

# Extreme events in the ocean: Episodic vigorous mixing above the continental slope

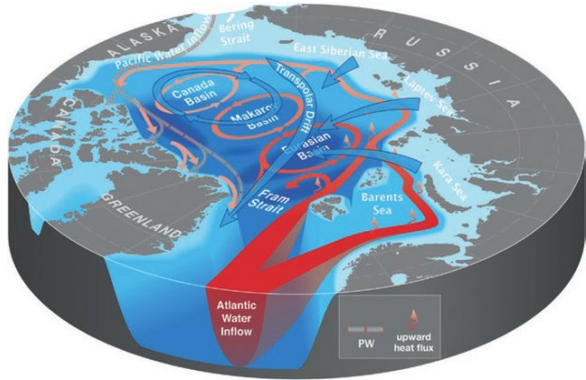
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Yueng-Djern Lenn, Tom Rippeth, Ben Lincoln, Brian Scannell (Bangor),  
Vasiliy Povazhnyy (AARI, St. Petersburg),  
Stefan Büttner (University Kiel)

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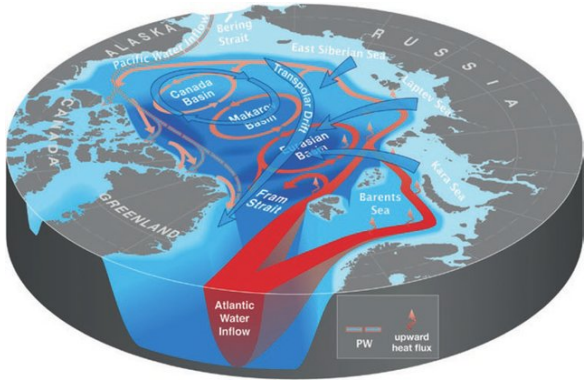


# The Arctic Ocean

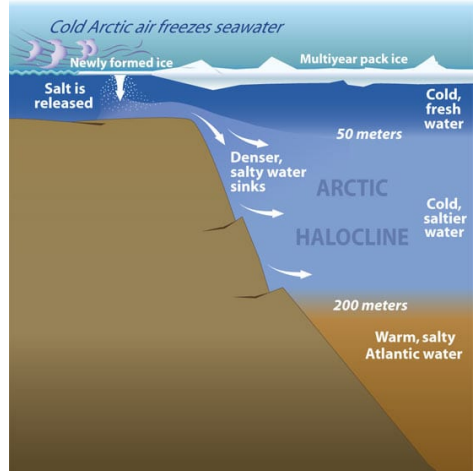


(c) YOUMARES – Oceans Across Boundaries: Learning from each other 8, 2018

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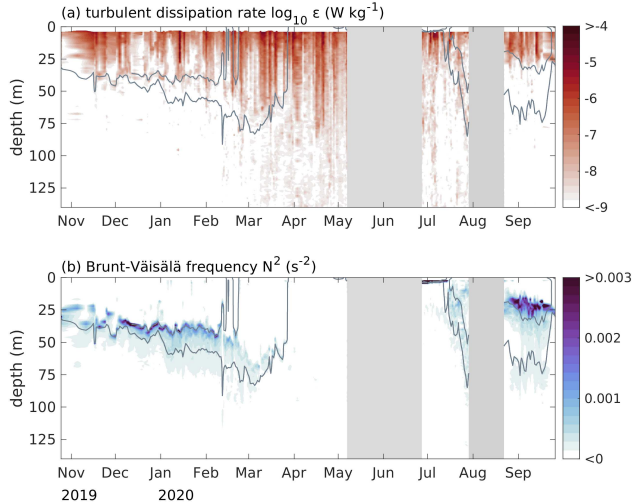


