

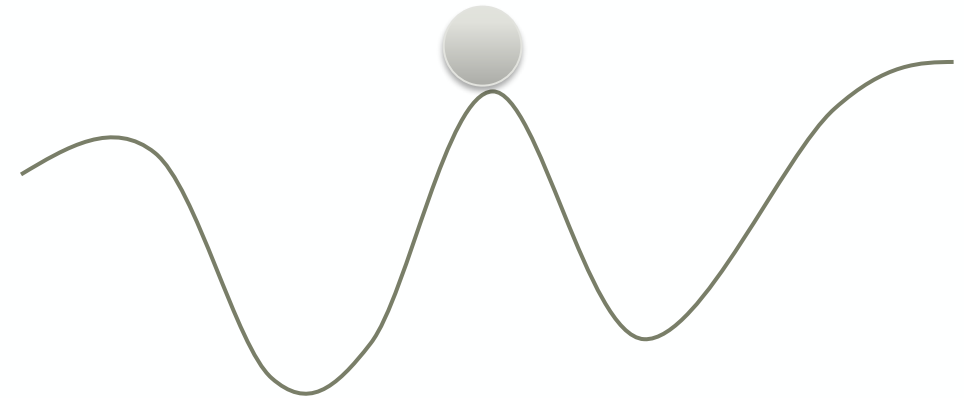
RESEARCH FELLOWS

CLIMATE CHANGE INITIATIVE MID-TERM REVIEW

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-LakeCREST- Climate change Related Ecosystem Shifts in Lakes



