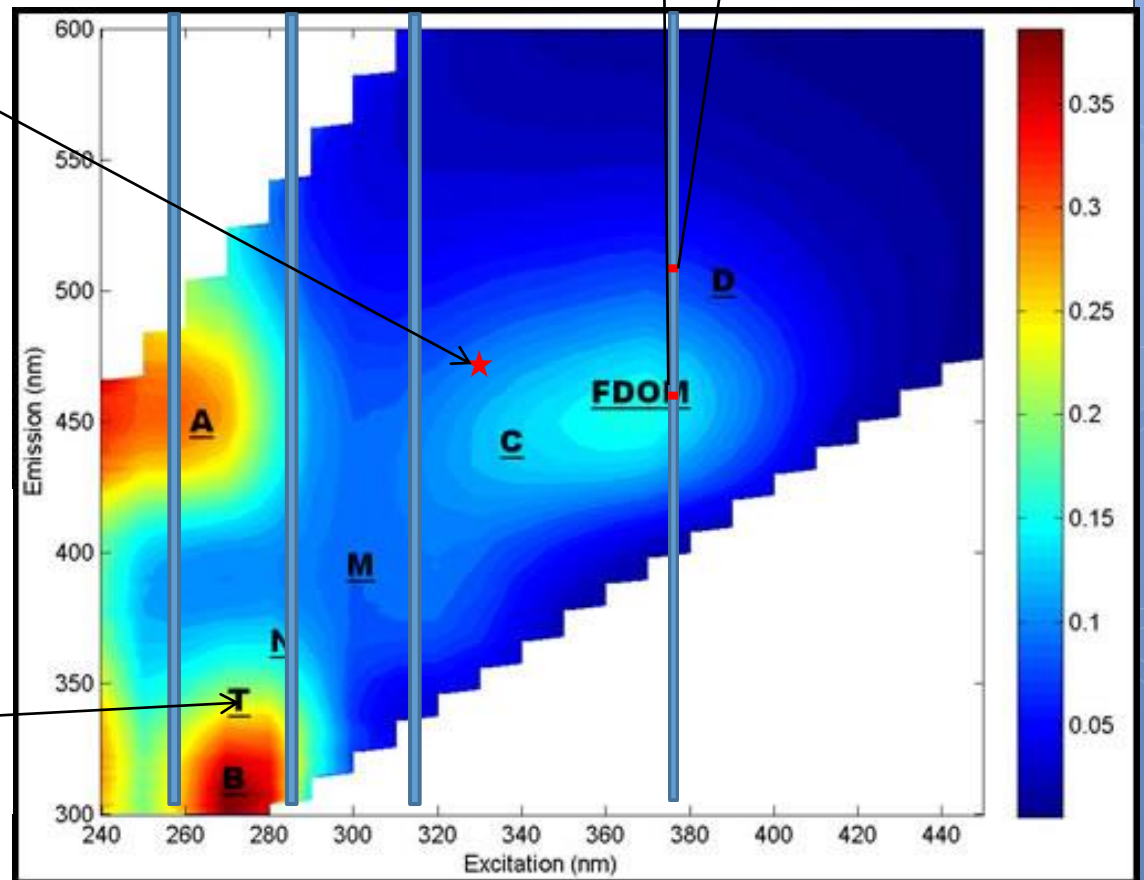
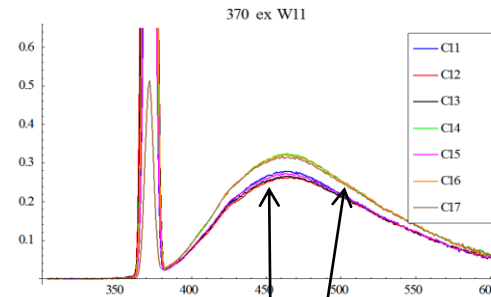


