

Satellite remote sensing for improving the WaterNSW Integrated Water Quality Model

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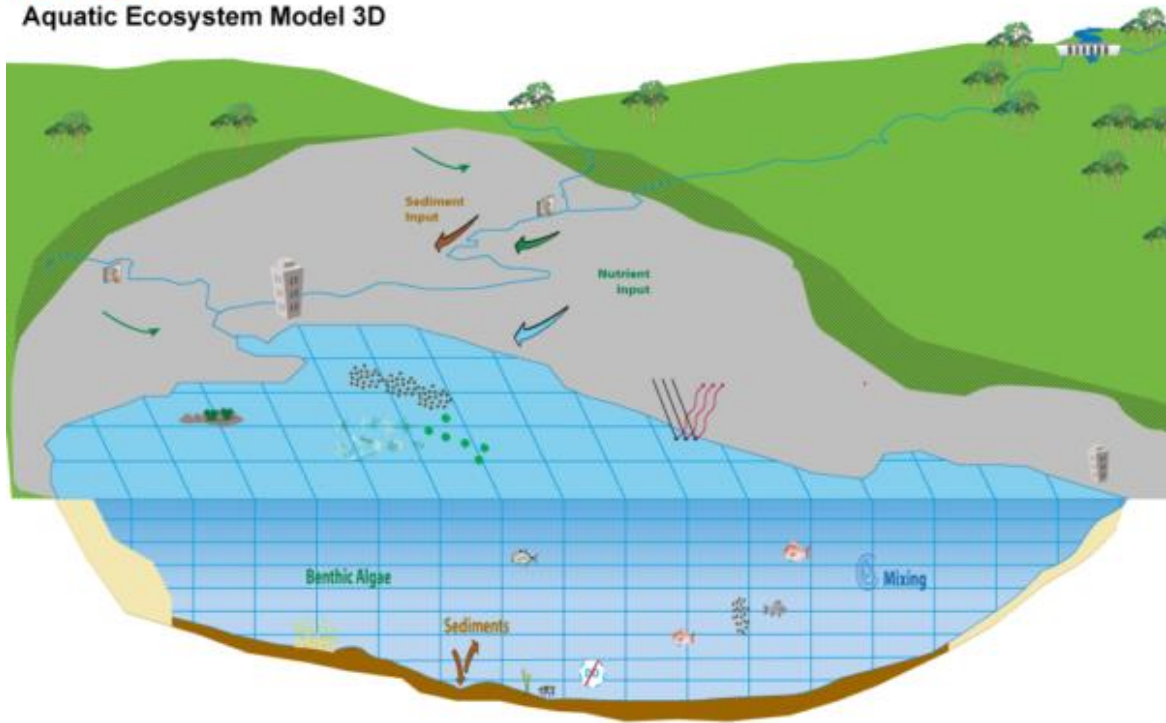


Can remote sensing help us create better models?

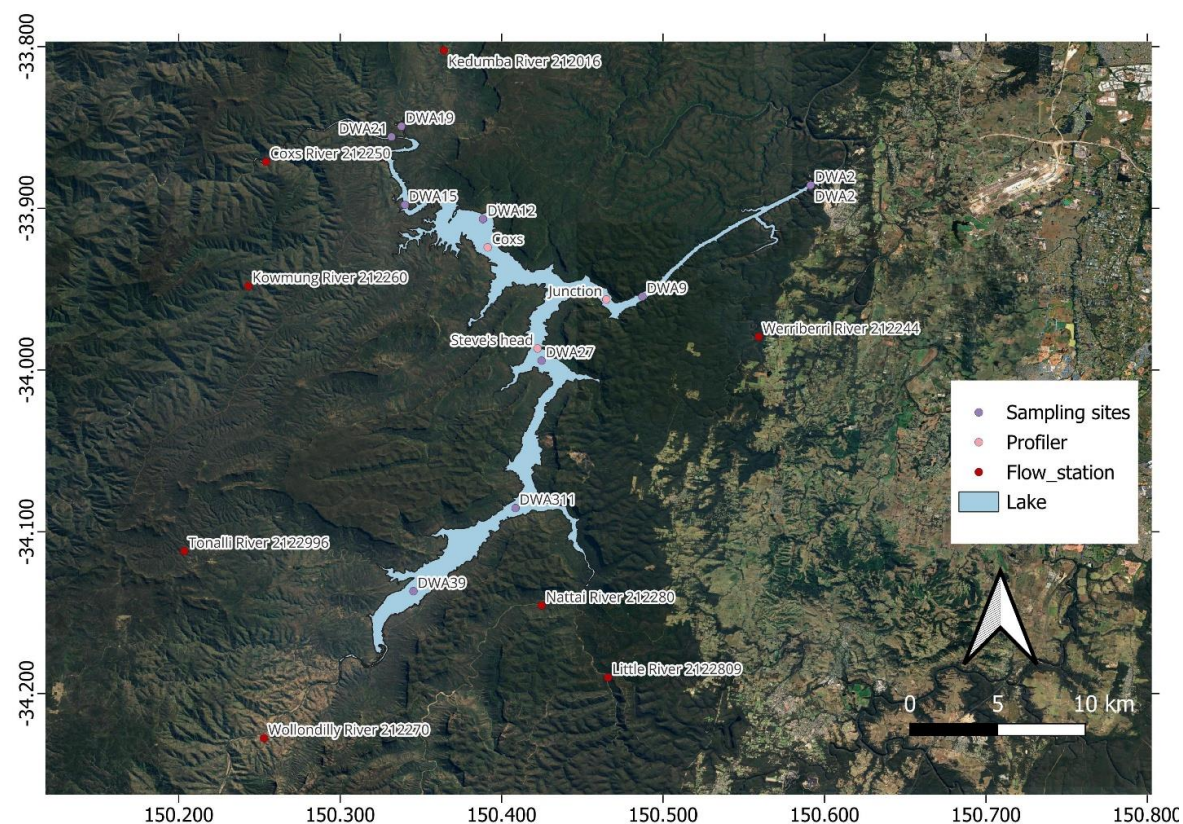
- We generally only have limited field data (in time and space)
- Remotely sensed data is freely available with good spatial coverage and increasing temporal coverage
- Can this data be used to help calibrate physically based water models?

