



It's a match: increasing understanding of dissolved organic matter processing of Tibetan catchments by combining optical spectroscopy and ultrahigh-resolution mass spectrometry

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The Nam Co watershed



Lake area: 1962 km²

Depth: 99 m

Endorheic

Currently

Higher yak stocking numbers

Jing et al. (2022)

wetter (lake level rises / glacial wastage)

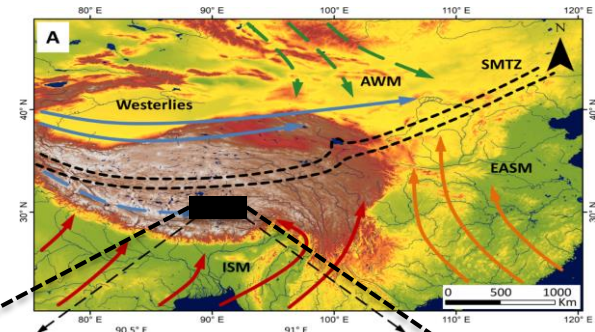
warmer (+ 1°C 60yrs⁻¹)

→ Greening

Zhang et al. (2013)

Knowledge gap:

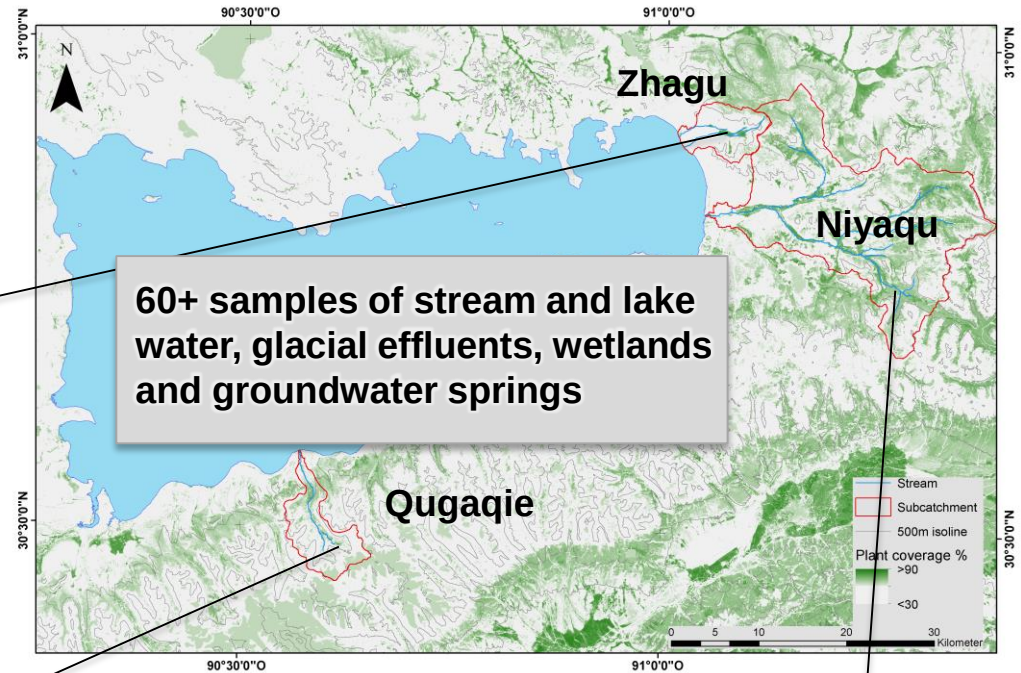
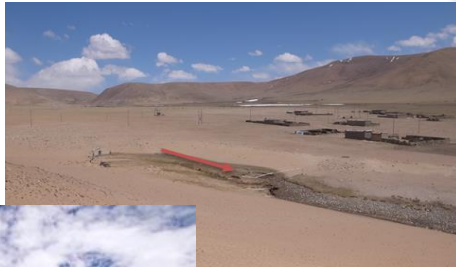
How do these climatic and land-use
changes influence characteristics of
DOM Anslan et al. (2020)



Wünnemann et al. (2018)