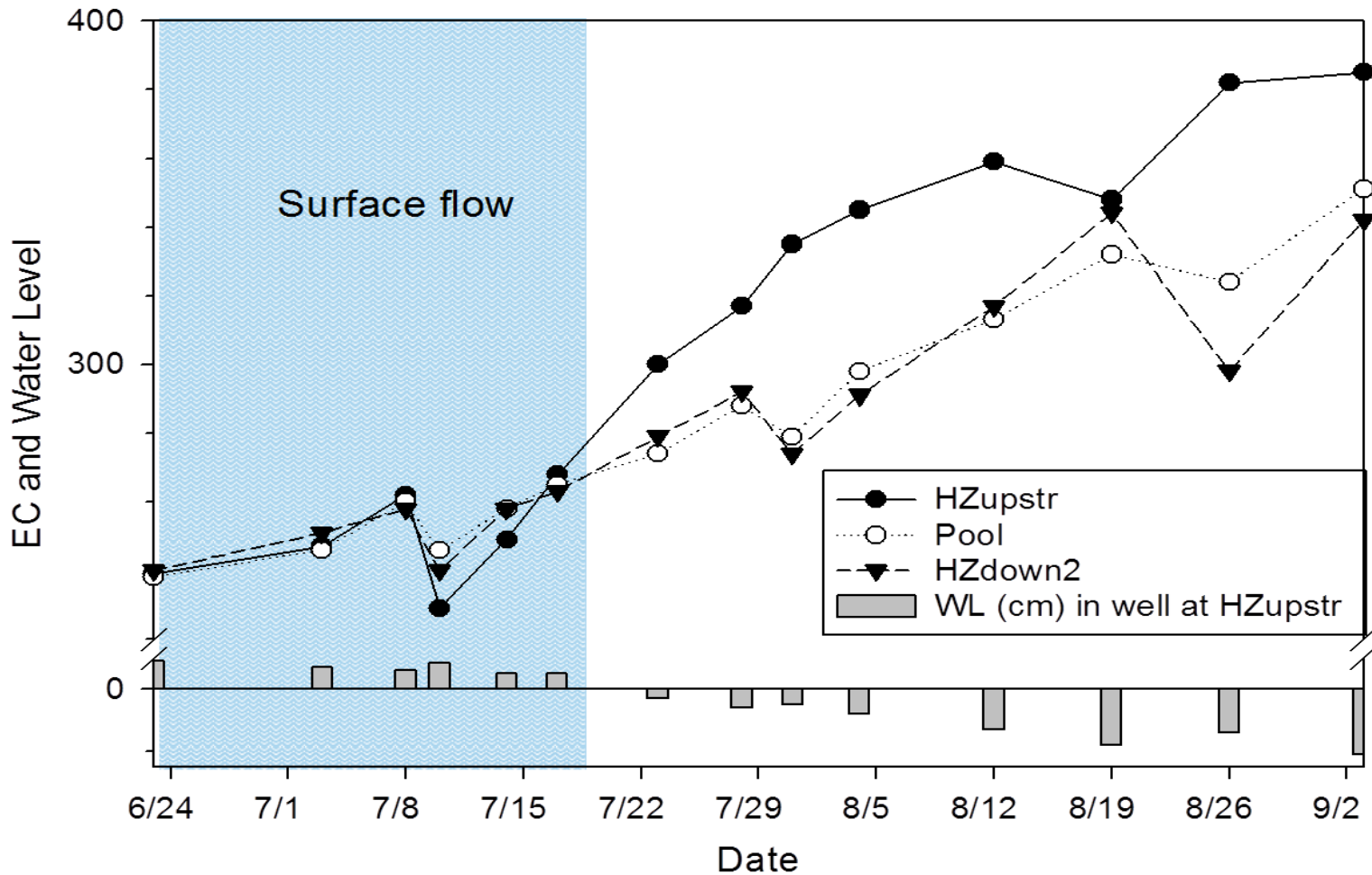
CDOM (325 ex 470 em)

Tryptophan protein-like peak (280 ex 340 em)