WaterNSW Integrated Water Quality Model

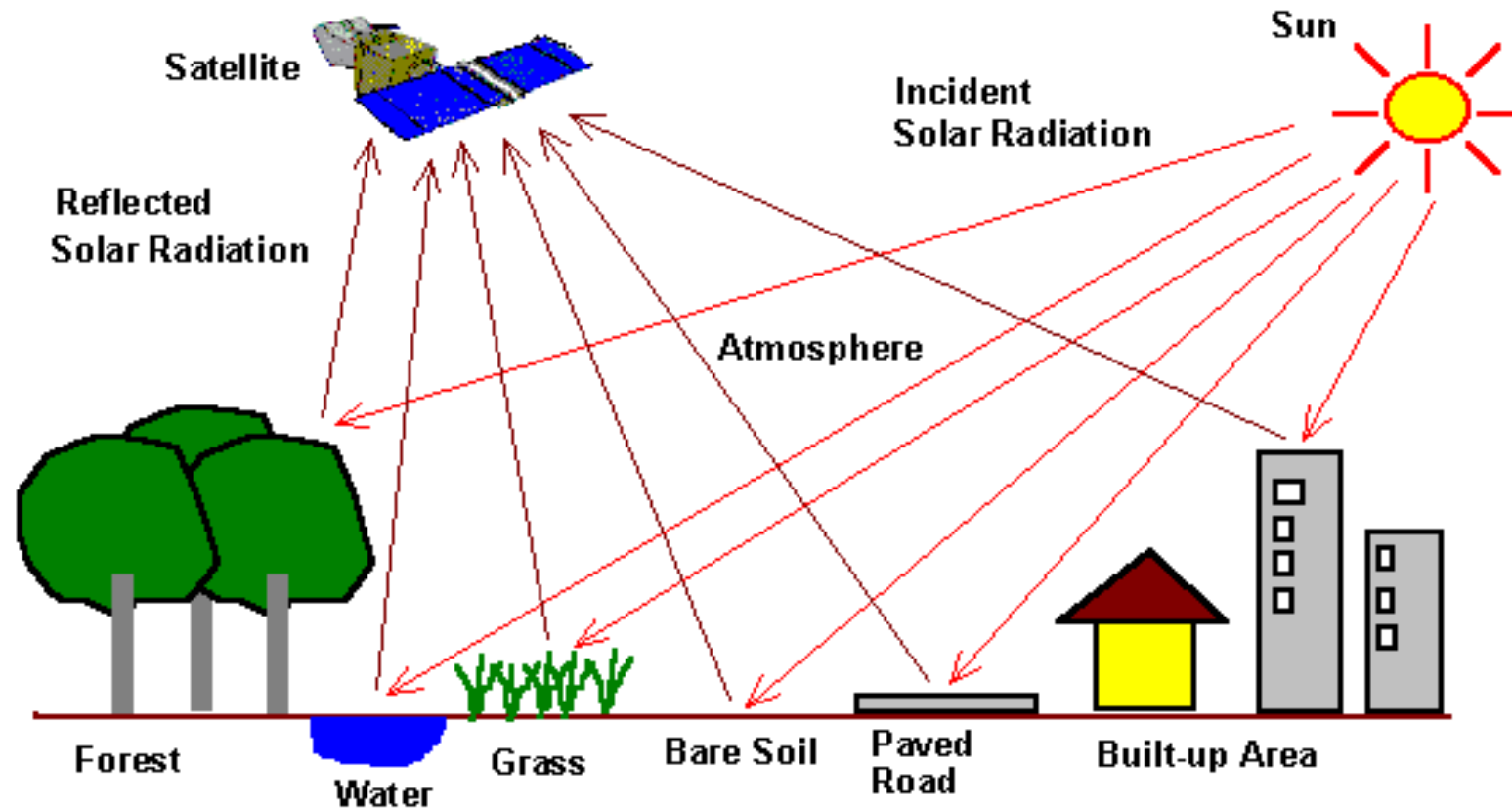
AEM3D
Aquatic Ecosystem Model 3D



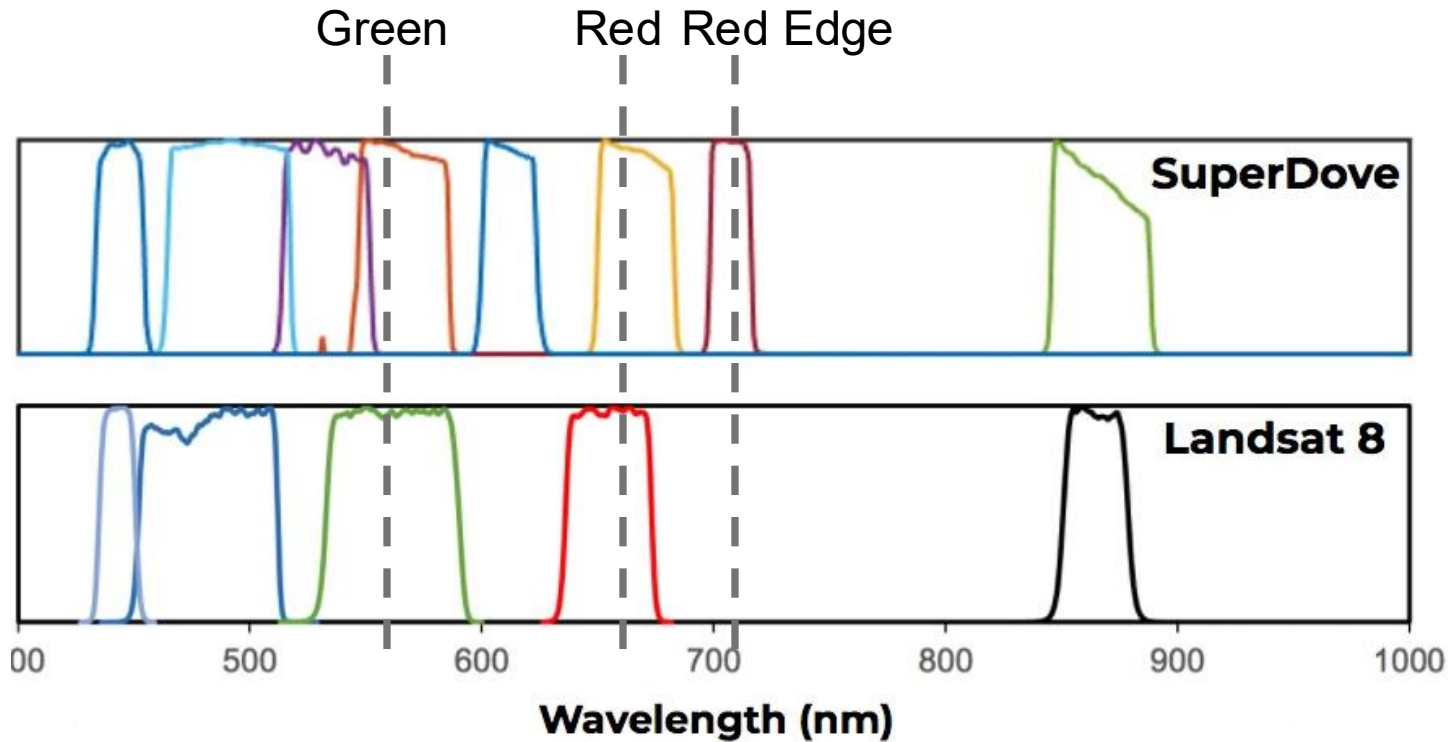
Symbols courtesy of the Integration and Application Network, University of