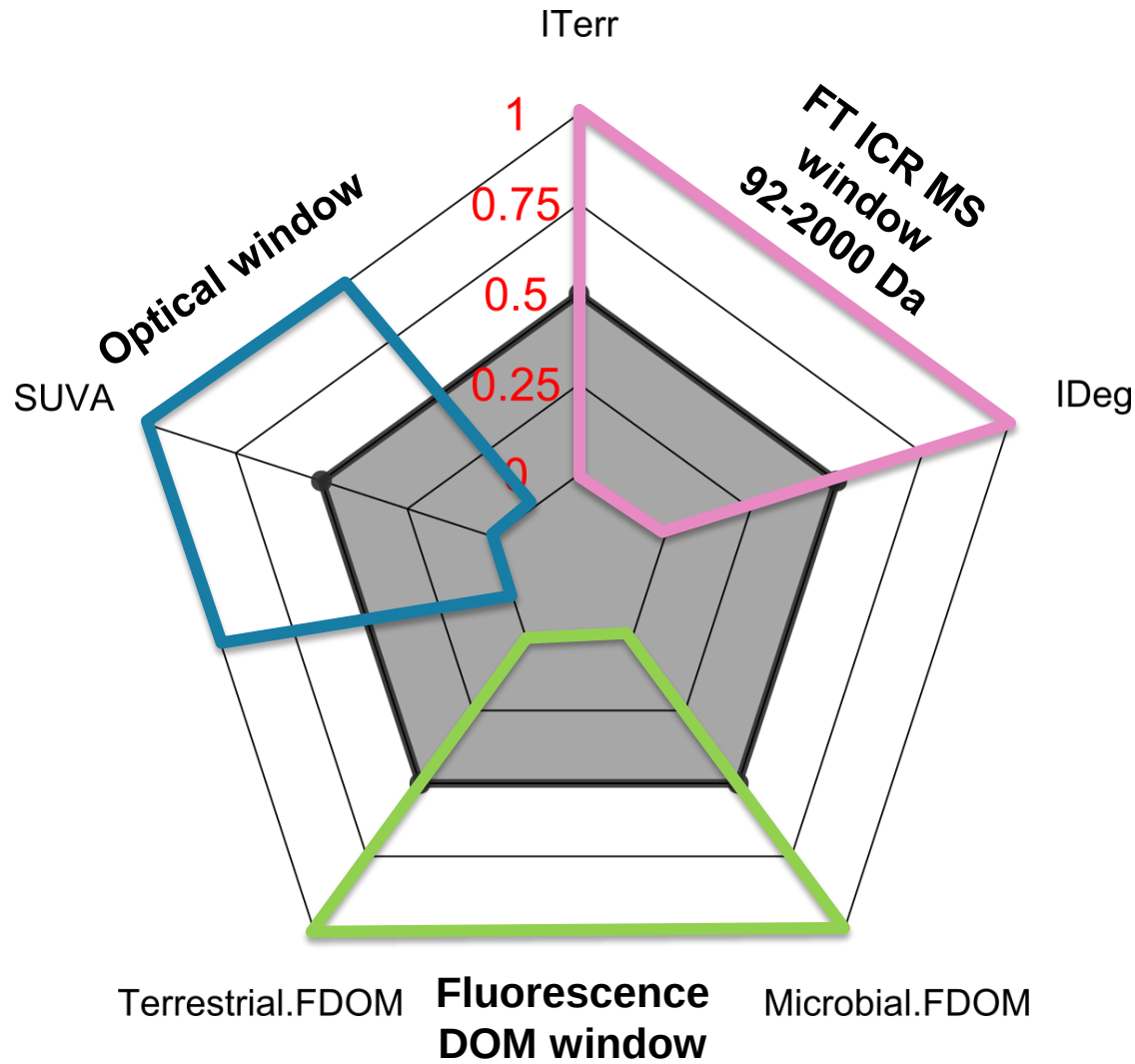


Subcatchments geographical outline



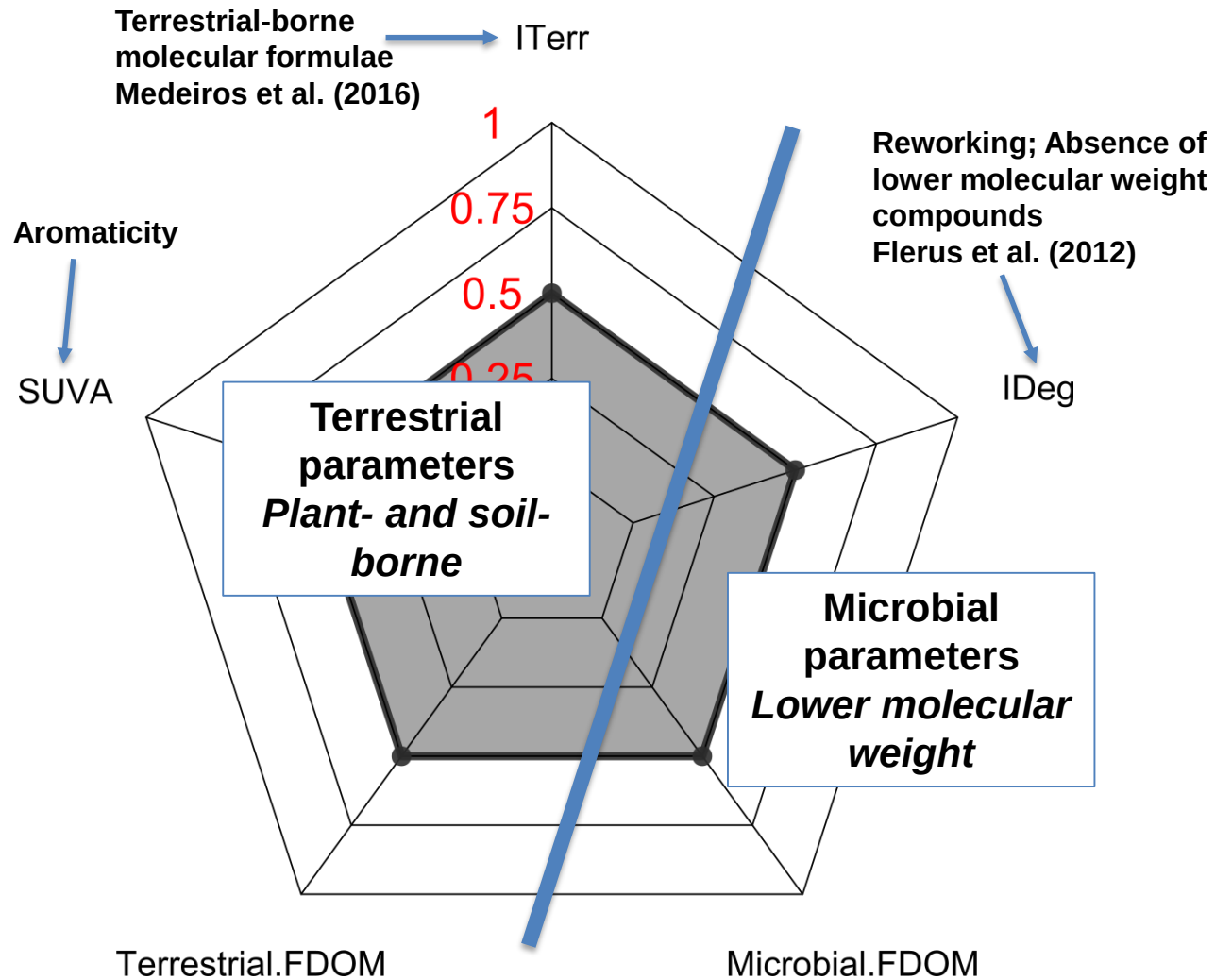
Plant cover estimates (Maurischat et al. 2022, under review)

Composition wheels



