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אוניברסיטת חיפה
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ИОФ РАН

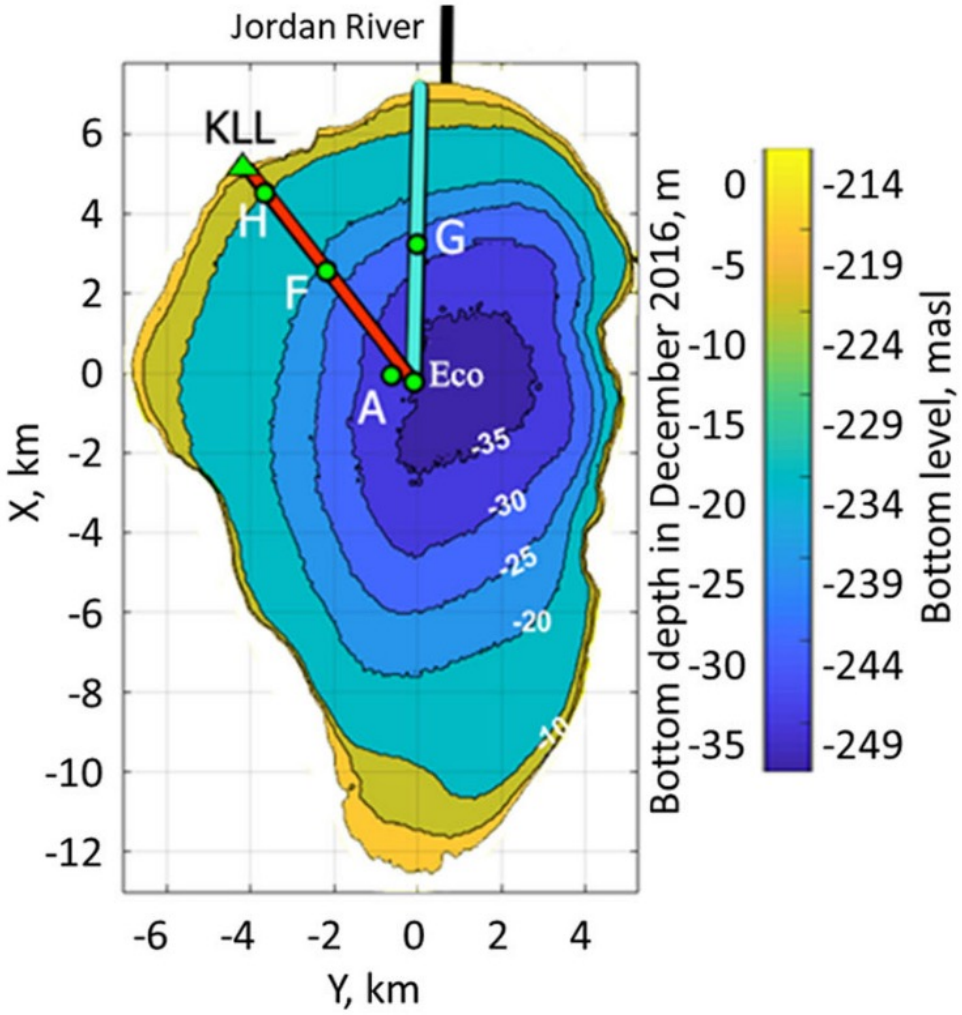
Abstract

Spatial and temporal variability of gas content in sediments of Lake Kinneret, North of Israel