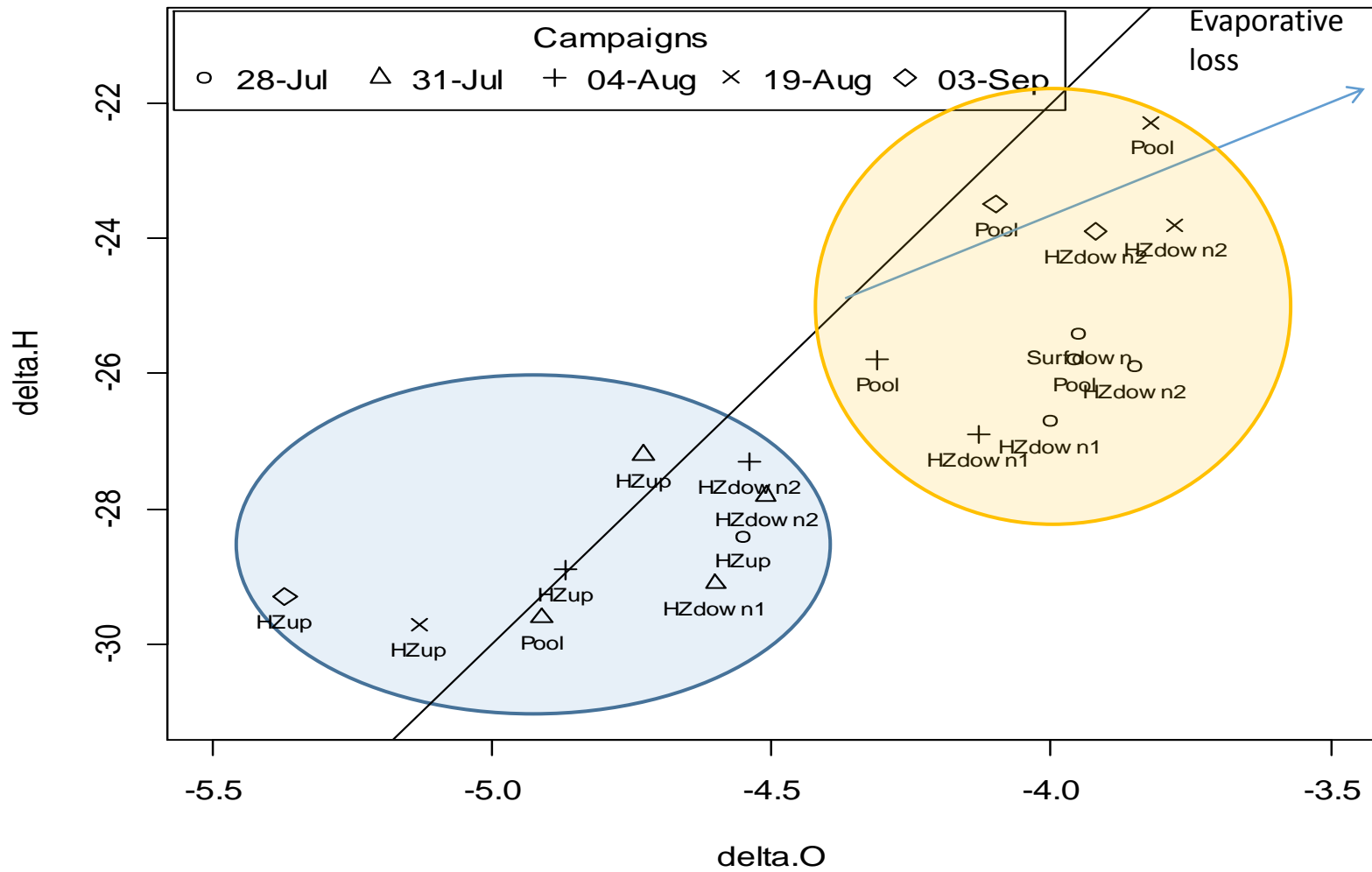


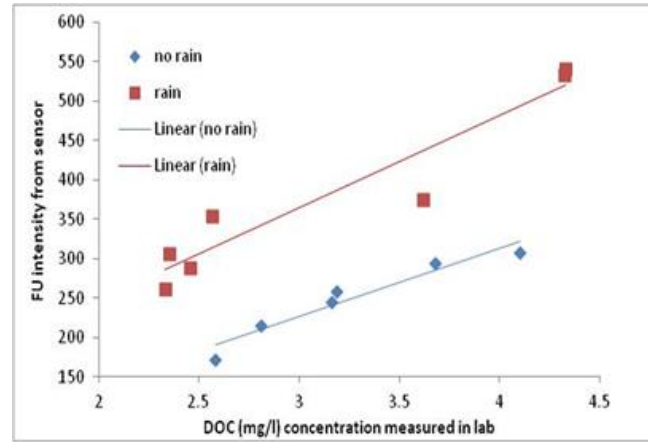
Fluorescence Index FI (370 ex 470 em/ 520 em)