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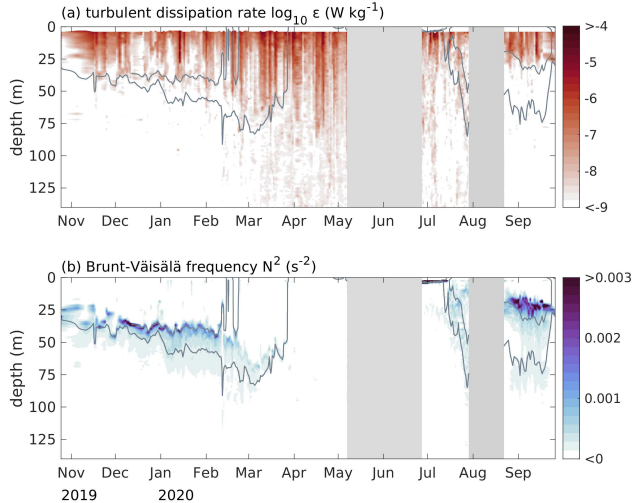
(c) WHOI

# Turbulent mixing in the central Arctic Ocean (MOSAiC campaign)



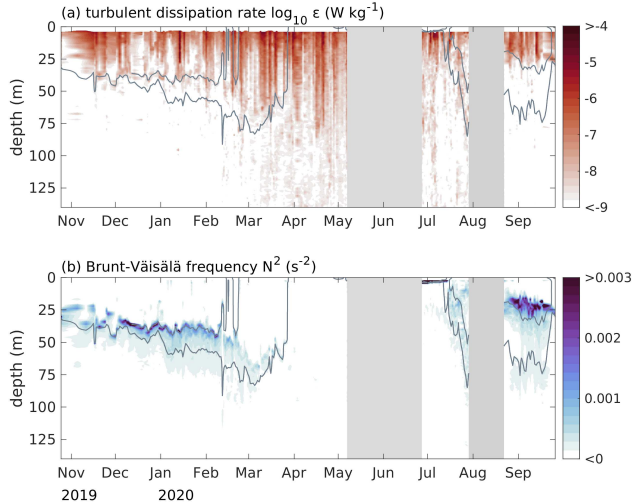


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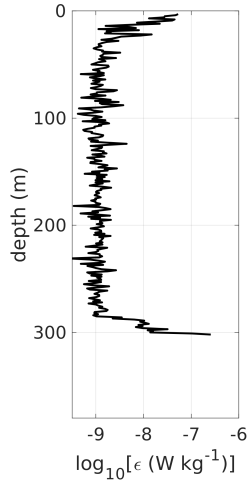
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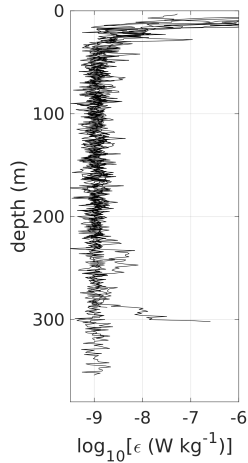
- strong halocline confines turbulence to surface layer
- slightly increased turbulence at deeper layers after breakdown of halocline and above complicated topography
- overall: low levels of vertical mixing and transport

# Turbulent mixing at the slope (summer 2018, Laptev Sea)



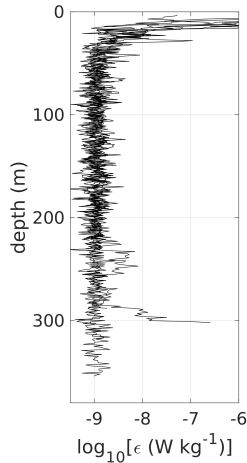
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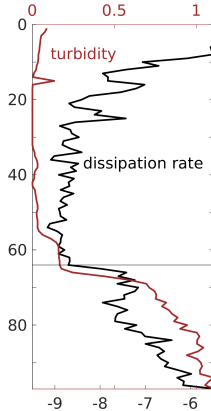