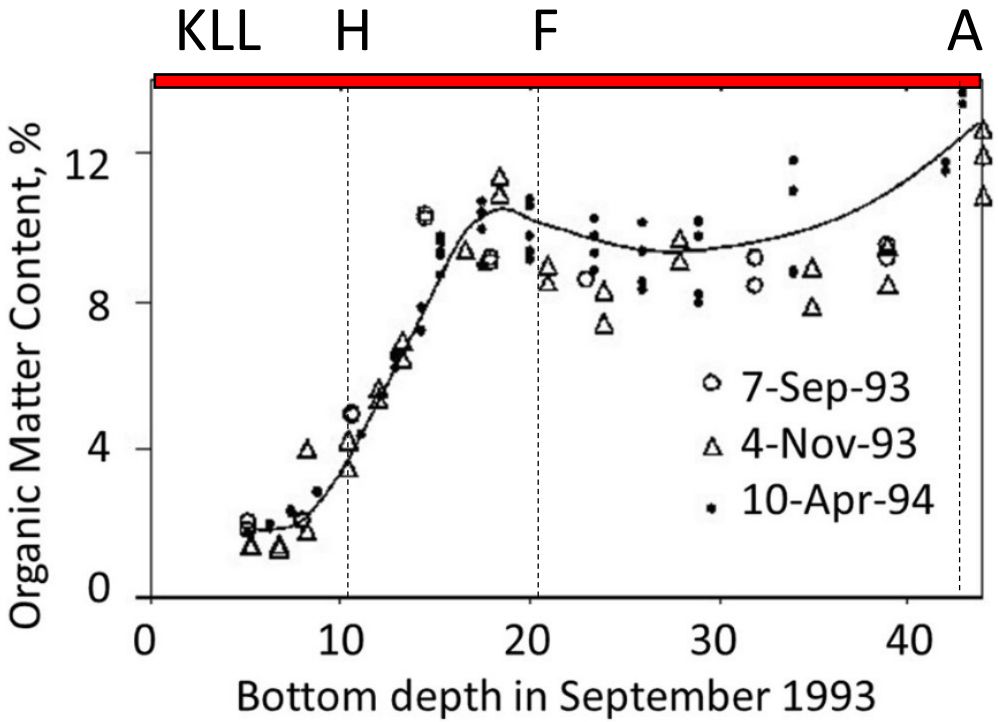
Session: BG7.1
Wednesday, 25 May 2022, 17:00–17:06

Ernst Uzhansky
Andrey Lunkov
Regina Katsman
Boris Katsnelson

Bathymetry and study area



Organic matter content (OMC)

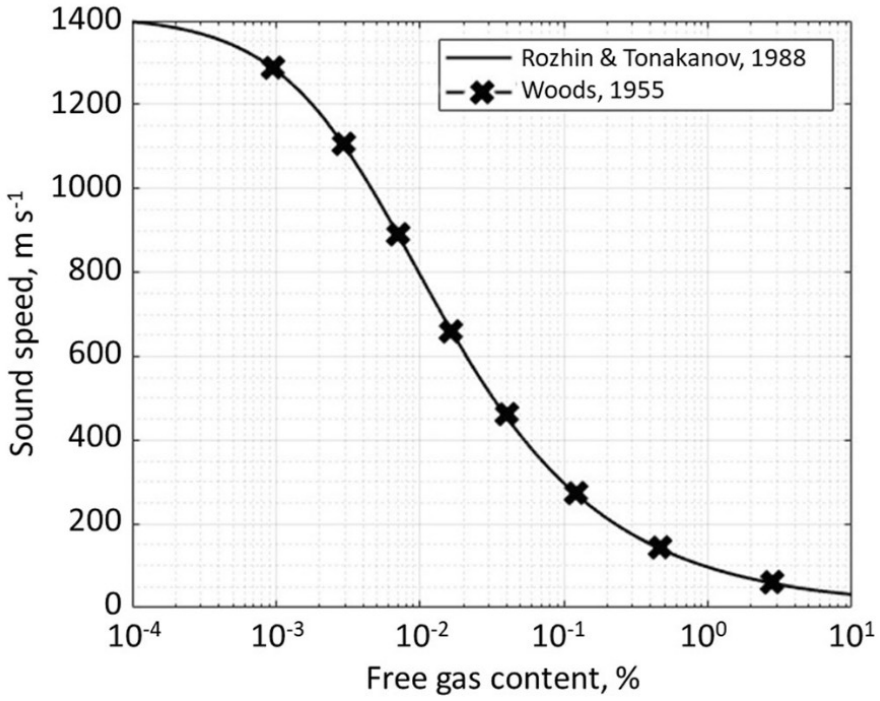


Characteristics of OMC in the bottom sediment along the North-West offshore transect.