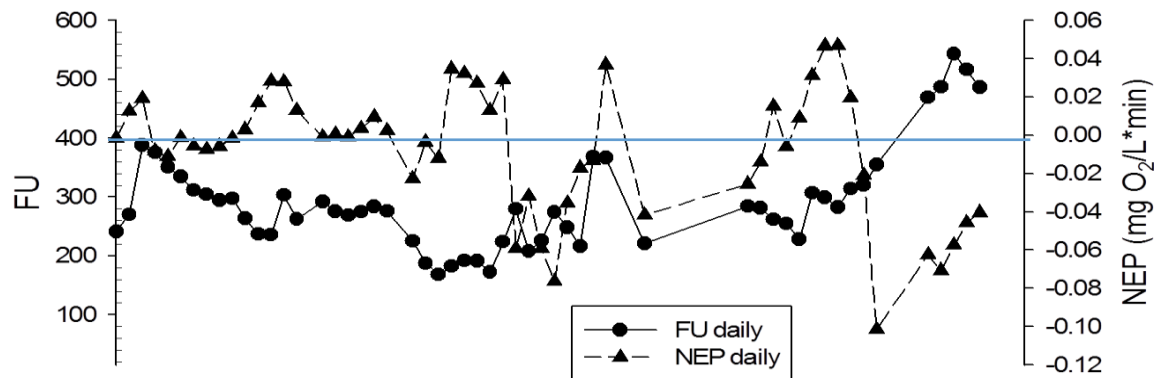
Isotopes





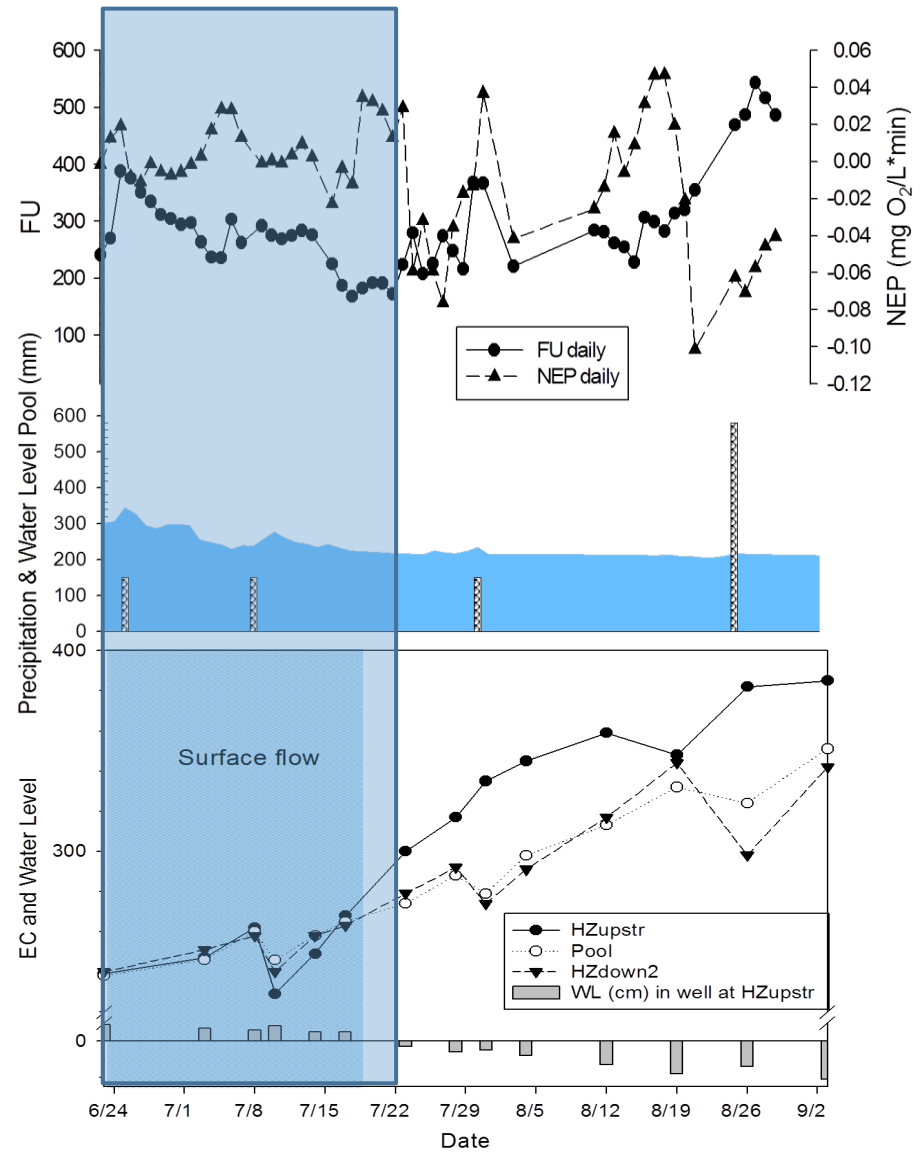
CDOM represents more terrestrial derived DOM -> autochthonous DOM underestimated