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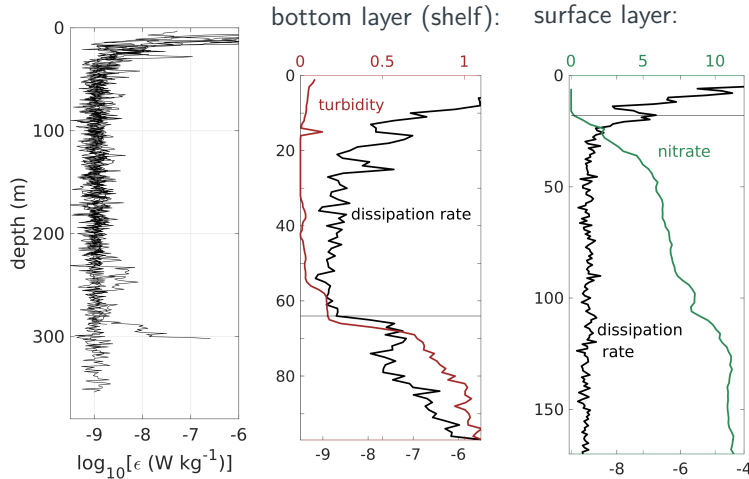


bottom layer (shelf):



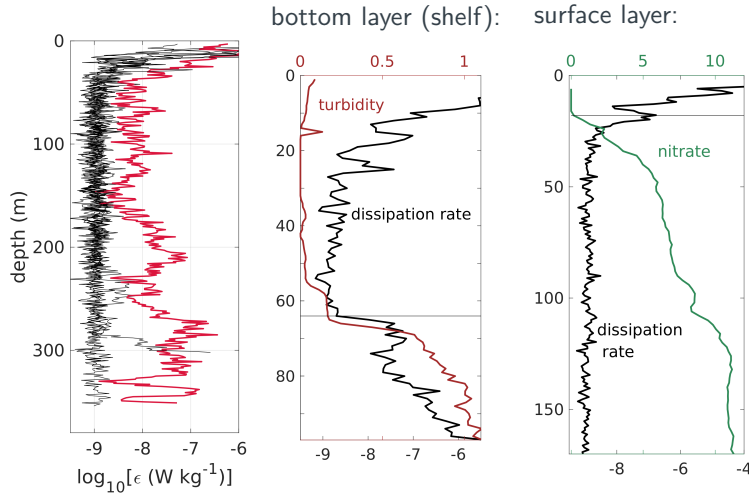
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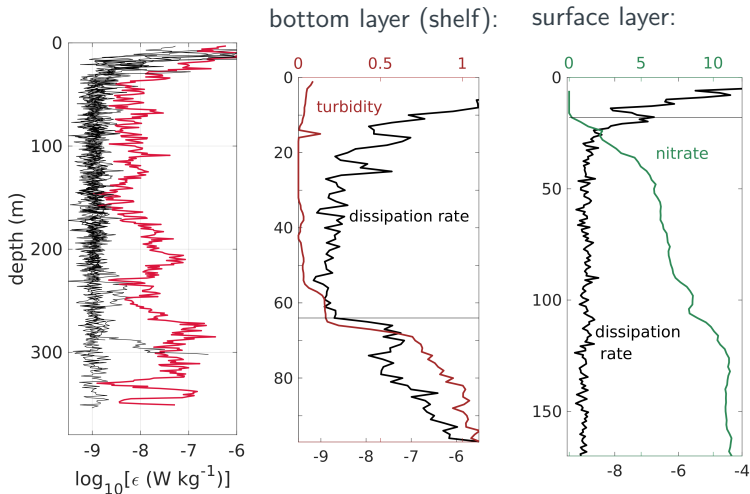
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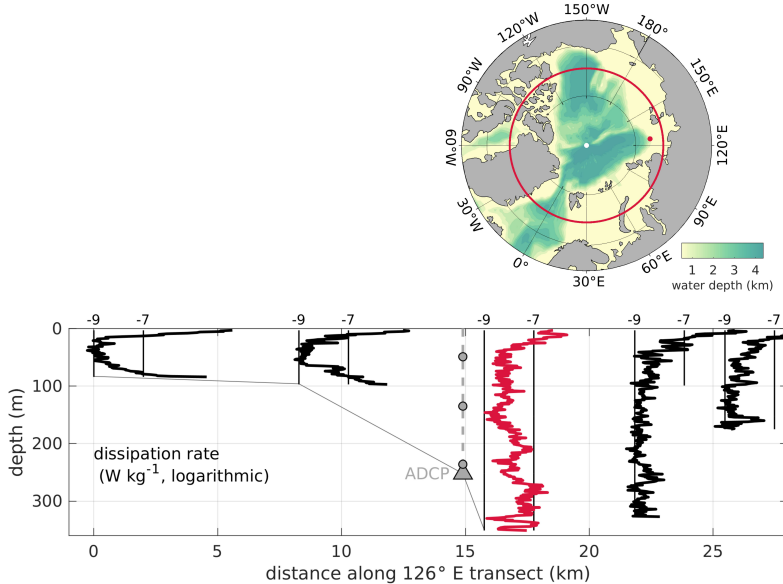
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## Questions