Ostrovsky & Tegowski, 2010. https://doi.org/10.1007/s00367-009-0180-4

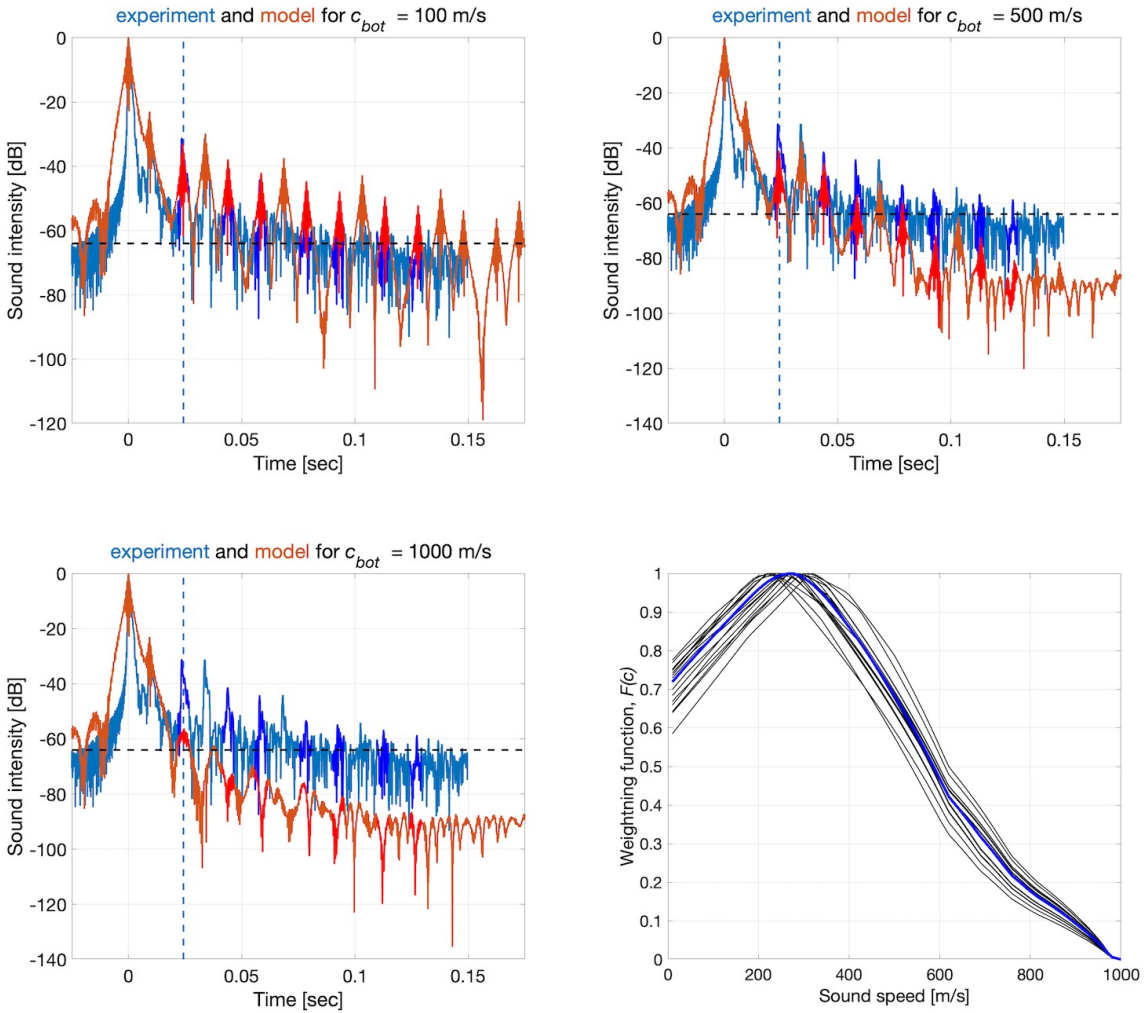
Methods: acoustic approach for gassy sediment characterization