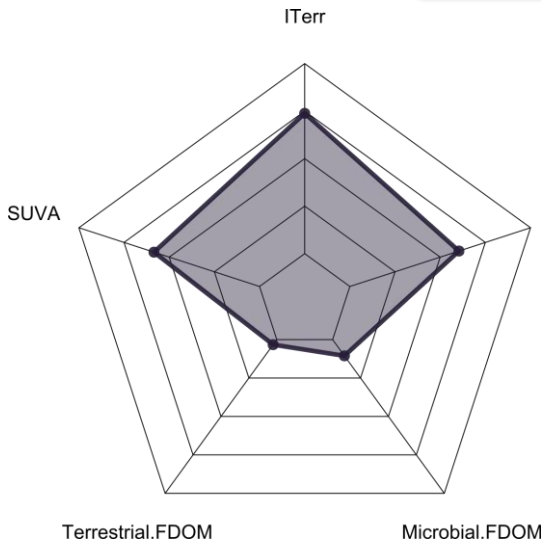
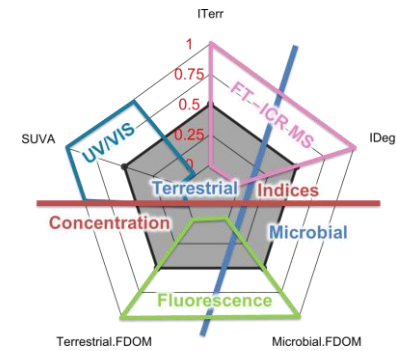
- Constraints: FT ICR MS and spectroscopy are not always looking at the same DOM pools through size exclusion
Hawkes et al. (2019)