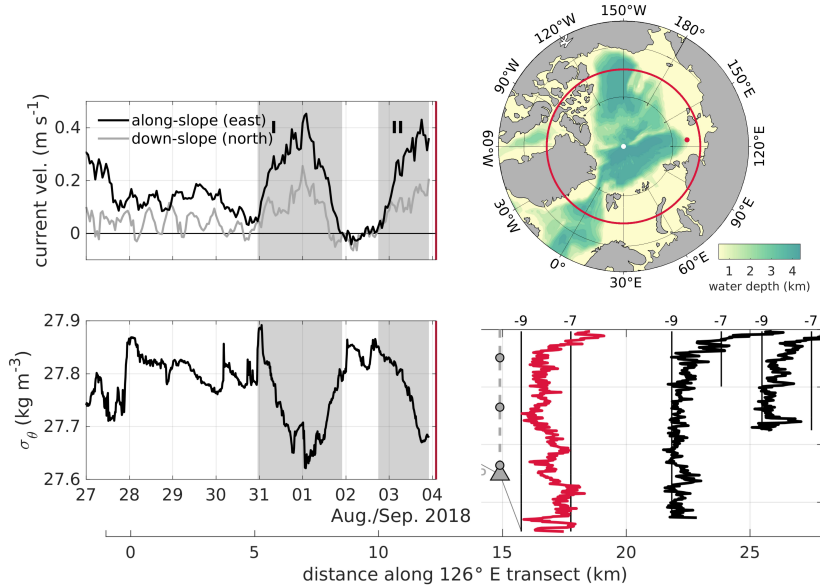
1. Where does this come from?
2. Does this happen often?
3. Effect on transport?



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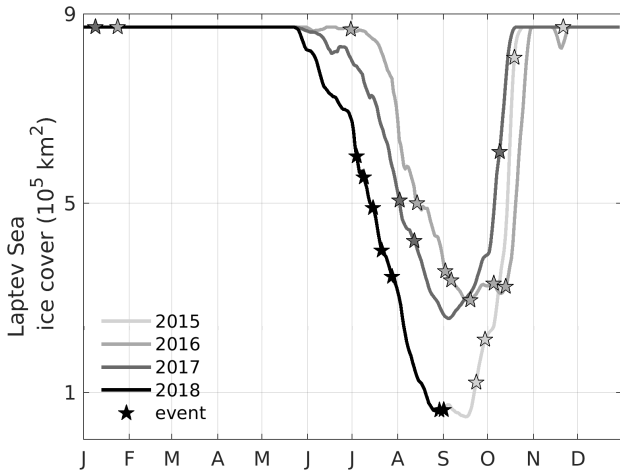
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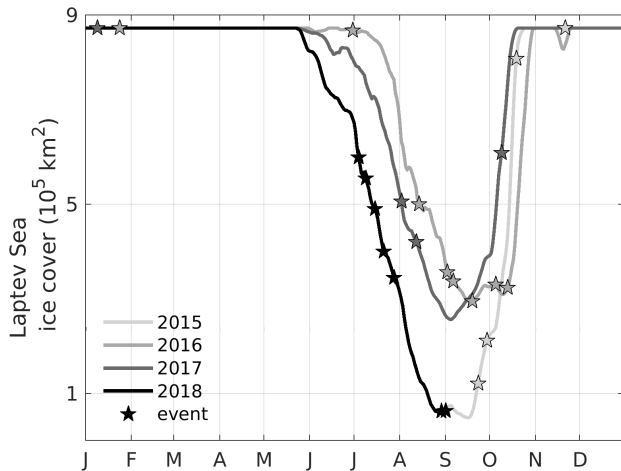
Next Question

How often does this happen?