Effective model



Sound speed in sediment vs. free gas content calculated for sediment properties of Lake Kinneret

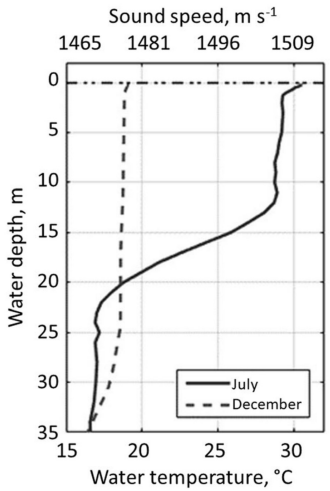
Geoacoustic inversion process



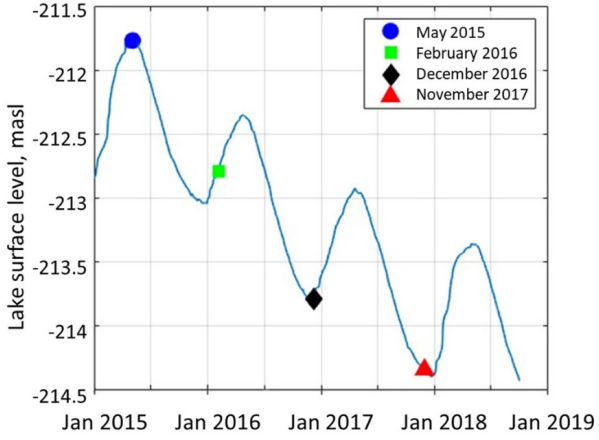
Experimental and modeled pulse responses, and the final weightning function. Here the estimated c = 285 ± 20 m/s, Θ = 0.11 ± 0.02 %.

Uzhansky et al., 2020. https://doi.org/10.1007/s00367-019-00629-4
Katsnelson et al., 2017. https://doi.org/10.1002/lom3.10178

Previous study. Controls on gas content.