Composition wheels



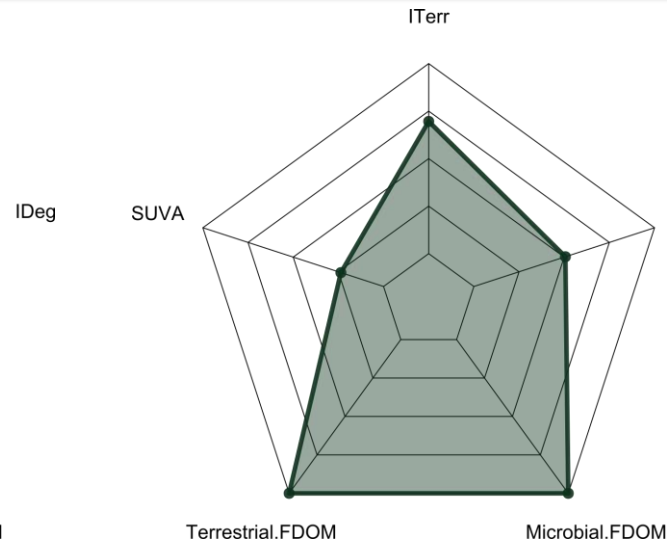
Endmember DOM characteristics

Take-Home 1/2:
Endmember DOM characteristics are highly variable and can be estimated along an aridity-degradation gradient



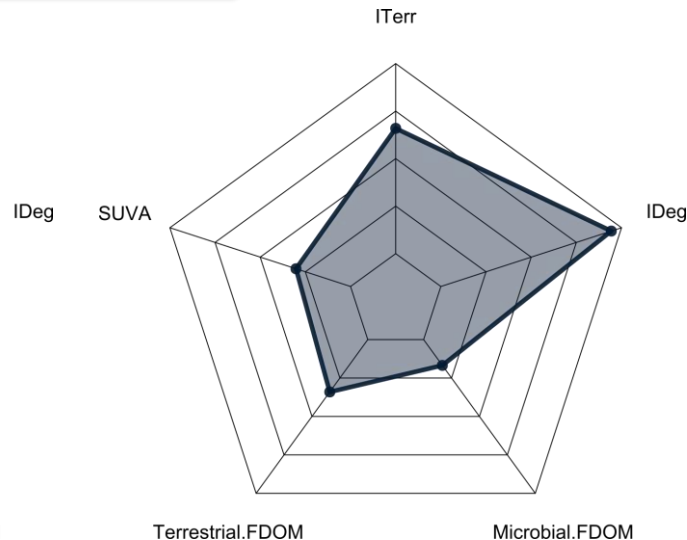
Glacial effluents

- Matching indication of aromatic / terrestrial compounds
- Limited release of FDOM, mostly of microbial origin



Wetlands

- High terrestrial and microbial FDOM
- Terrigenous molecular formulae



Springs of degraded pastures

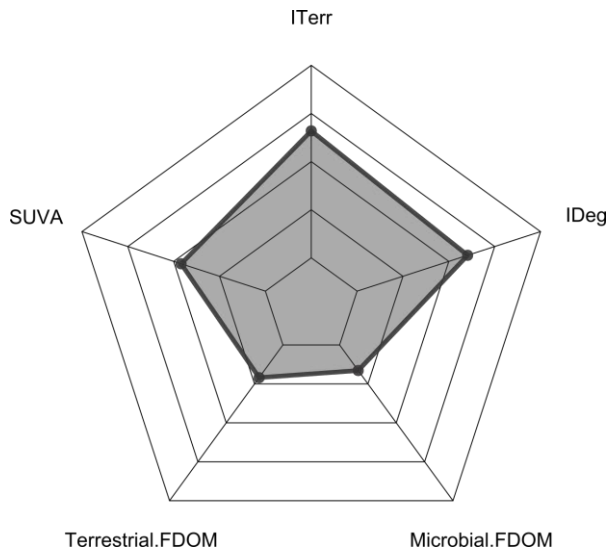
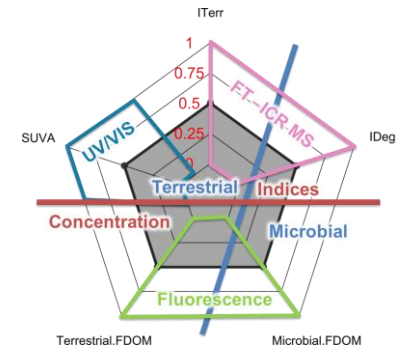
- Strongly degraded DOM of terrestrial origin