$$NEP = GPP - R$$



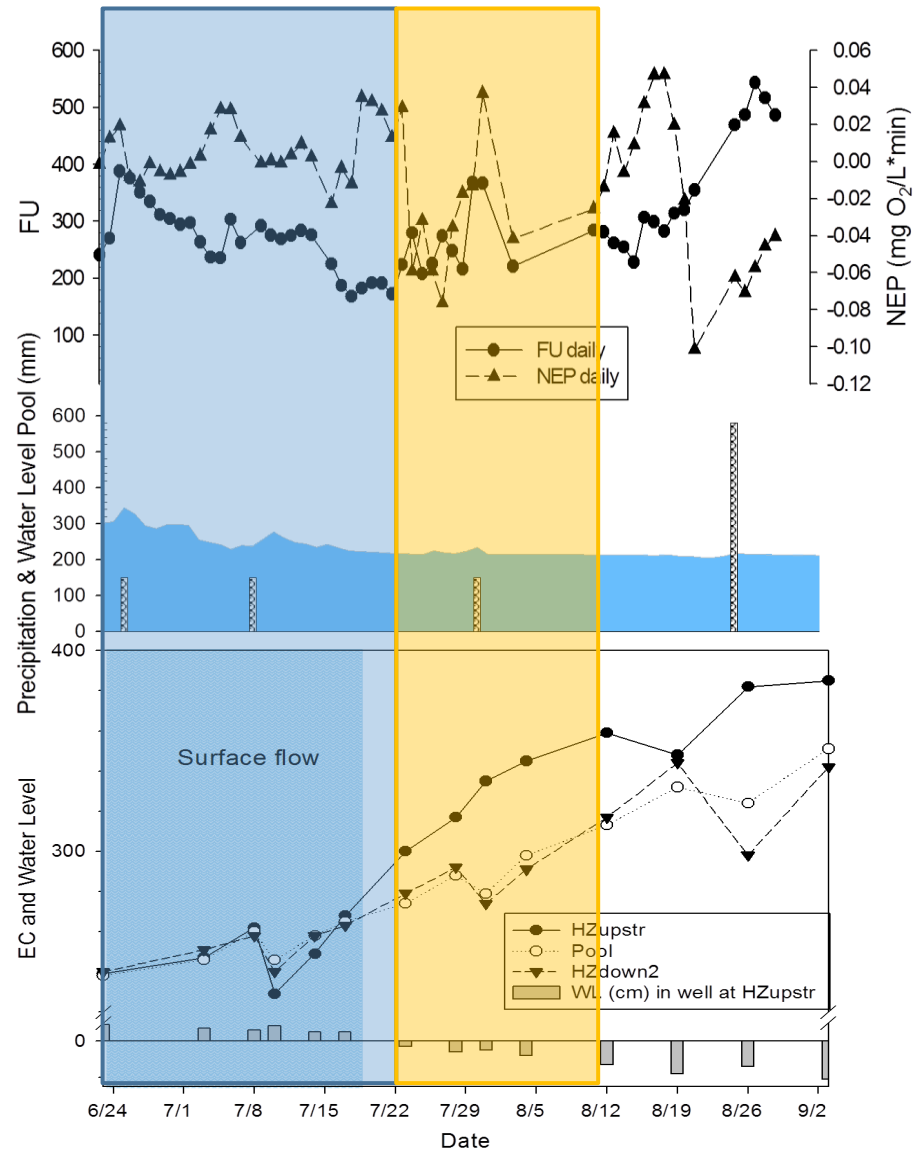


Before drought the NEP and the CDOM are negatively correlated -> CDOM tends to reduce primary production.