Maryland Center for Environmental Science (ian.cannon@umces.edu)



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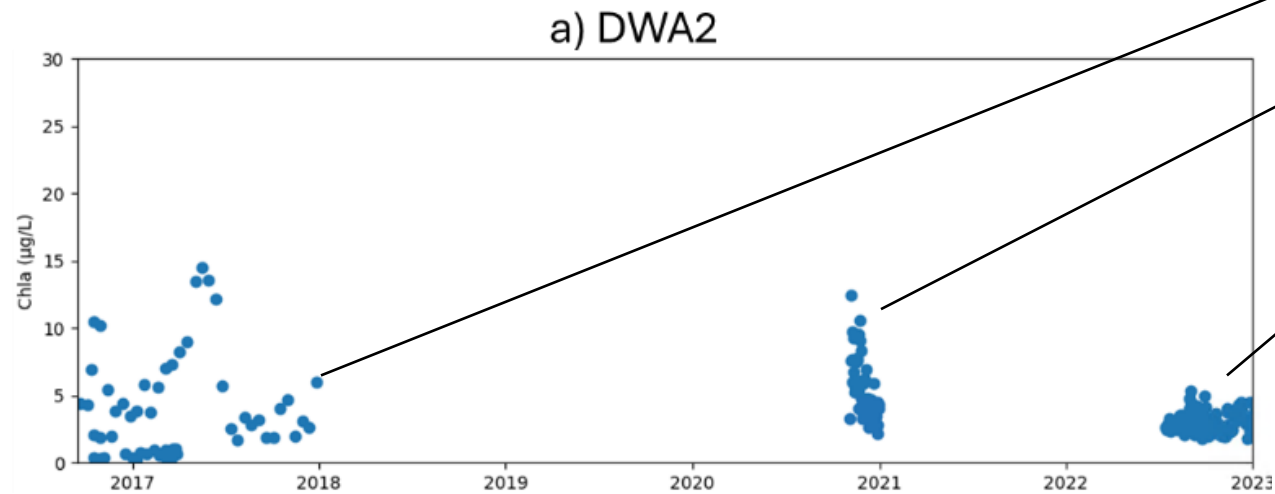
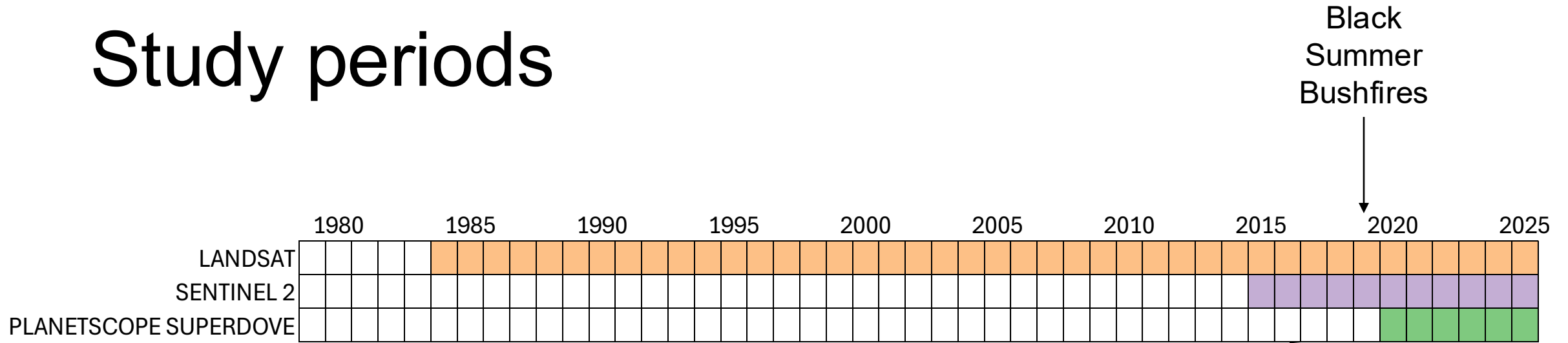
Using remotely sensed data



