

# Is grab sampling adequate to the seasonal monitoring of contaminants of emerging concern?

## A case study on a multi-purpose artificial lake in Brasília, Brazil

### Emerging pollutants in aquatic ecosystems

### PARANOÁ LAKE

- Most important body of water in the Brazilian capital
  - Brasília – 3,000,000 inhab
- Region with low water availability and high demand
- Climate with very dry winters and rainy summers



### FACTS

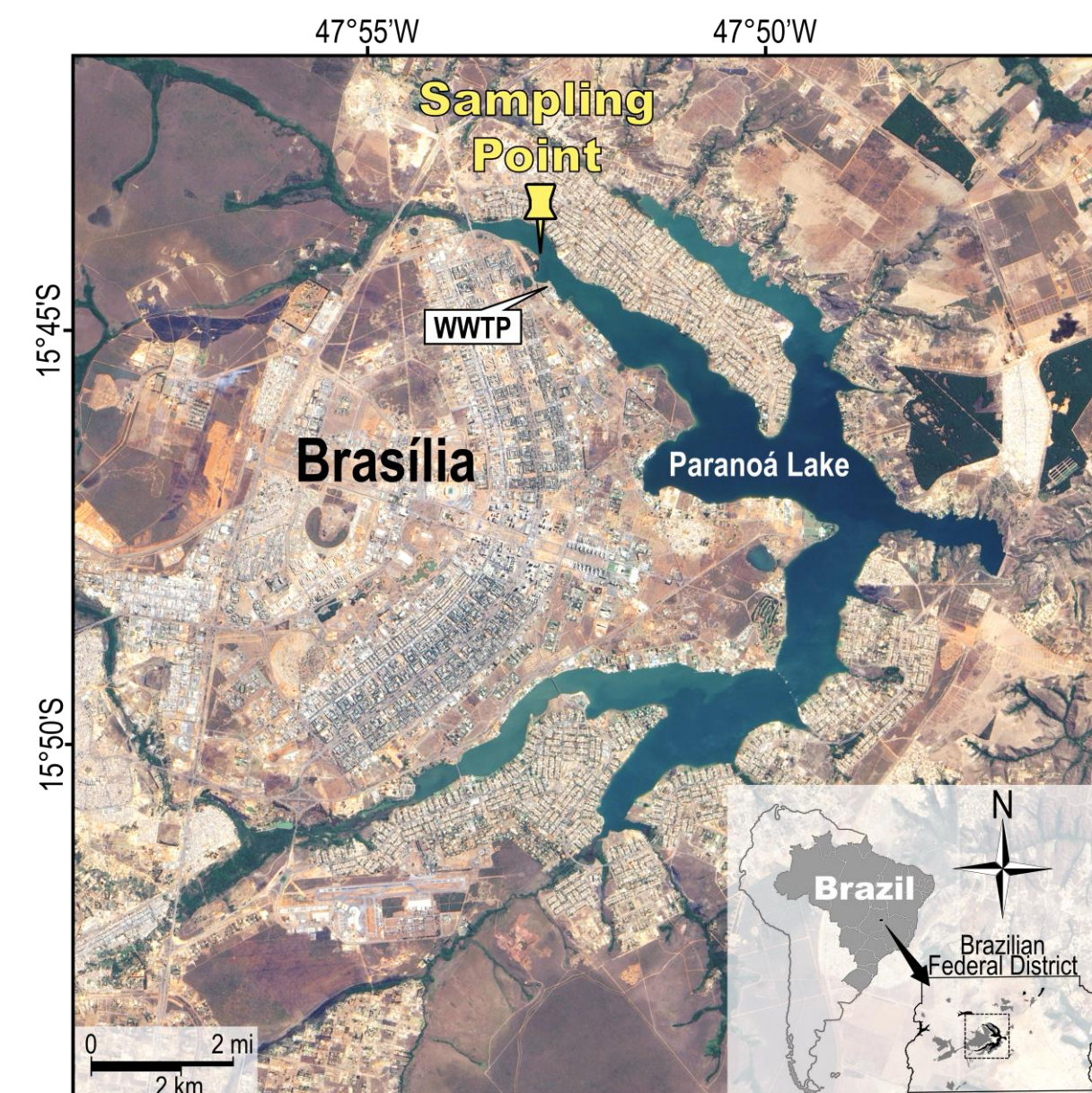
- Levels of contaminants of emerging concern (CECs) in waters are expected to vary seasonally
  - Usage pattern
  - Variation in flow and water availability
- Monitoring often carried out by grab sampling
  - Monthly
  - Longer intervals (different seasons)