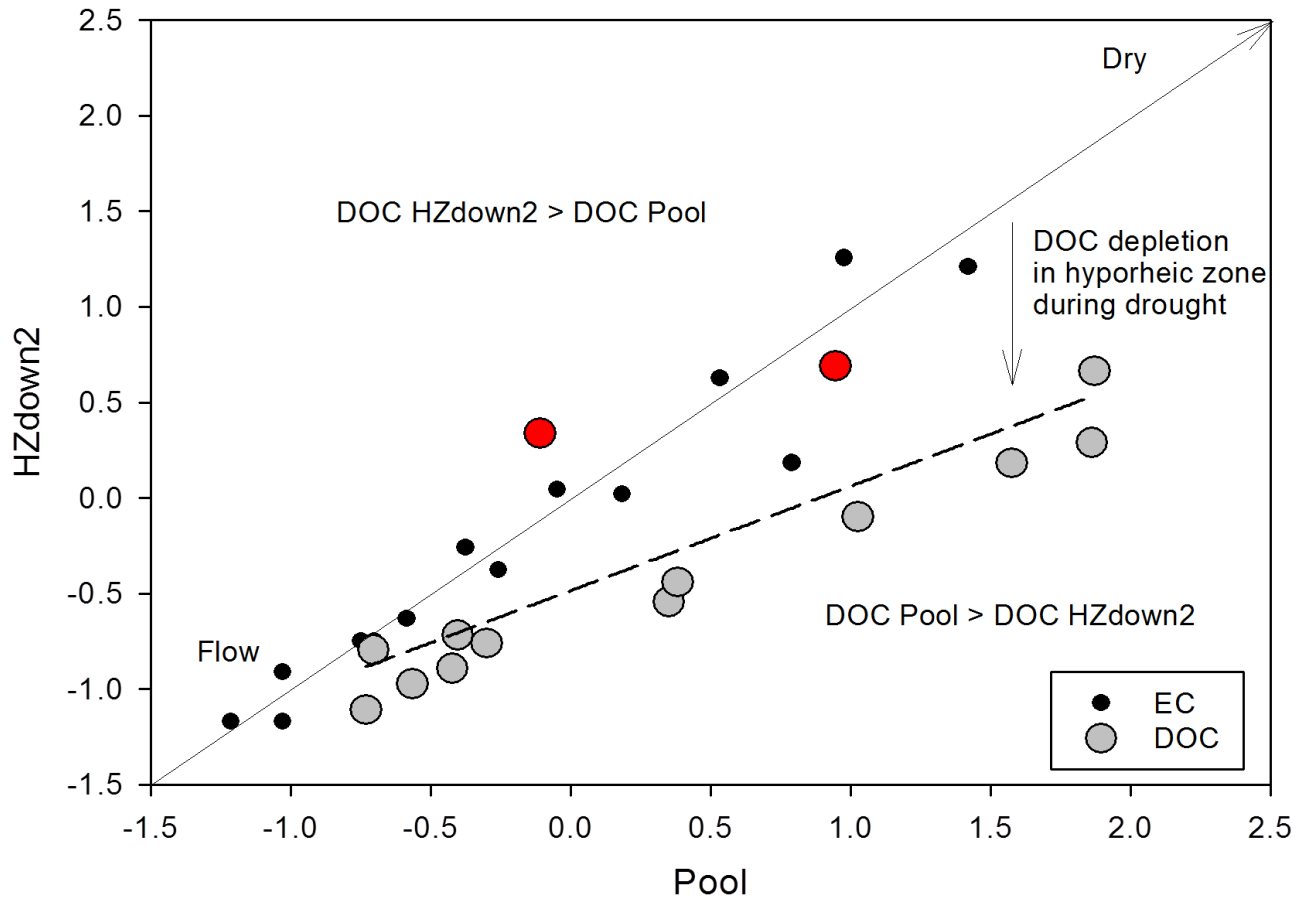


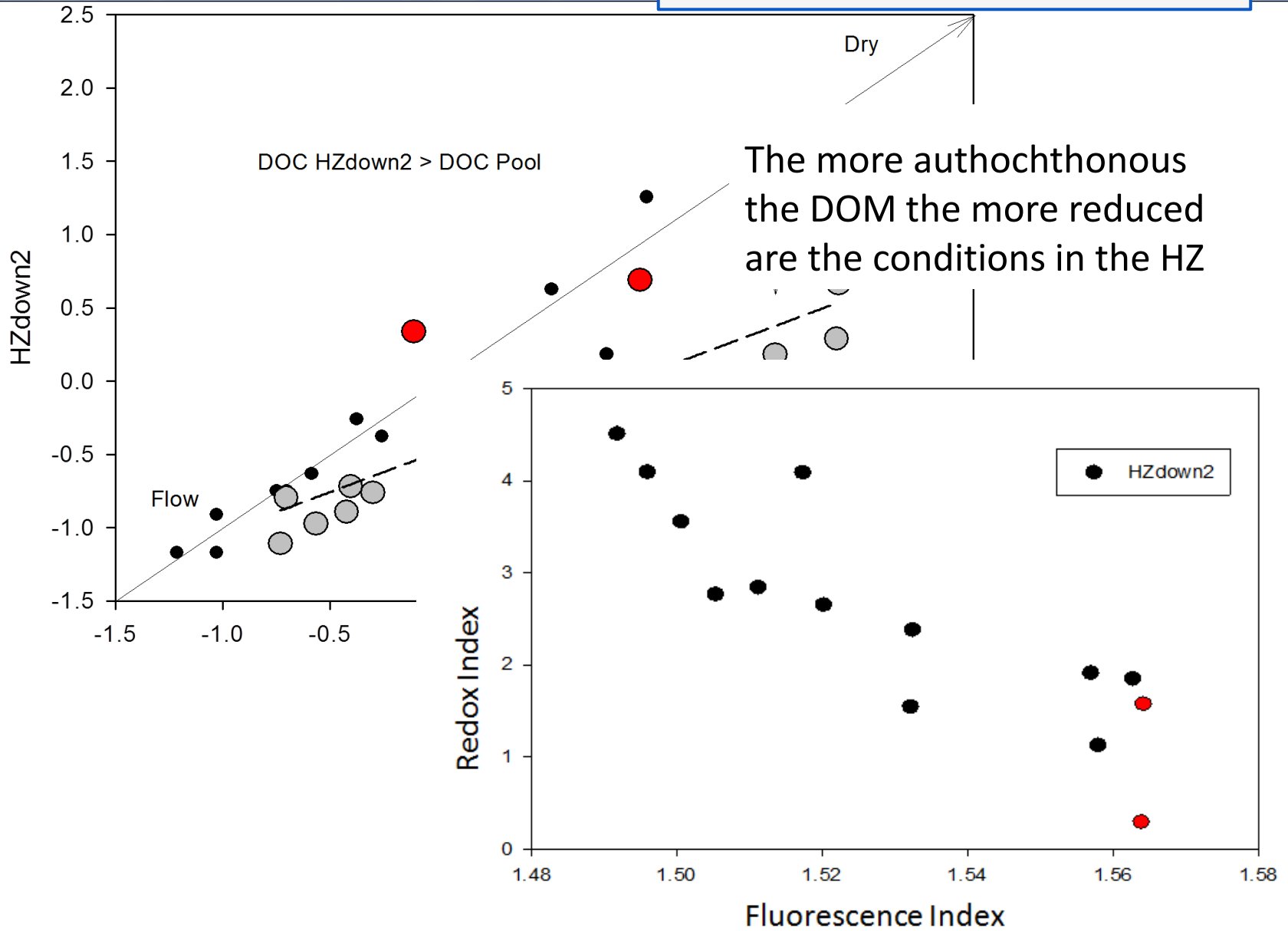


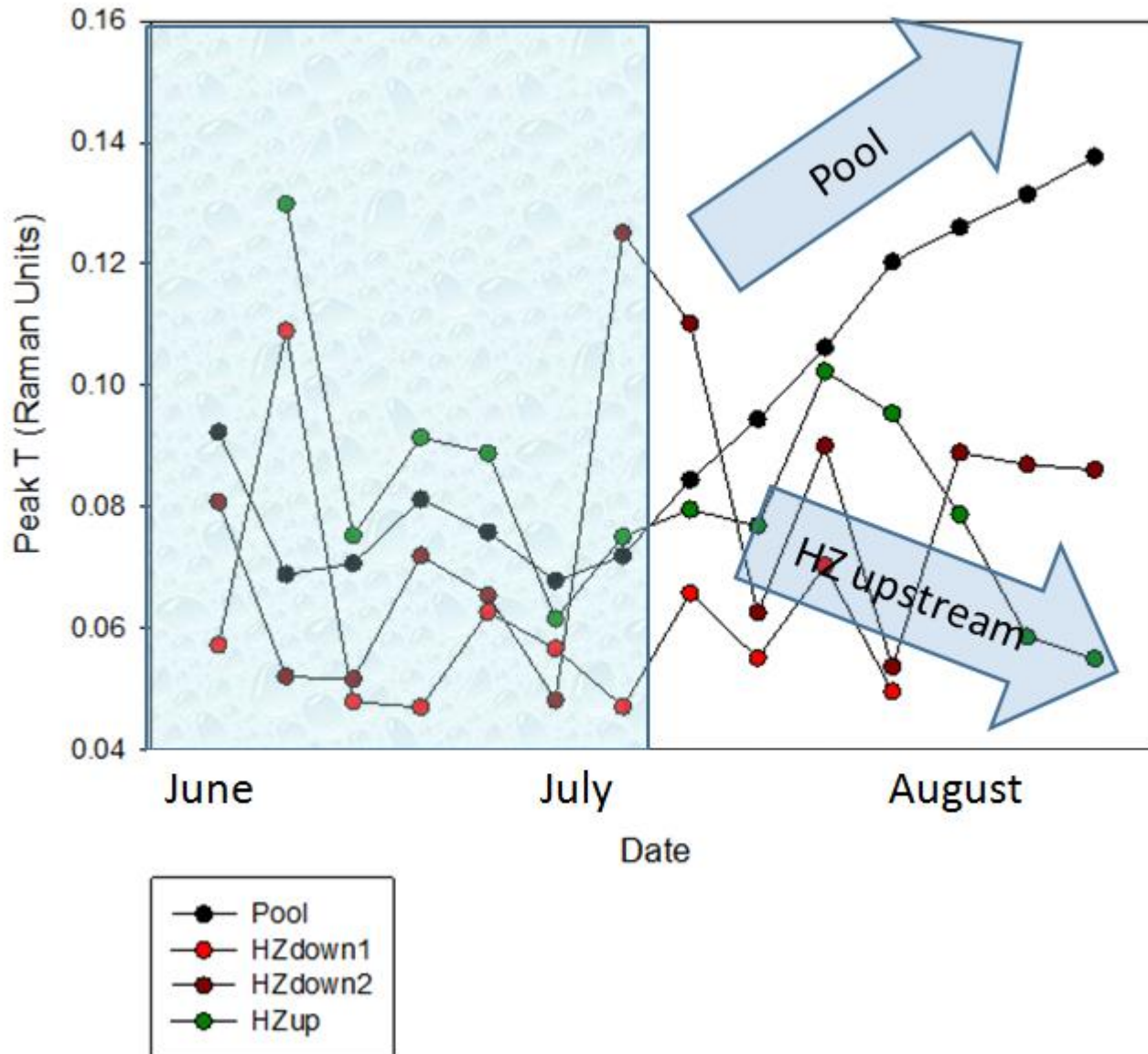
During fragmentation they are not anymore negatively correlated – measurements of protein-like substances in continuum?



