Effects of varying Fe & Cu concentrations on phytoplankton growth

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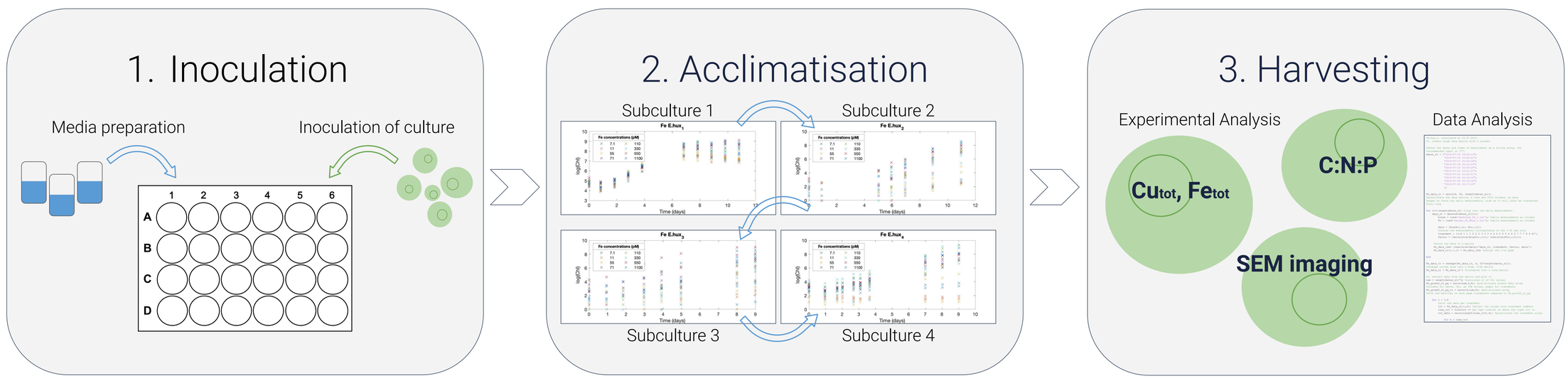
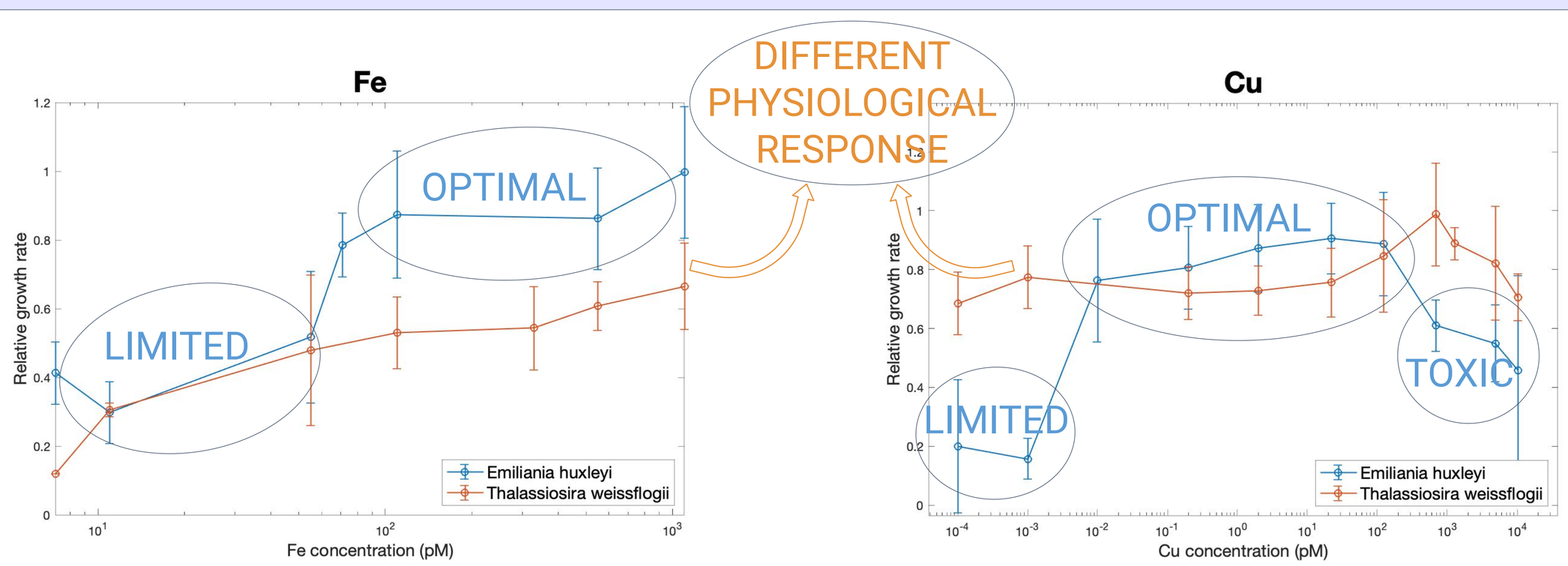
Overview

Iron (Fe) and Copper (Cu) are vital to all phytoplankton in very small concentrations, hence in regions where their availability drops below a certain threshold, phytoplankton struggle to grow. Recently it has been discovered that in some species that are Fe-limited, the cells substitute the Fe-sites for Cu instead, allowing them to still function (e.g. Semeniuk *et al*., 2015). This study is looking at the interplay of varying Fe and Cu concentrations and the resulting growth response in three species: coccolithophore *Emiliania huxleyi*, and two diatoms *Thalassiosira oceanica* and *Thalassiosira weissflogii*.

Methods



Results



Conclusions

- Open ocean coccolithophore *Emiliania huxleyi* shows an expected response to the varying concentrations of Fe and Cu.
- Species adapted to different environments show a significantly different physiological response, yet to confirm how and why.

So what? Models used to predict the impacts of future climate change can be adjusted to include to complexities observed in laboratory experiments, making them more accurate. Copper toxicity data is especially valuable for policy-making to set the bounds of which concentrations are allowed to be released in rivers/oceans.

References

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Matlab Code

https://tinyurl.com/y4xdpwm5

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