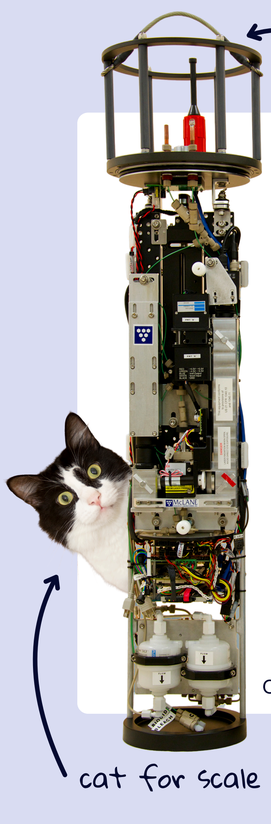
GULF OF AQABA 2025 BLOOM DYNAMICS

through the lens of an Imaging FlowCytobot (IFCB)

Herdís G. R. Steinsdóttir [1,2,3], Miguel J. Frada [2,3], Derya Akkaynak [1,3]

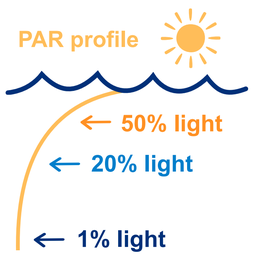
BACKGROUND AND MOTIVATION

Each spring, deep thermal mixing sets the stage for a phytoplankton bloom in the Gulf of Aqaba. In 2025, a multidisciplinary campaign tracked the rise and fall of the bloom as mixing reached >700 m. Here, we present preliminary results from observations made with an Imaging FlowCytobot (IFCB), an instrument that quantitively images cells between 5-200 µm in a water sample. Samples were collected at three light depths throughout the bloom (see methods). We show how the phytoplankton community changes over time, with particular focus on the diatoms.



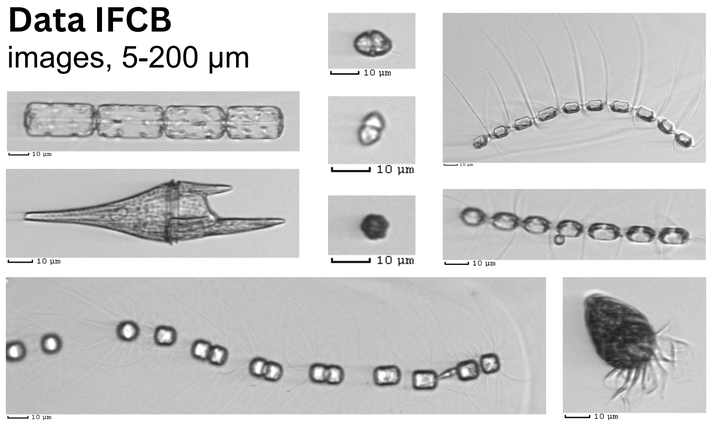
METHODS

Sampling
daily to weekly,
three depths,
fixed light

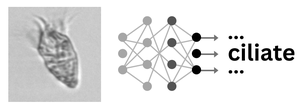


Olson, Sosik. L&O Methods. 2007.

Data IFCB
images, 5-200 µm

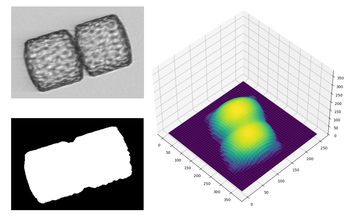


Classification
manual annotation,
CNN model training,
inference



PyTorch, inception v3

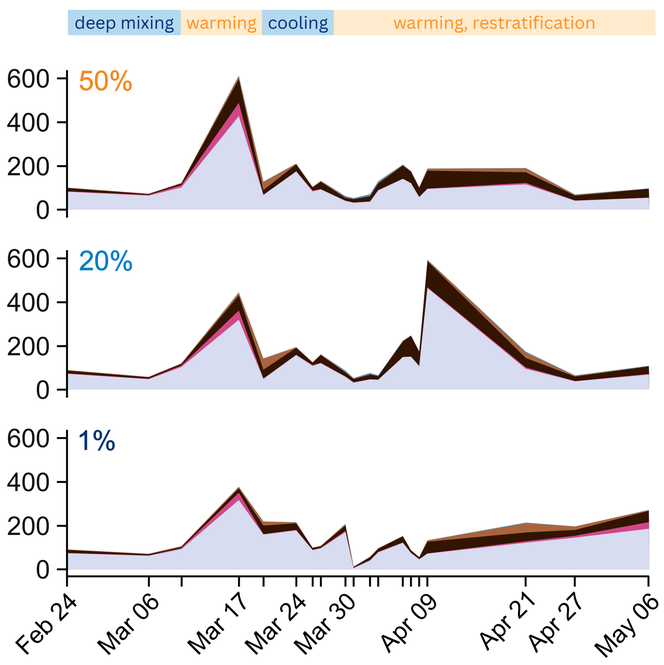
Biovolume
segmentation,
distance mapping