$$NDCI = \frac{RedEdge - Red}{RedEdge + Red}$$

$$Red/Green = \frac{Red}{Green}$$

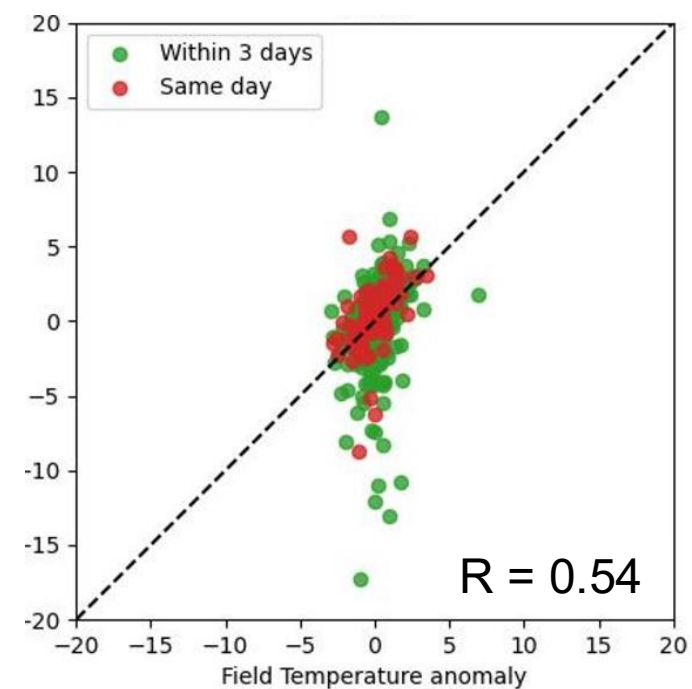
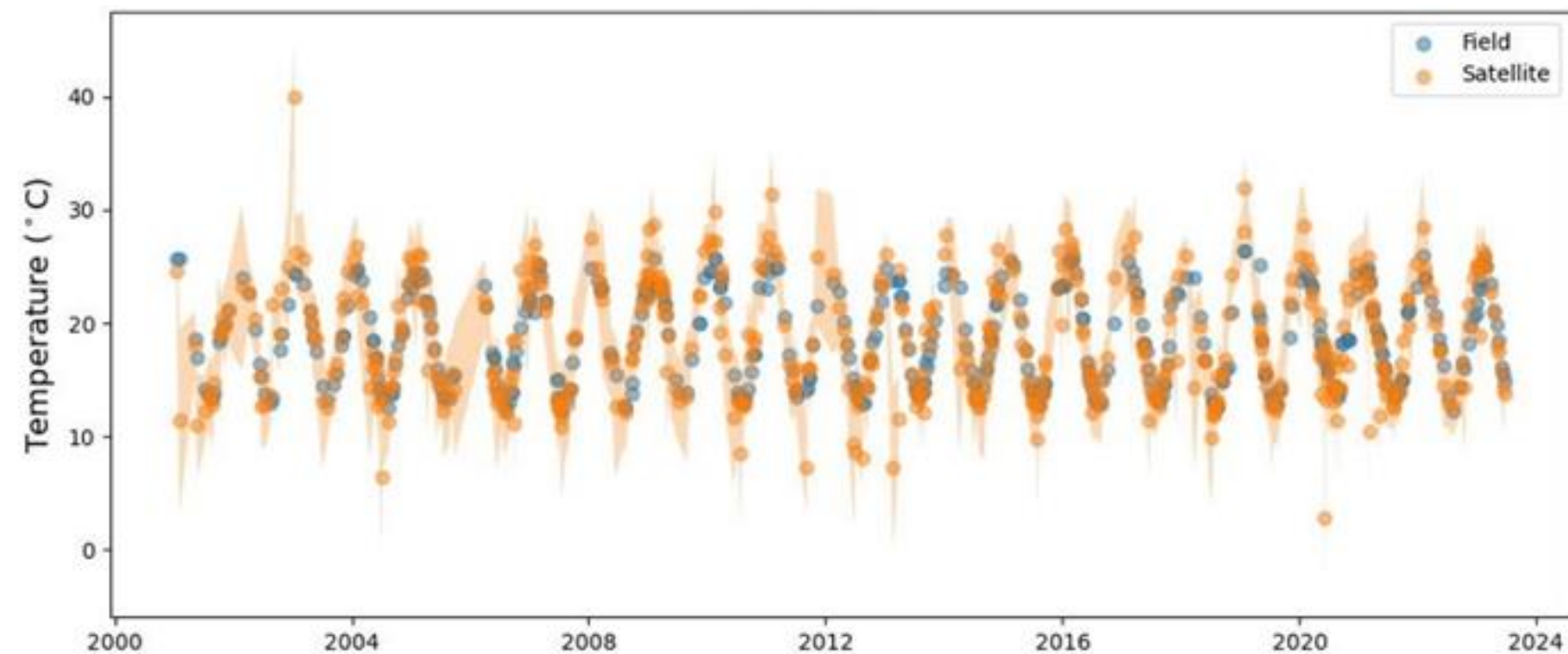
Study periods