DOM characteristics along fluvial domains

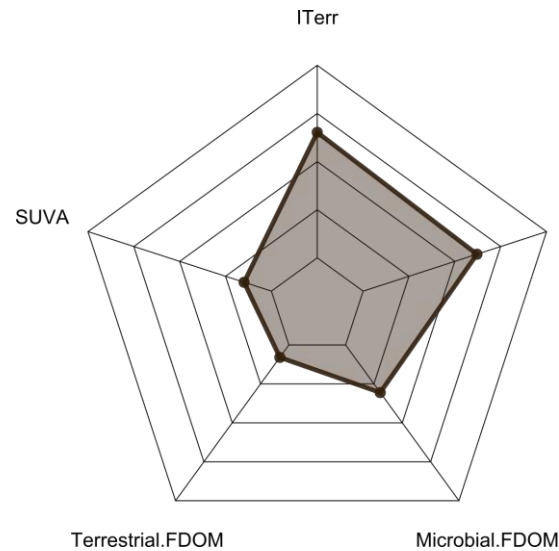
FLOW

Take-Home 2/2: Processing of DOM diminishes the terrestrial catchment signature and mostly takes place in the brackish zone and the lake



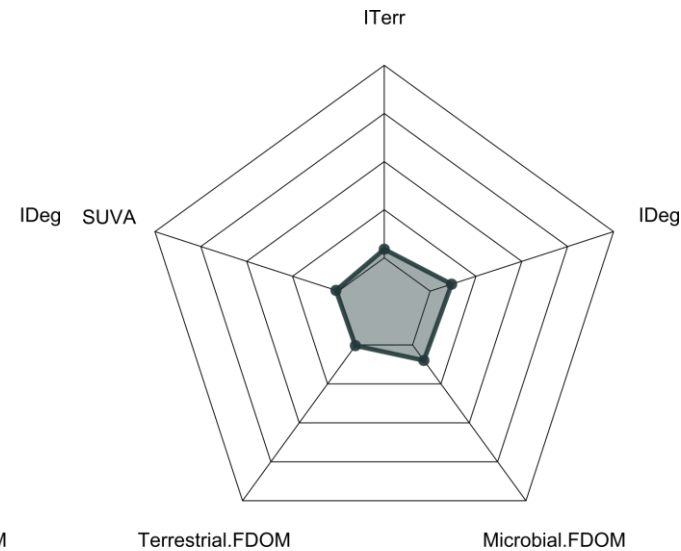
Stream water

- Mostly of terrestrial material with moderate FDOM contributions



Brackish water

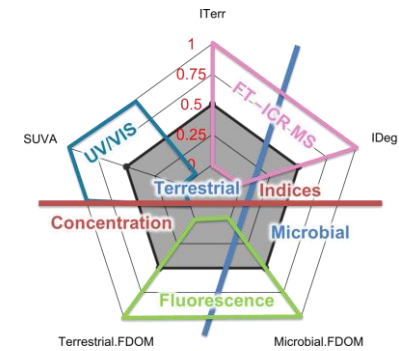
- Dilution, intermixing and microbial hotspot
- Loss of terrestrial markers



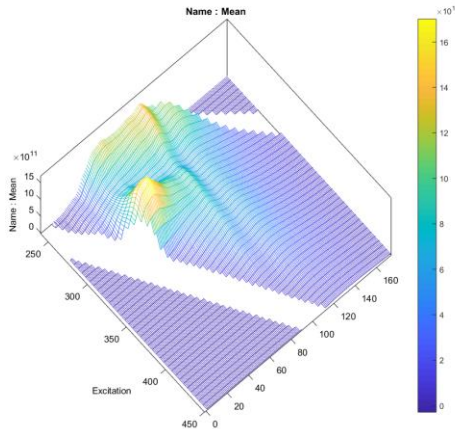
Lake water

- Terrestrial signatures vanished (photooxidation)
- Production of labile OM; IDeg / microbial FDOM

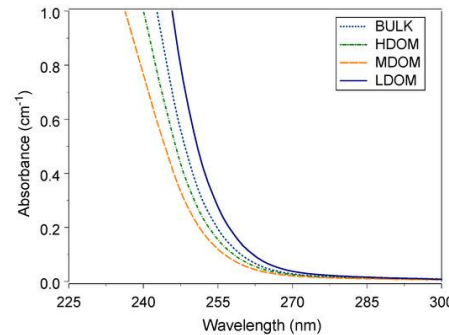
Different analytical windows' indicators match



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Chuang et al. (2021)

- Compared indicators yield matching results
- Differences in analytical depth and width are an **asset**
- Allow to draw further / refined conclusions and help understanding complex aquatic interactions

Thank you!



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