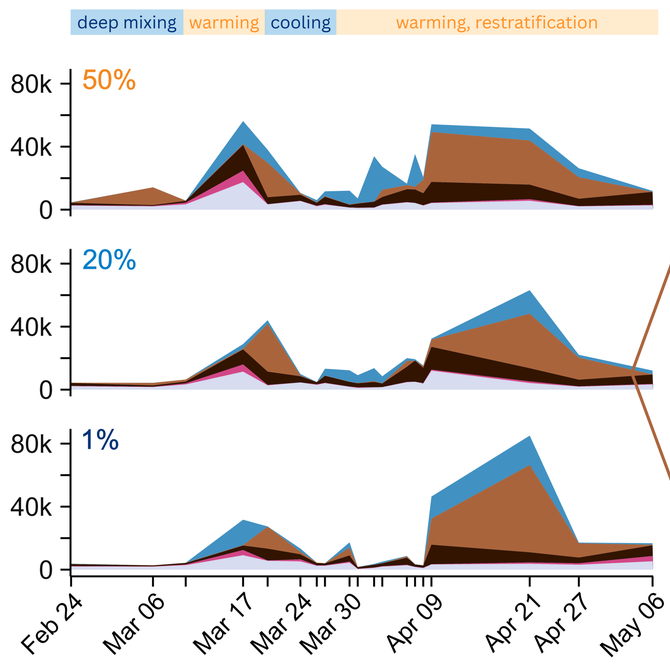
Moberg, Sosik. L&O Methods. 2012.

RESULTS

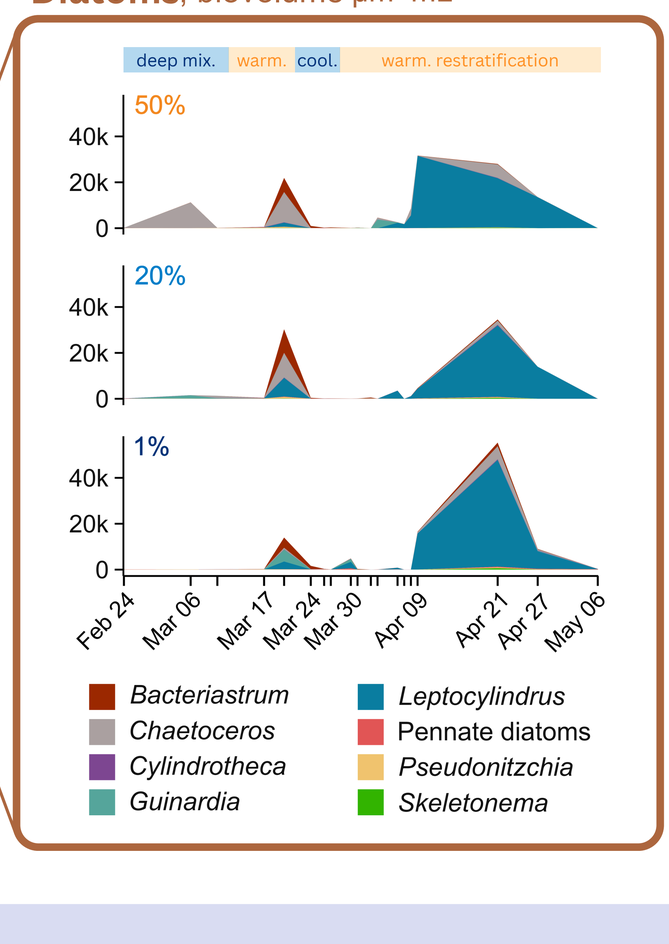
Density cells/chains mL^{-1}



Biovolume µm^3 mL^{-1}



Diatoms, biovolume µm^3 mL^{-1}



Selected major groups

- Ciliates
- Diatoms
- Dinoflagellates
- *G. huxleyi*
- 5-10 µm round cells

SUMMARY AND NEXT STEPS

Small phytoplankton dominated the bloom numerically, while chain-forming diatoms (*Bacteriastrum*, *Chaetoceros*, *Leptocylindrus*) were major contributors to cellular biovolume. We detected two main bloom peaks, each following a period of warming and dominated by different diatoms genera, indicating rapid succession. Next steps involve comparing these observations with pigment measurements and integrate results into the broader 2025 bloom dataset, with the aim of identifying mechanisms regulating the rise and fall of diatom blooms.

CHECK OUR DASHBOARD

1. Hatter Department of Marine Technologies, Leon H. Charney School of Marine Sciences, University of Haifa
2. Department of Ecology, Evolution and Behaviour, Alexander Silberman Institute of Life Sciences, HUJI
3. The Interuniversity Institute for Marine Sciences in Eilat

h.steinsdottir@pm.me

אוניברסיטת חיפה
UNIVERSITY OF HAIFA
جامعة حيفا
THE INTERUNIVERSITY INSTITUTE FOR MARINE SCIENCES IN EILAT
COLOR LAB
CARLSBERG FOUNDATION