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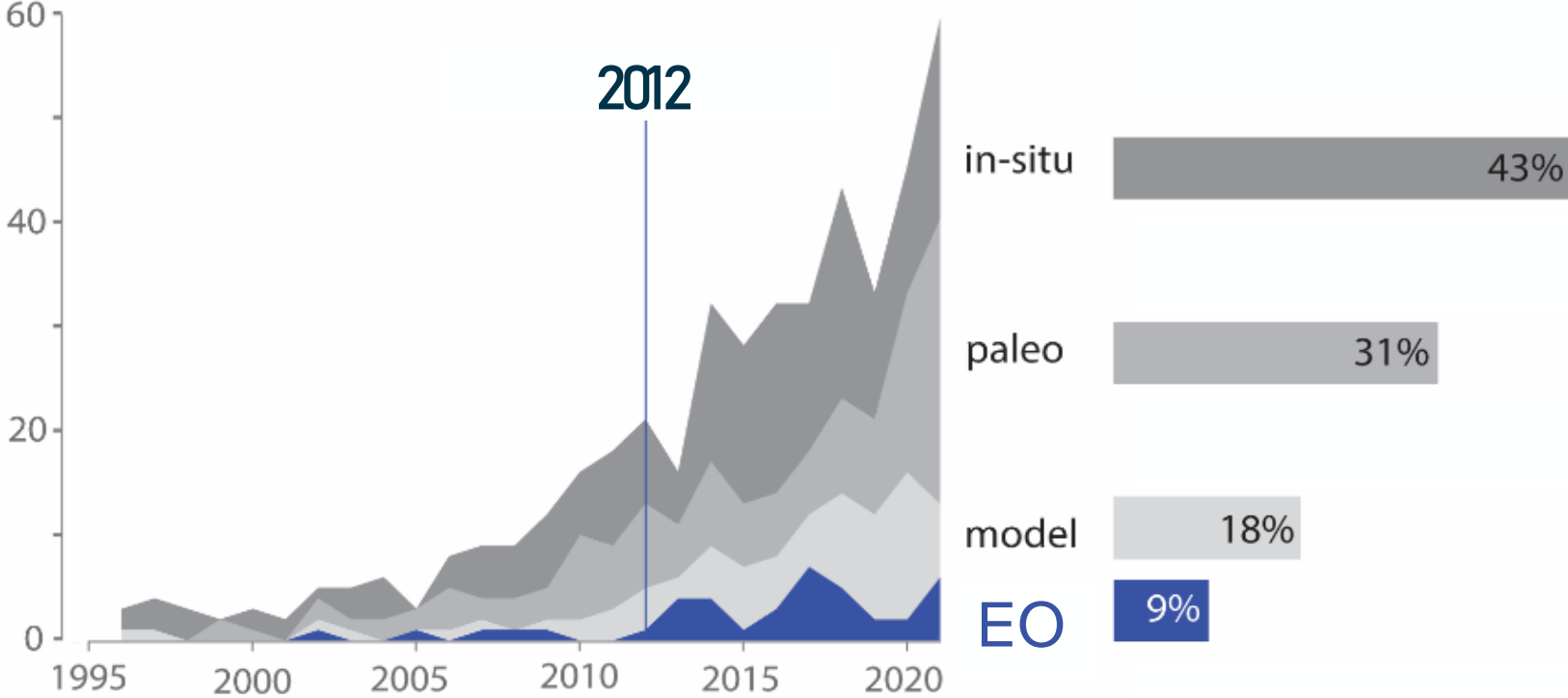
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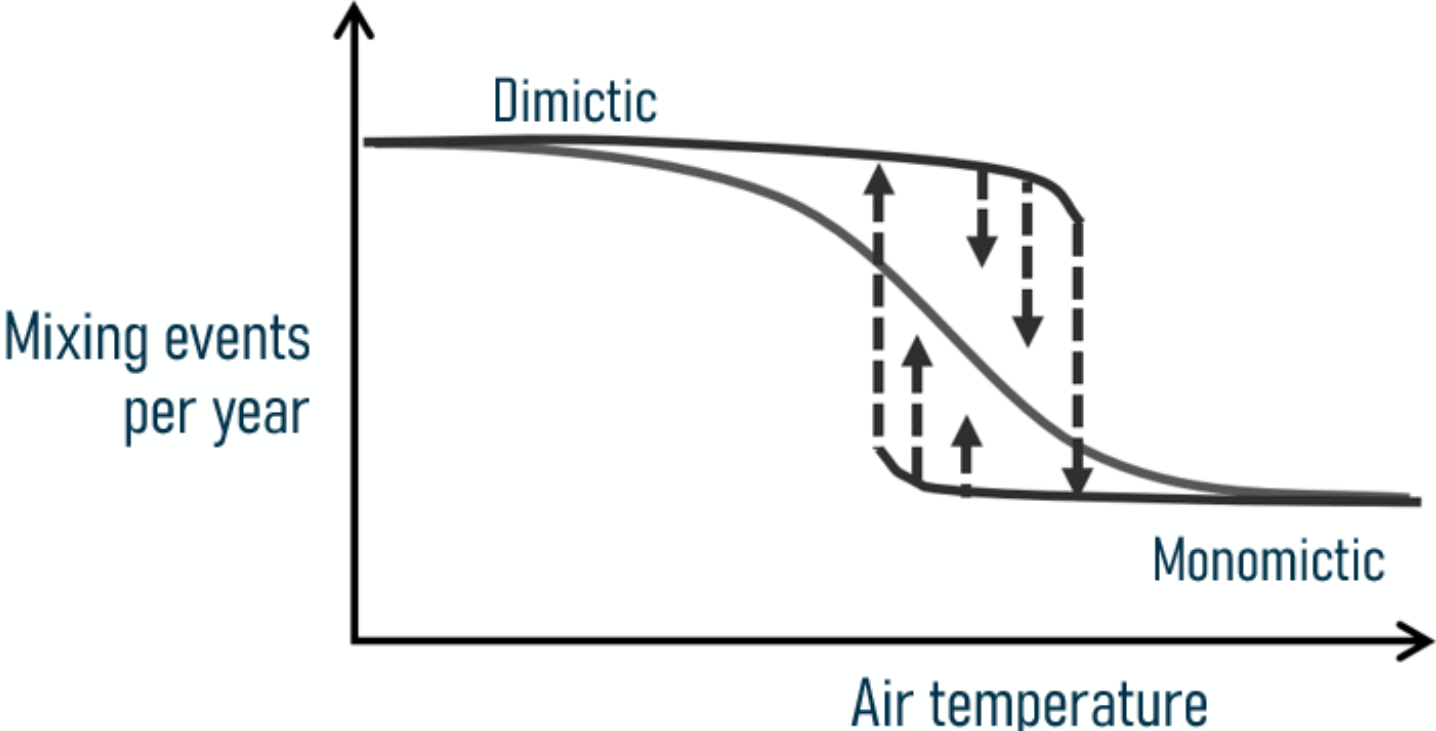
Can we detect lake shifts from Earth Observations?