### HYPOTHESIS

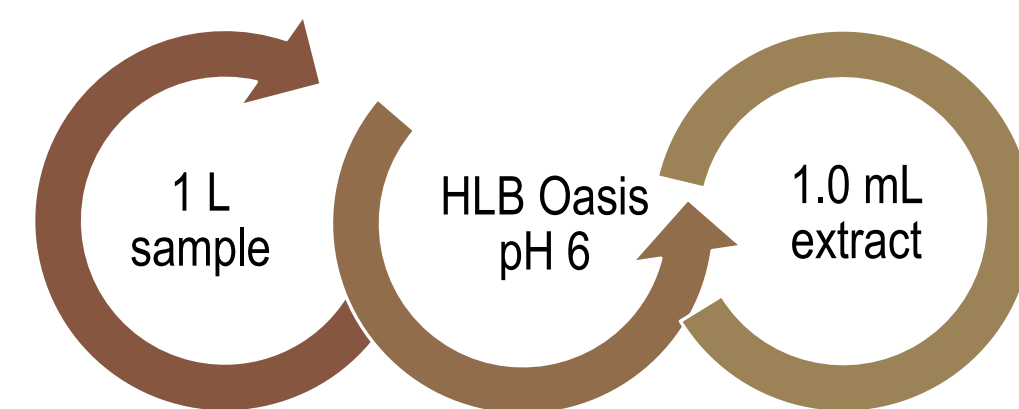
- Are monthly samplings reliable for investigating seasonality?
- In regions with well-defined seasons, will sampling at longer time intervals be enough?
- Can variations in CECs levels occur over shorter intervals?

### STRATEGY

- Sampling during 14 consecutive days
  - Dry winter
  - Rainy Summer
  - Same time of the day