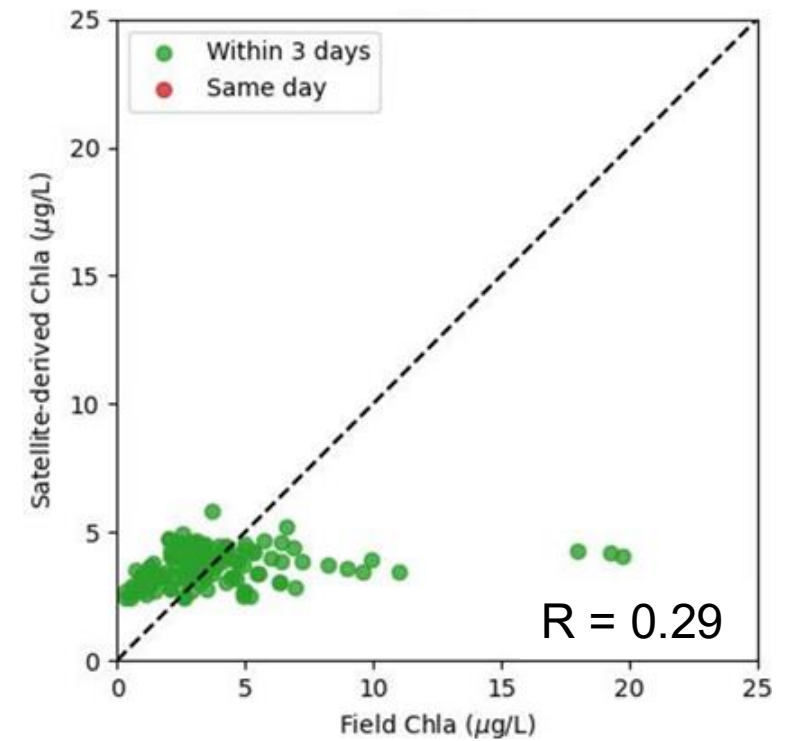
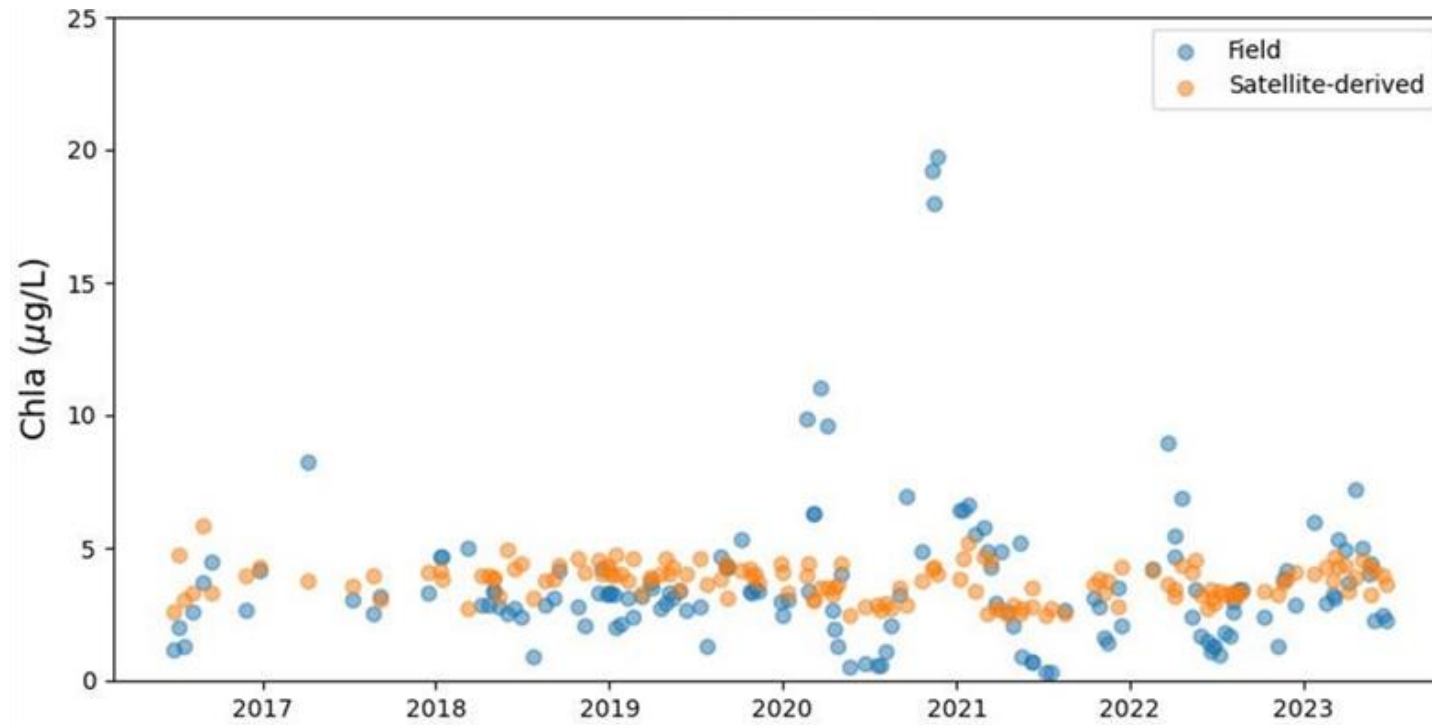
Study scope

- Compare remotely sensed data to in situ data
- Compare both to AEM3D simulations
- Improve AEM3D simulations?
- Are UAVs useful for algal monitoring?