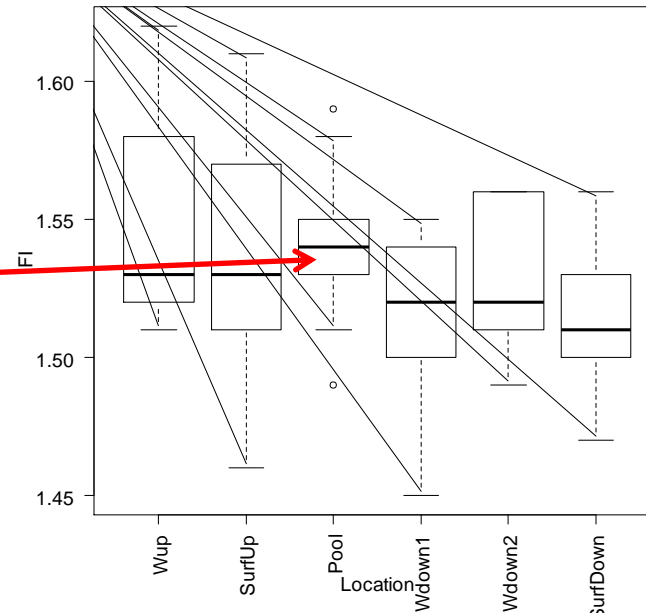
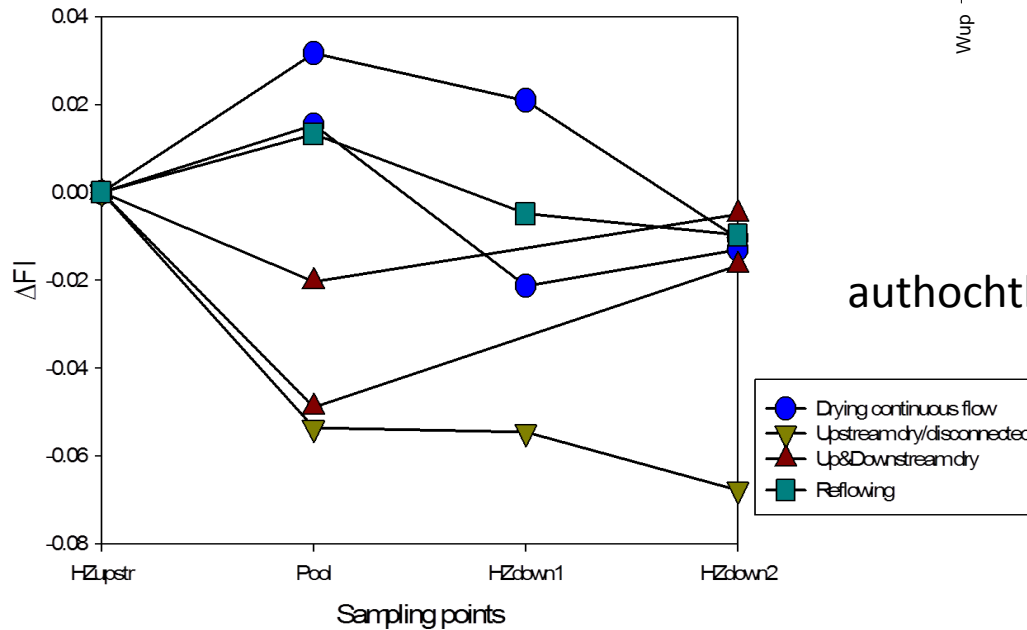
HZ during drought







- **DOM source HZ significant changes**
- No significant changes in relative composition inside the **pool**

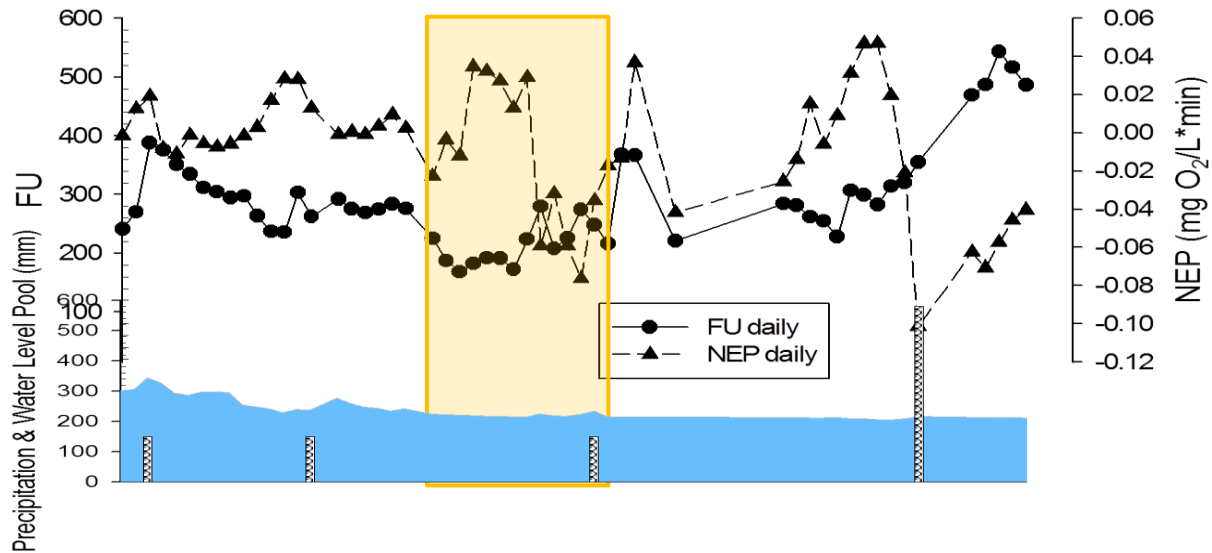


autochthonous \gg FI \gg terrestrial

- What drives DOC transformation and consumption in the HZ?
 - Residence time in the HZ
 - Only during drought the HZ is a Hot Spot for DOM transformation
 - The bedrock and the fresh input from the pool affect the HZ
 - Reduced conditions in the HZ



- When is the “Hot moment” of DOM transformations?
 - When the stream is dry and there is a short rain event
 - In the first days of fragmentation
- How does this affect the NEP of the pool?
 - Strong rise in GPP, NEP gets positive, then negative during algae bloom



- Couple DOM quality and quantity to CO₂ measurements
- Continuous measurements with fluorimeters in the HZ
- Continuous measurements of protein-like DOM
- Drought and reflow in artificial flumes



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