- Analysis by SPE-LC-MS/MS

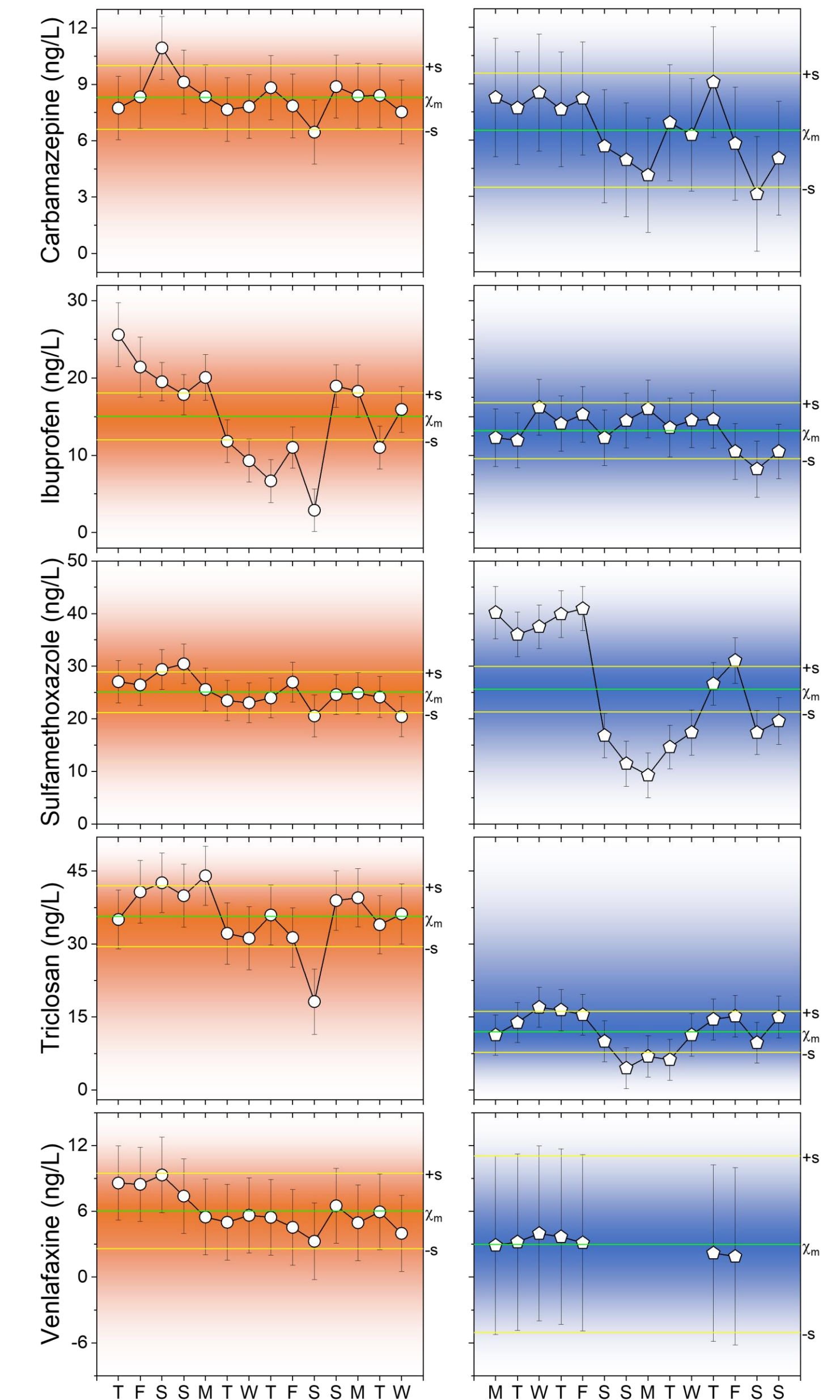
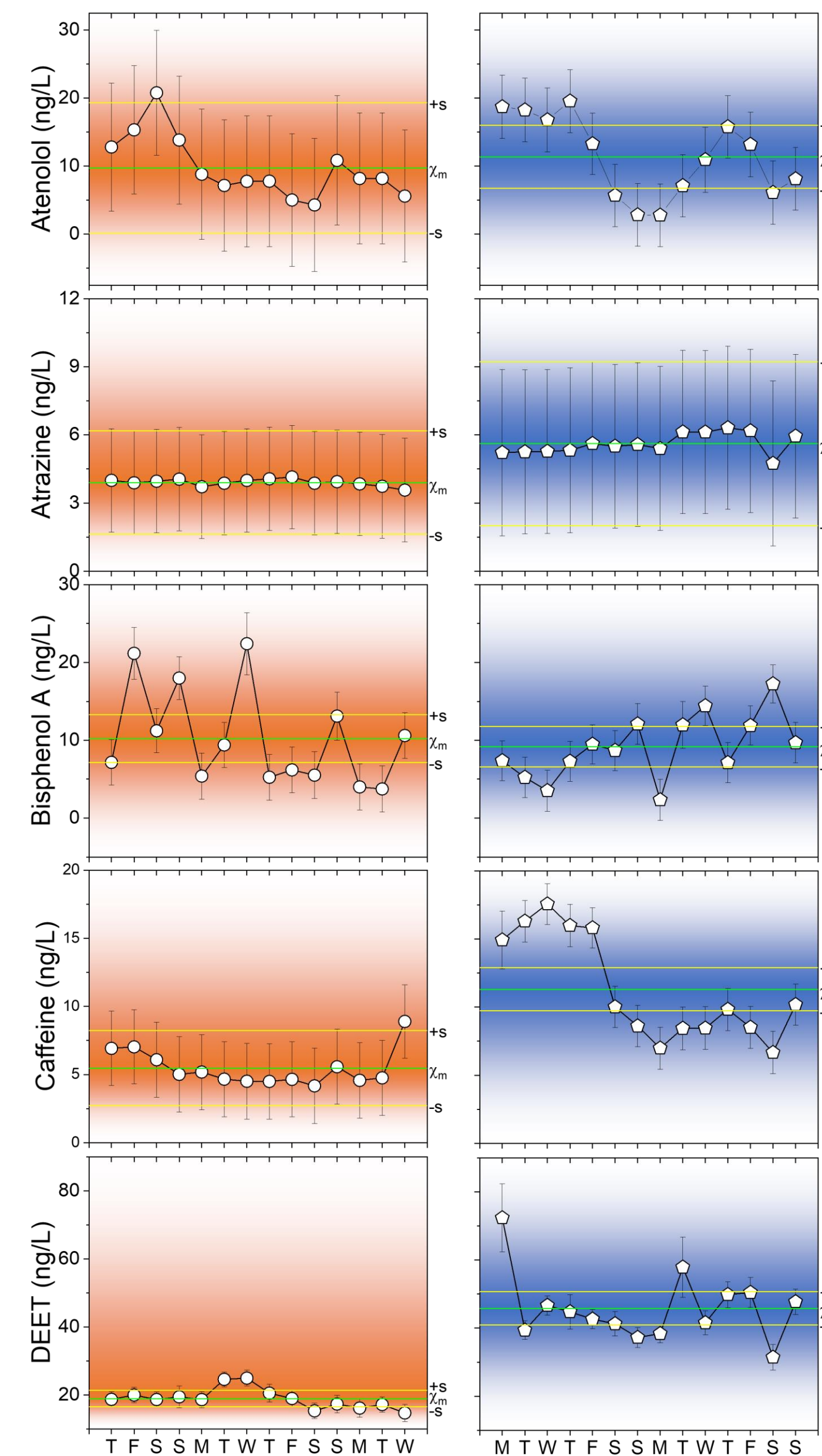


- Atenolol, atrazine, bisphenol A, caffeine, carbamazepine, ibuprofen, DEET, sulfamethoxazole, triclosan, and venlafaxine
  - LOD, 0.75 – 1.5 ng/L
  - Recovery, 35 – 87%
  - Matrix effects, 55 – 115%

### RESULTS

#### Dry Winter

#### Rainy Summer



### CONCLUSIONS

- Possible seasonal behavior for CAF, DEET, and TCS
- Wrong conclusions depending on the sampling date
  - e.g. ATN, CAF, SMX, TCS,
- Alternative: composite samples, passive samplers (POCIS, DGT...), sampling at different time scales