## How often do these mixing events happen?



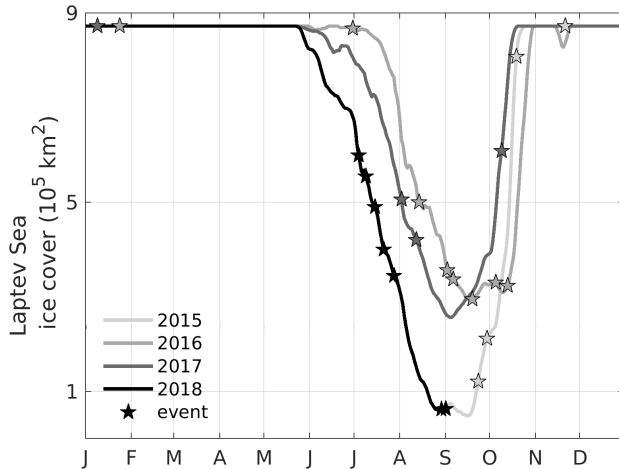
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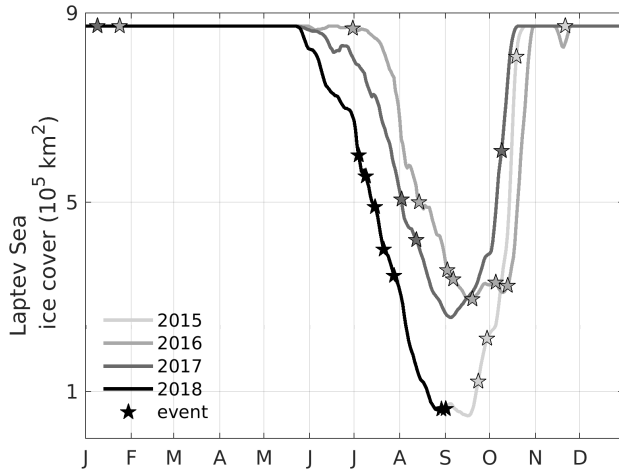


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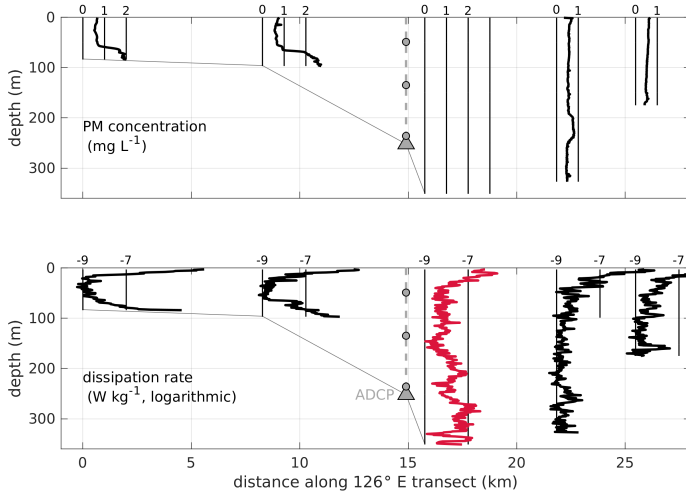