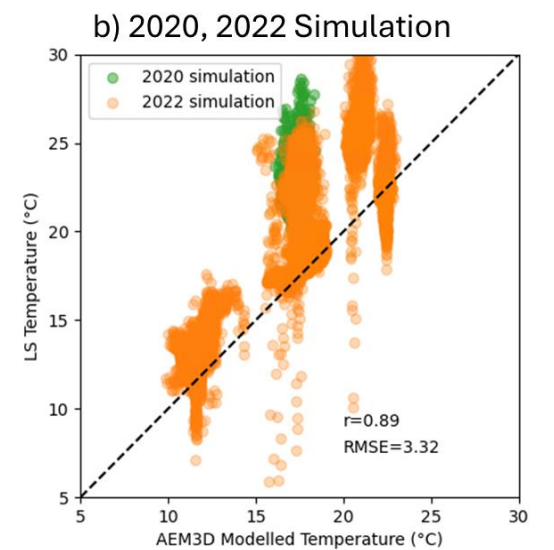
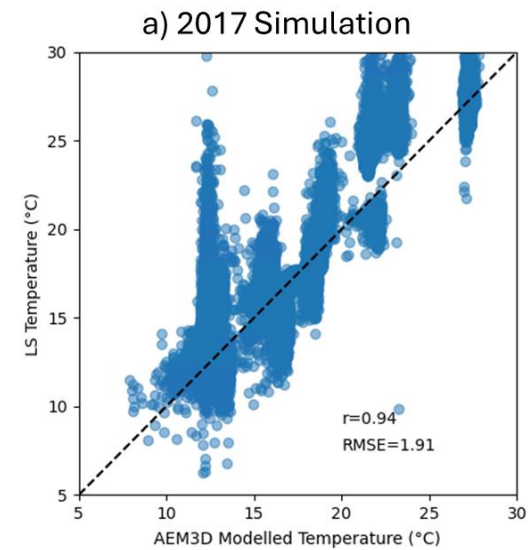
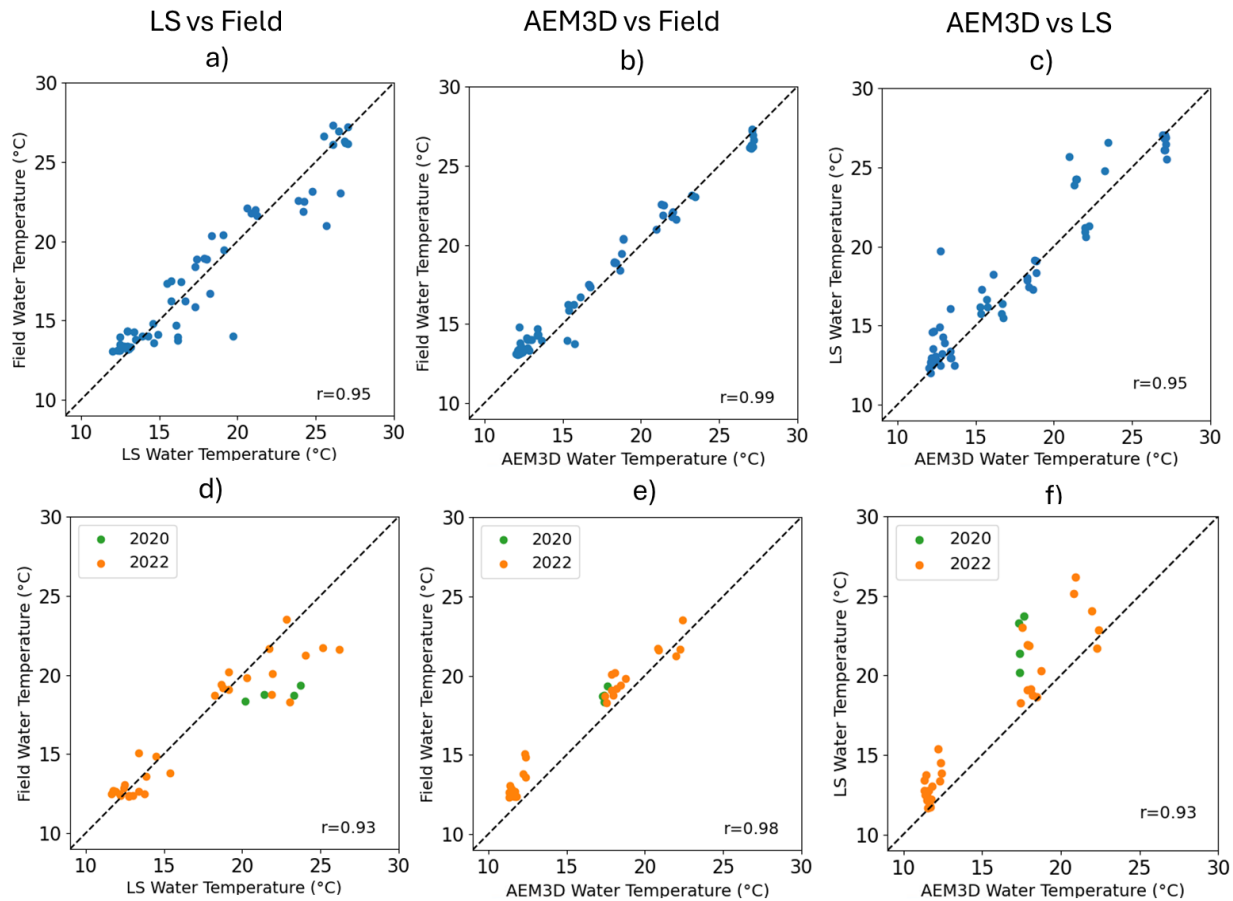
Lake surface temperatures