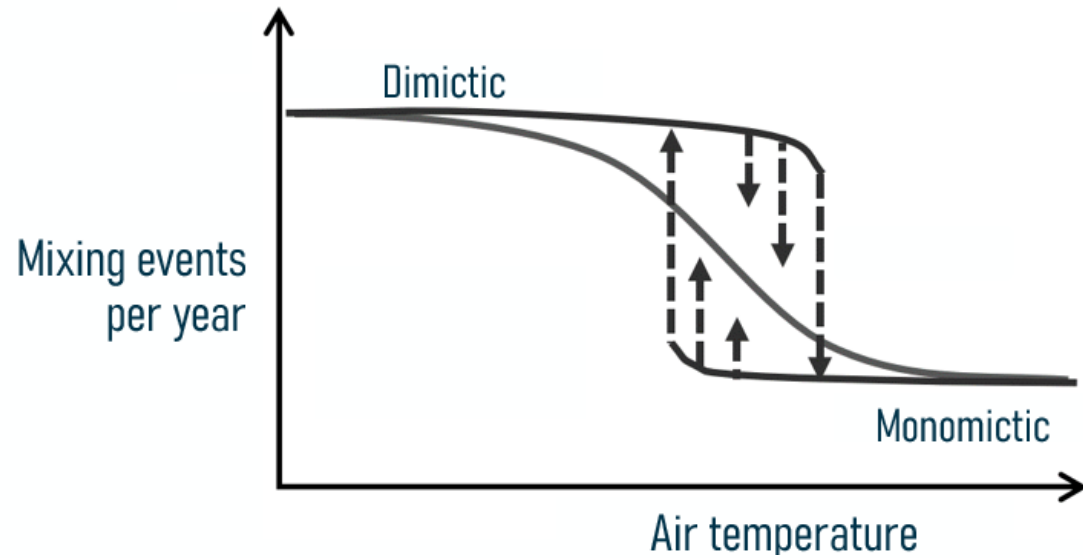


449 studies about climate related shifts in lakes



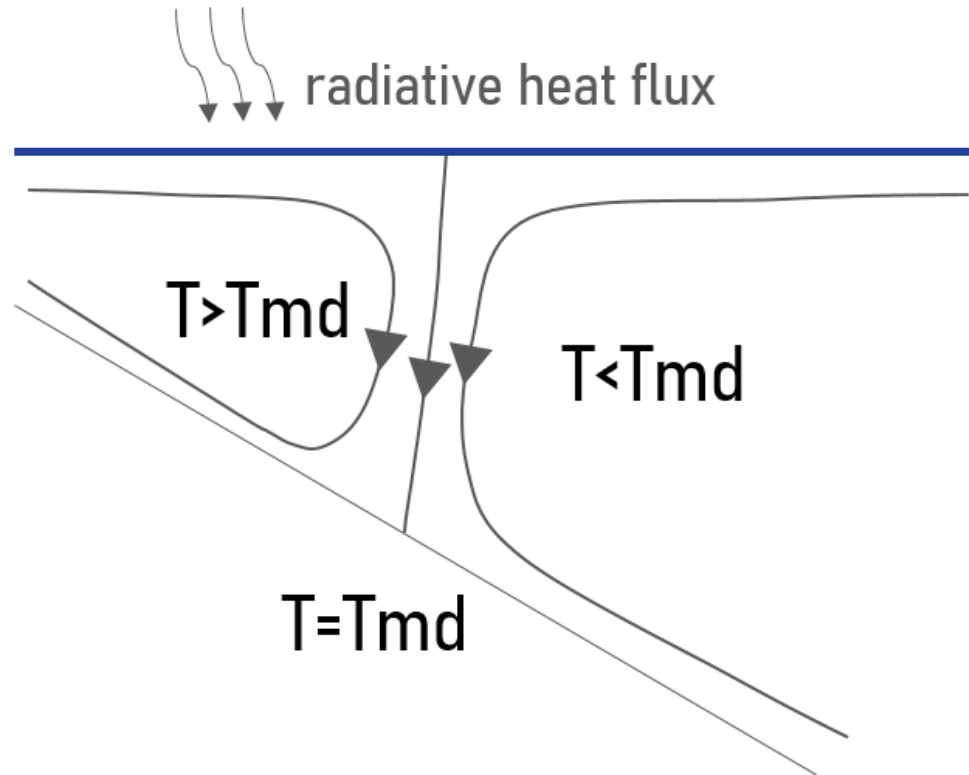
[Calamita et al., Limn. Ocean. 2024]





- Over 2000 lakes:
 - lake water level
 - lake water extent
 - lake surface water temperature
 - lake ice cover
 - lake water-leaving reflectance
- Temporal resolution: daily, 1992-2022
- Spatial resolution of 1/120 degrees (near 1 km at the equator)





“ The thermal bar is a downwelling plume of fresh water at the local temperature of maximum density (T_{md}) ”