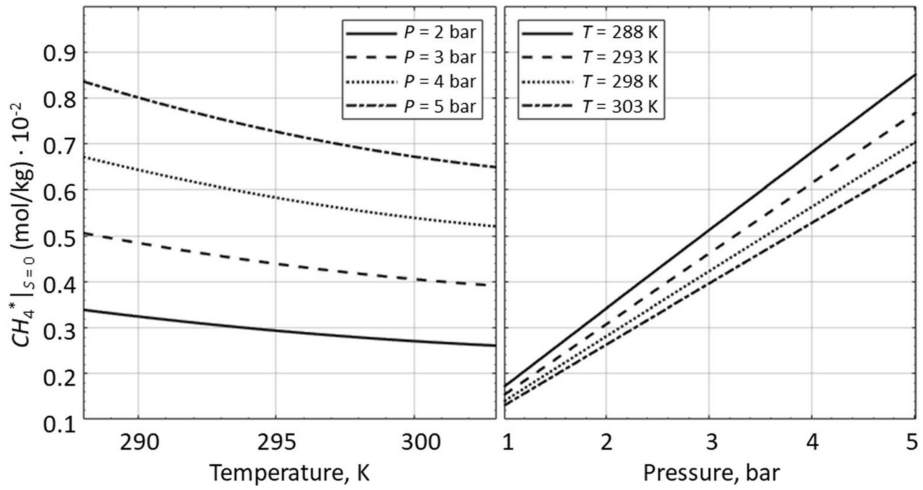
Lake level



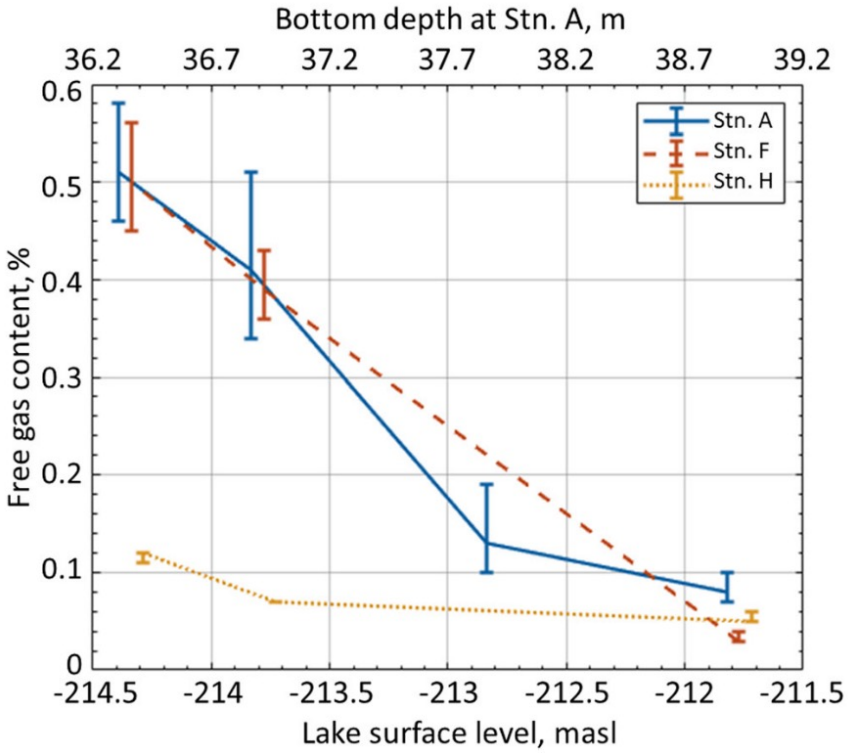
Solubility controls:

Temperature

Hydrostatic pressure



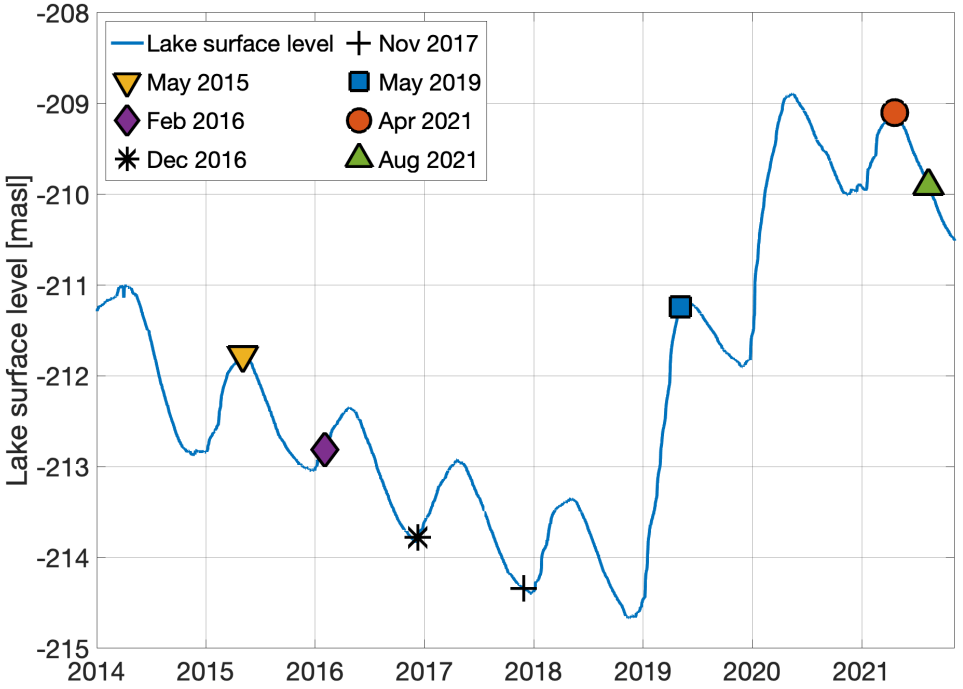
Results of estimations: northwestern transect