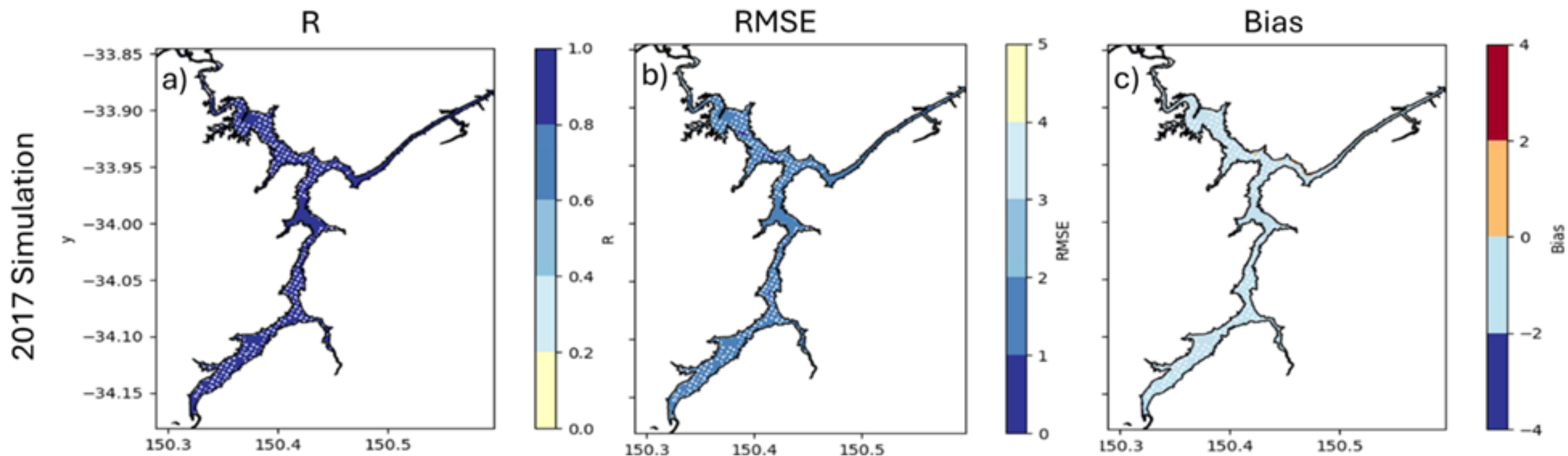
Chlorophyll-a



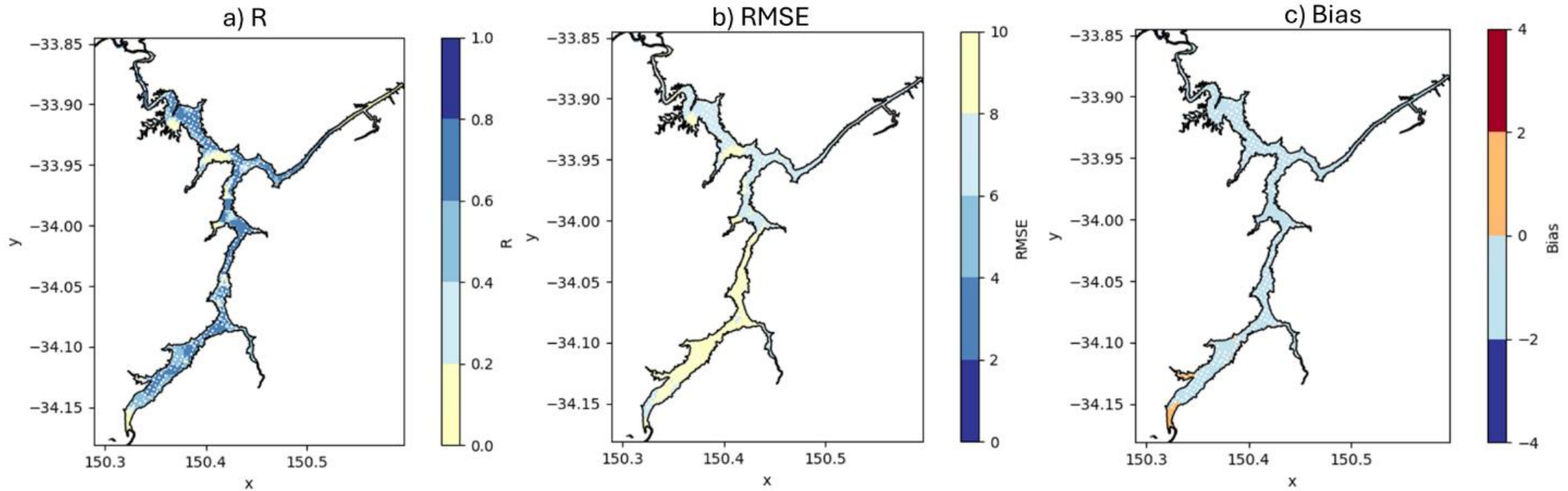
Now compared to the model results



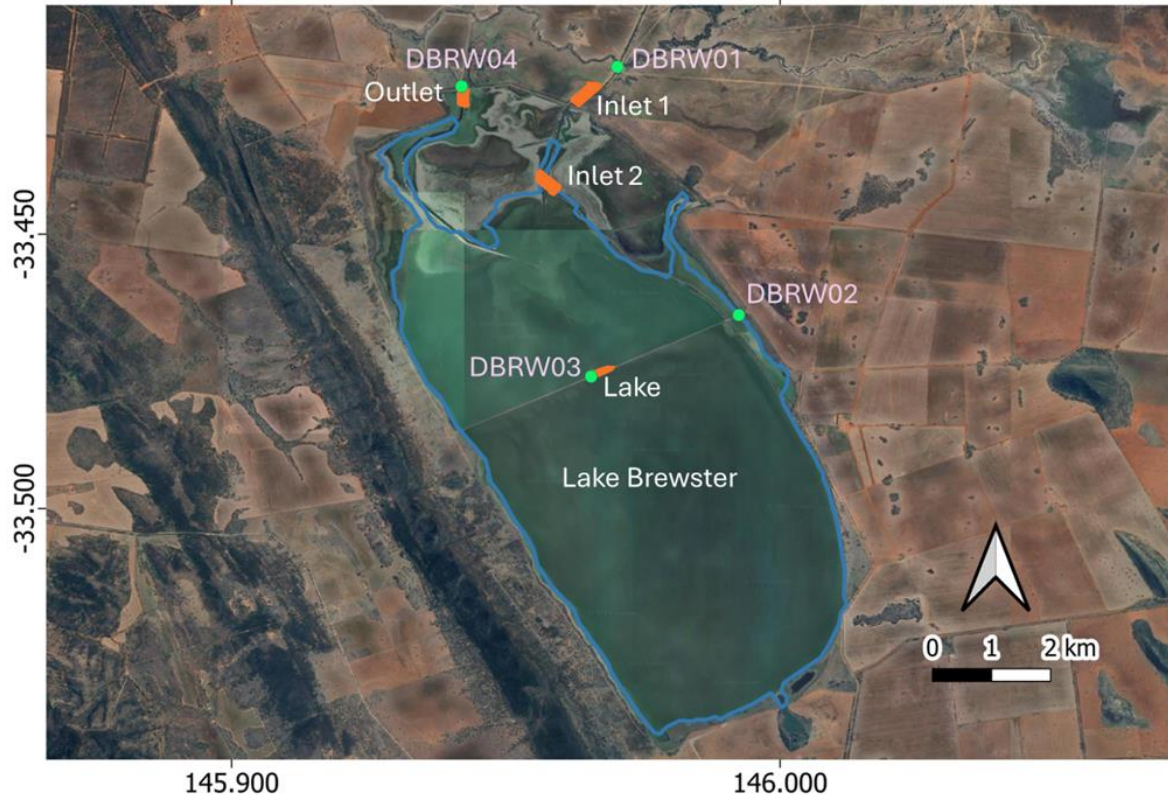
Leveraging spatial information



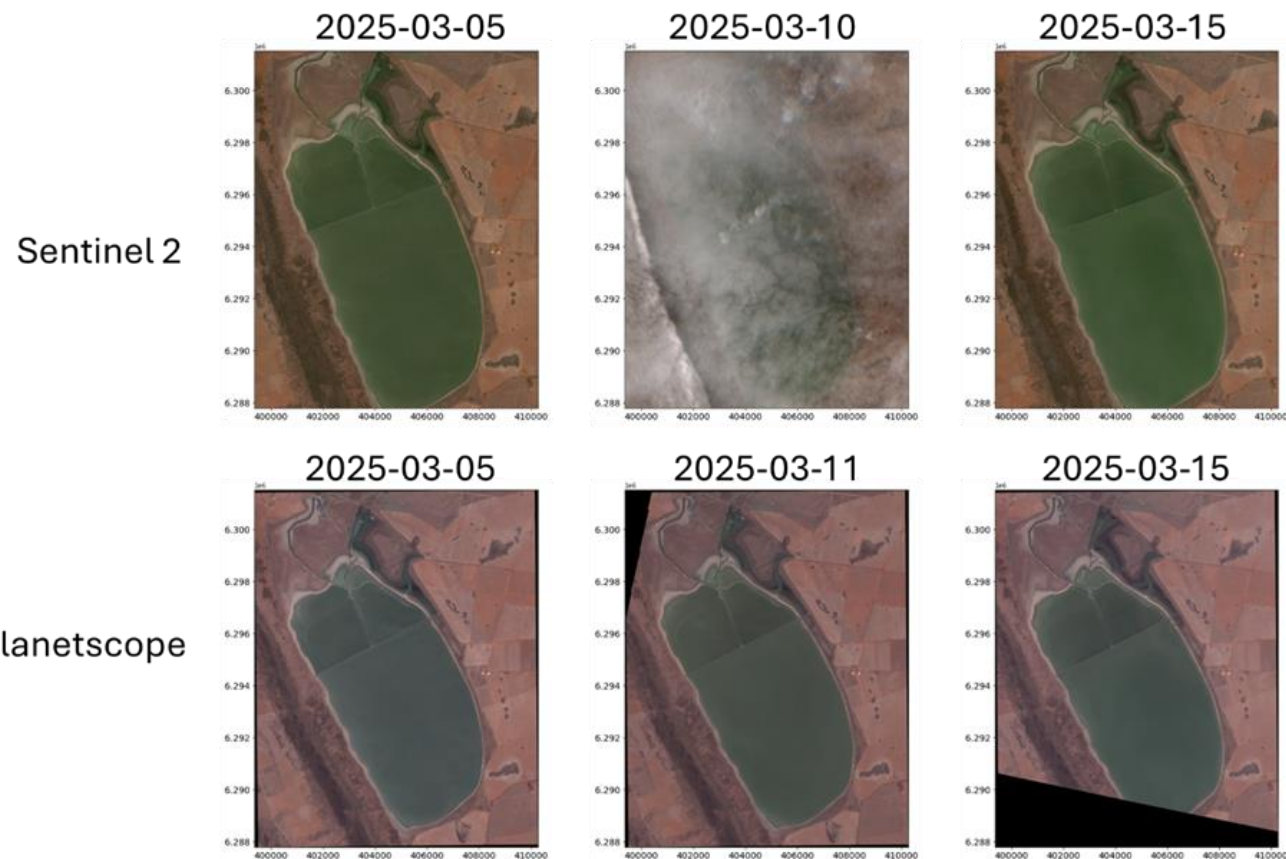
Chlorophyll-a



Is higher spatial resolution data useful?



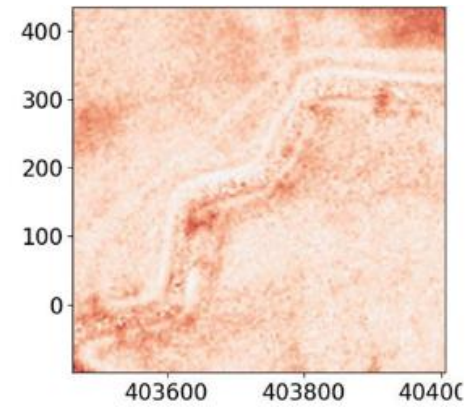
The problem of clouds



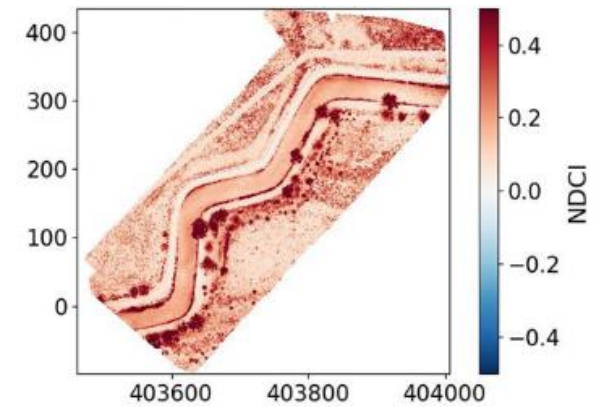
Satellite vs UAV



Planetscope



UAV



Conclusions

- There is some skill in remotely sensed water quality data
- But not enough to reliably constrain AEM3D
- UAV flights provide similar information to Planetscope but further testing required compared to freely available satellite data