[Holland & Kay, 2003]

LakeCREST Project – Elisa Calamita (Eawag, CH)



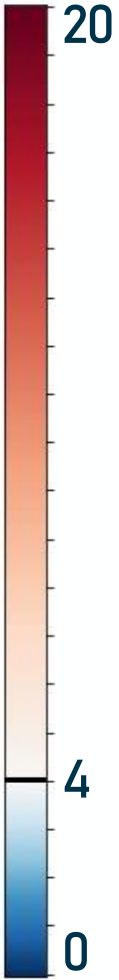
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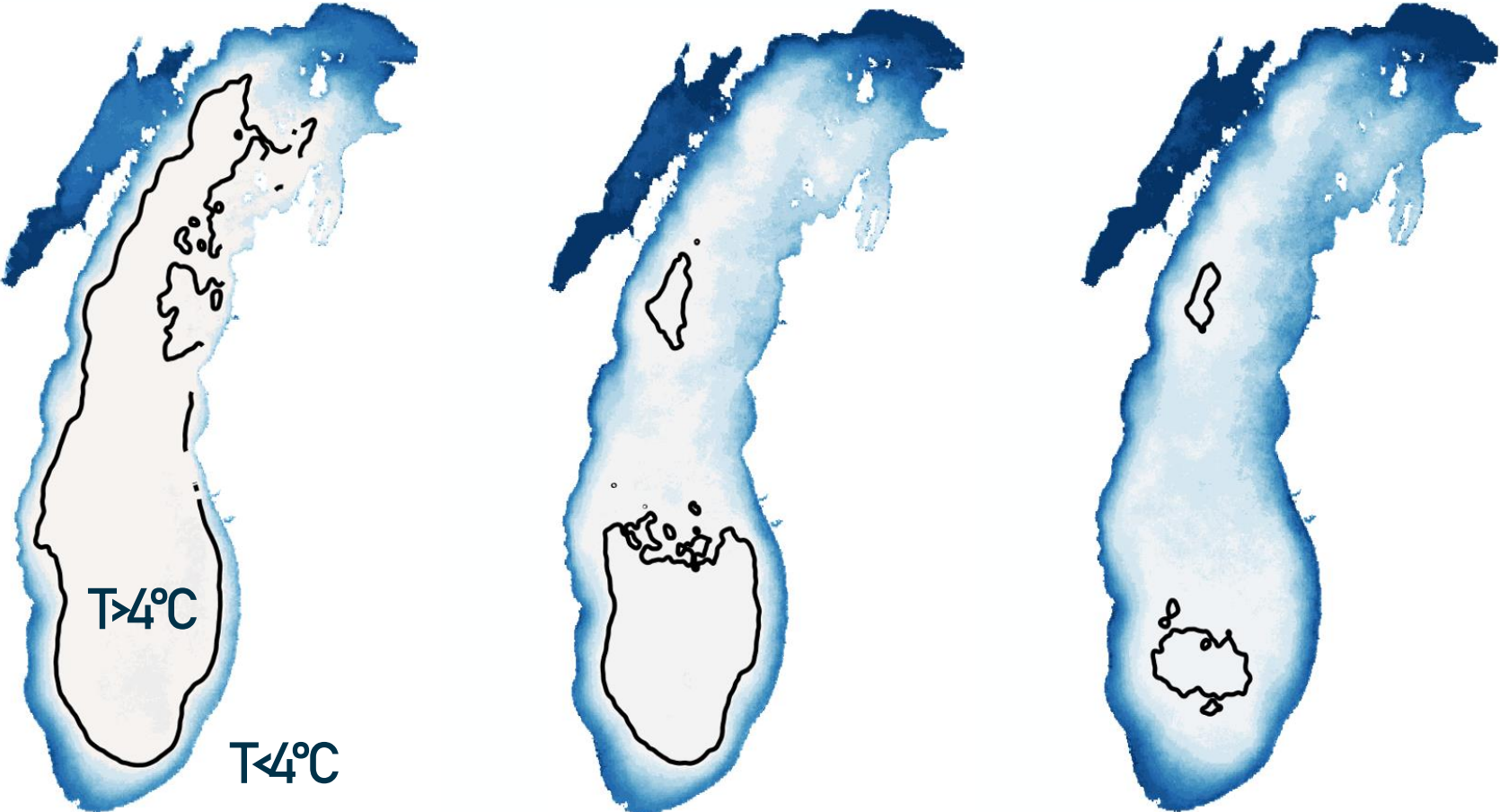


T (°C)