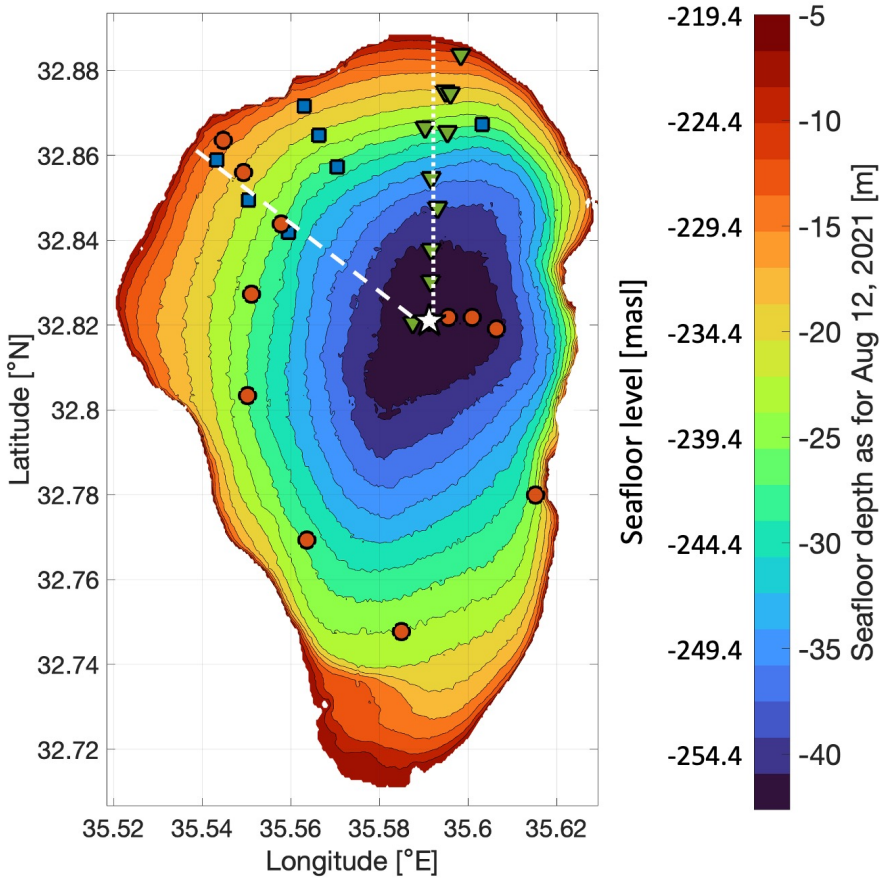
Estimated free gas content vs. lake level and corresponding bottom depth at Stn. A. Vertical error bars represent 95% confidence interval.