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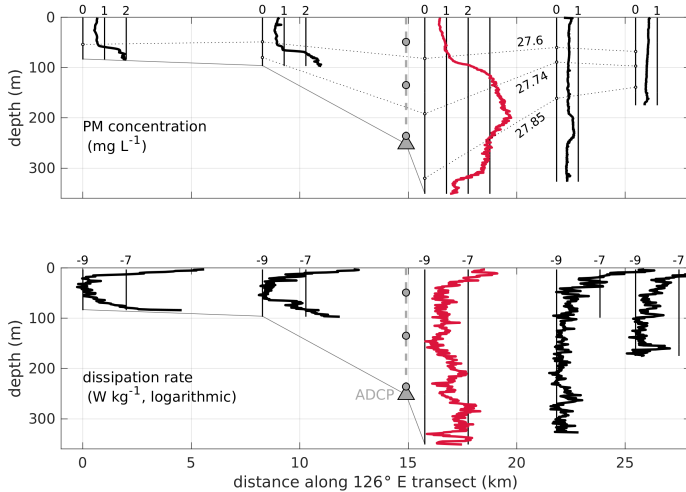
What about the transport?

# Suspended sediment transport



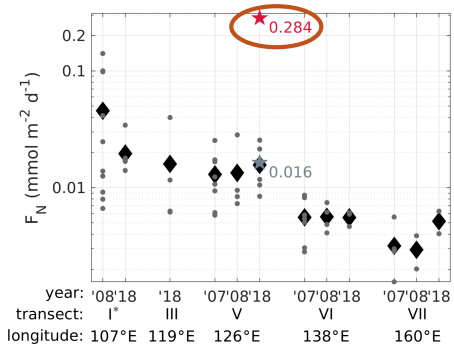
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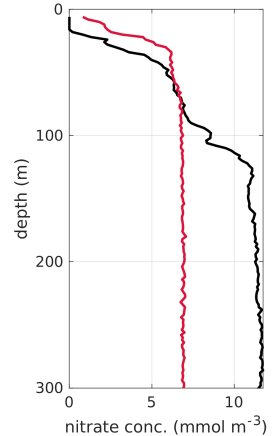
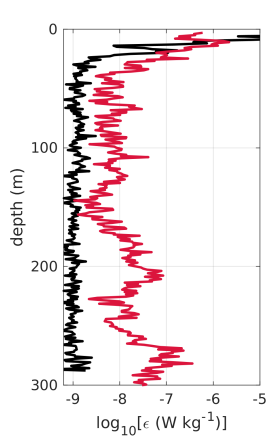
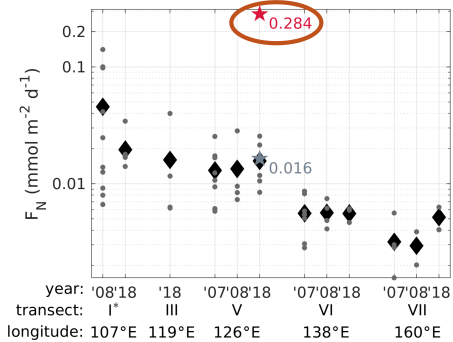


- lateral transport at intermediate depths important factor on pan-Arctic scale, but mechanisms unclear
- here: suspended sediment cloud of  $\sim 500 \text{ g m}^{-2}$  originating from upper slope, contributes to basin sedimentation flux and carbon burial

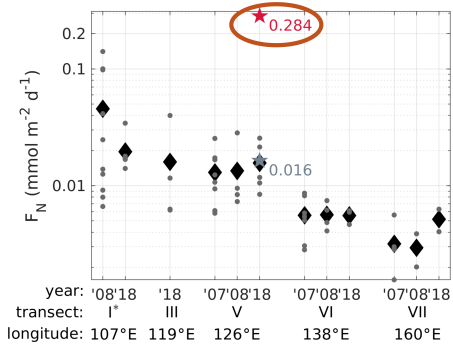
# Vertical nutrient transport



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Impact:

- Locally enhanced primary productivity.
- Contribution of spatially confined, episodic events at slope to overall vertical nutrient transport comparable to "background" transport contribution over whole basin.

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- First observation of intermediate nepheloid layer this far north, connects shelf and basin, might significantly contribute to basin sedimentation flux.
- Mixing events resupply nutrients to surface and boost late primary productivity, contribution to overall nutrient supply  $\sim$ equal to basin-wide weak (summer) mixing.