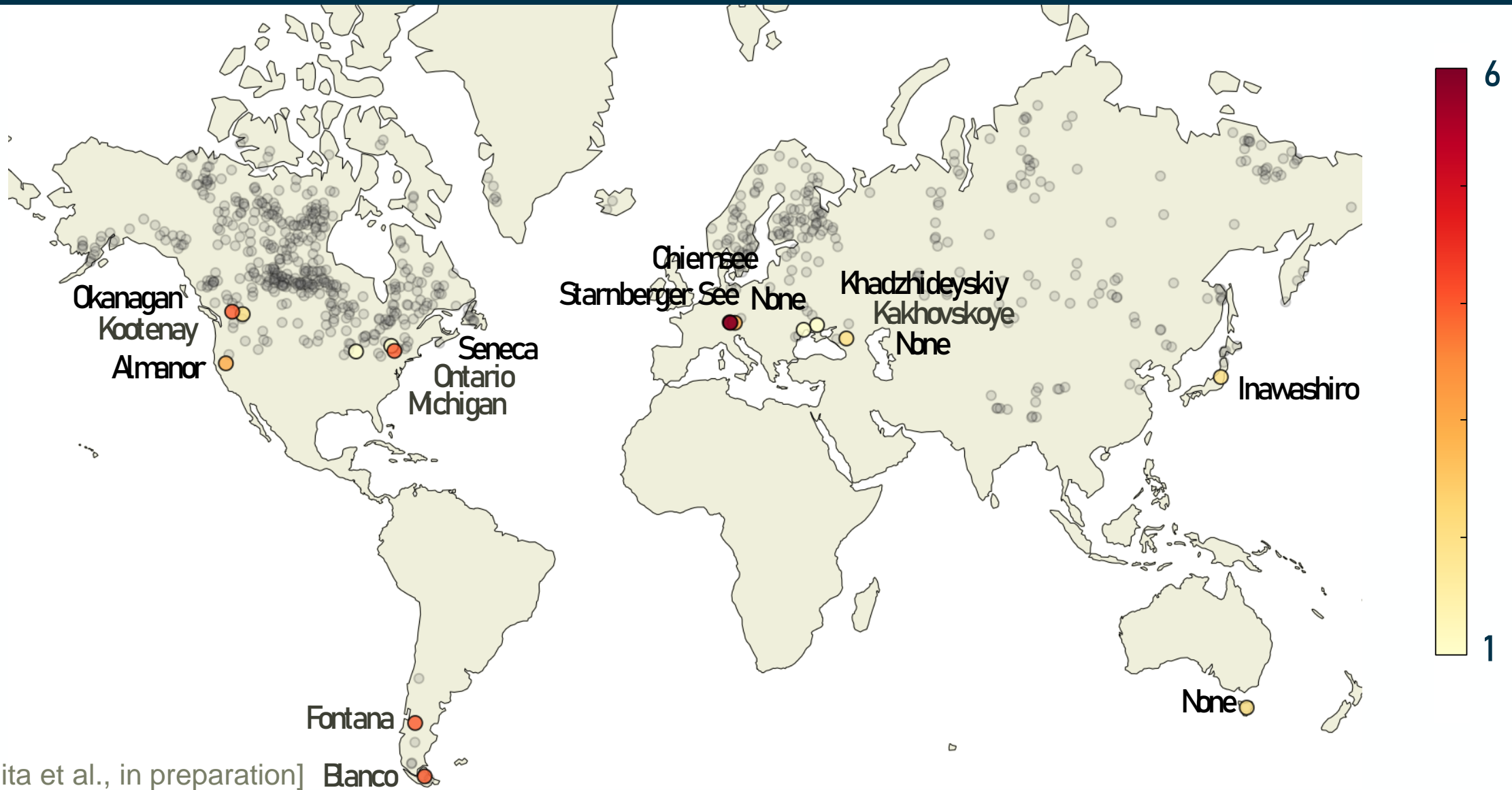


Thermal bar

fall overturning



Mixing Anomalies



[Calamita et al., in preparation]



Take home messages

- Satellite Earth Observation can be used to monitor **mixing anomalies** occurring in dimictic lakes worldwide.
- Satellite Earth Observation reveal which lakes are more prone to undergo a **mixing regime shift** in the future.
- Satellite Earth Observation can be useful to develop **early warning systems** for lake mixing regime shifts.

More to come...**RESETlakes** Project starting soon!

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Thank you!

Michael Brechbühler
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Jelle Lever
Laura Carrea
Daniel Odermatt