Uzhansky et al., 2020. https://doi.org/10.1007/s00367-019-00629-4

Lake level fluctuations in Lake Kinneret in 2014 – 2021



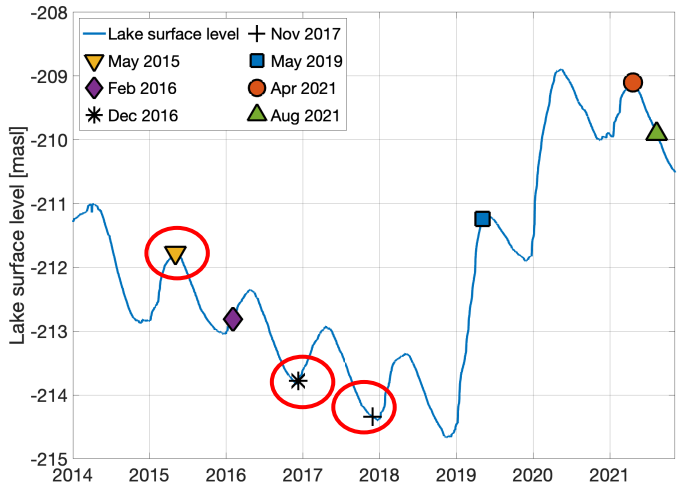
Points of measurements



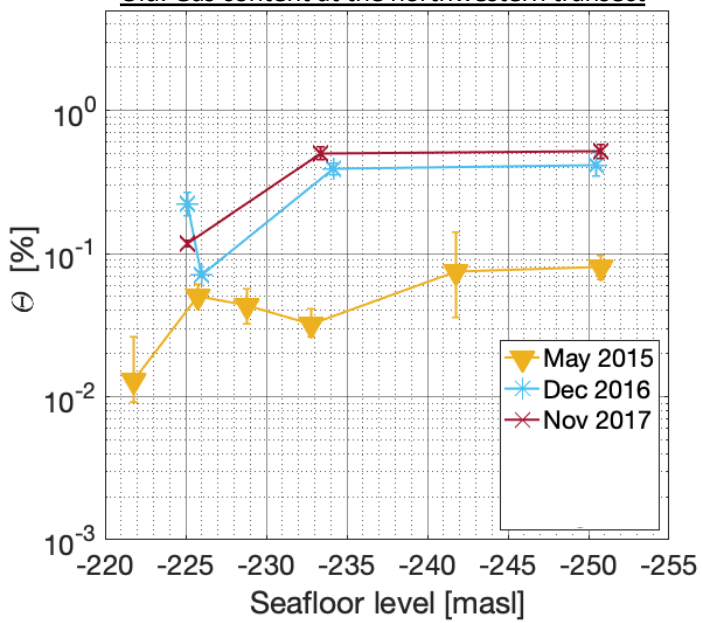
Bathymetric map of Lake Kinneret with points of acoustical measurements carried out on May 6, 2019, Apr 22, 2021, and Aug 12, 2021.

Additional controls? Organic matter content and ebullition.

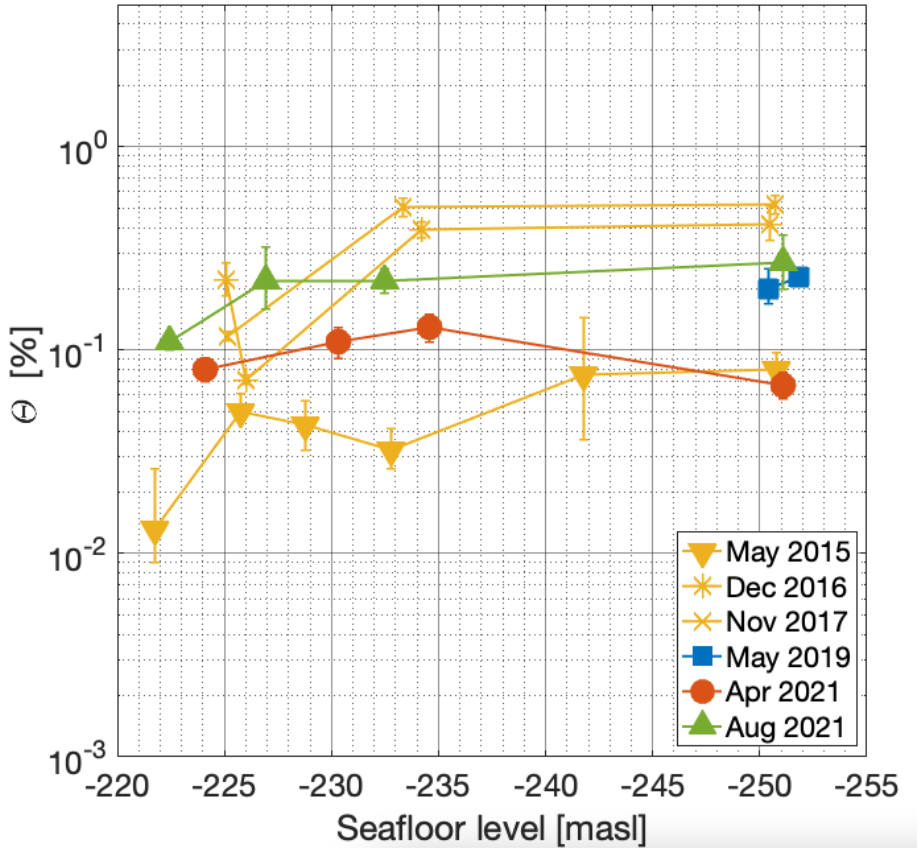
Multiannual changes in lake level



Old: Gas content at the northwestern transect



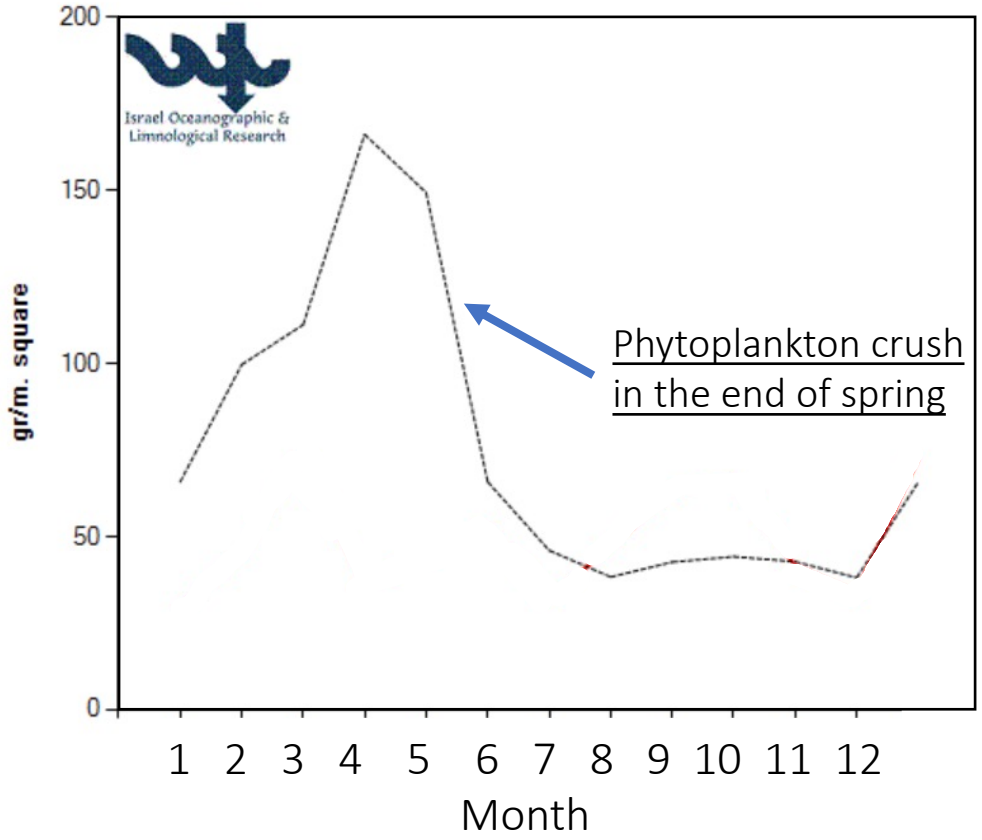
New: Gas content at the northwestern transect



Uzhansky et al., 2020. https://doi.org/10.1007/s00367-019-00629-4

What else can affect Θ? Organic matter and ebullition.

Total phytoplankton in the water. Multi-annual averages.



Hypothesis 1

Significant increase of organic matter content in the bottom after planknot crush.

Hypothesis 2

Shallower water — ebullition due to strong surface waves.

Strong wind (Mediterranean Sea Breeze) up to 20 m/s creates storms with high surface waves.

Outlook: identification of controls on gas content (OMC, lake level, surface waves, etc.), and statistical analysis.