

Sea Ice – Ocean Modeling:

- 1. High resolution**
- 2. Floe size distribution**

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J. Zhang modeling taxonomy: **PIOMAS, BESTMAS, BIOMAS, MIZMAS, HIOMAS**

MAS = Modeling & Assimilation System

PIO = **Parallel** Ice-Ocean (*N. Pole in Greenland*)

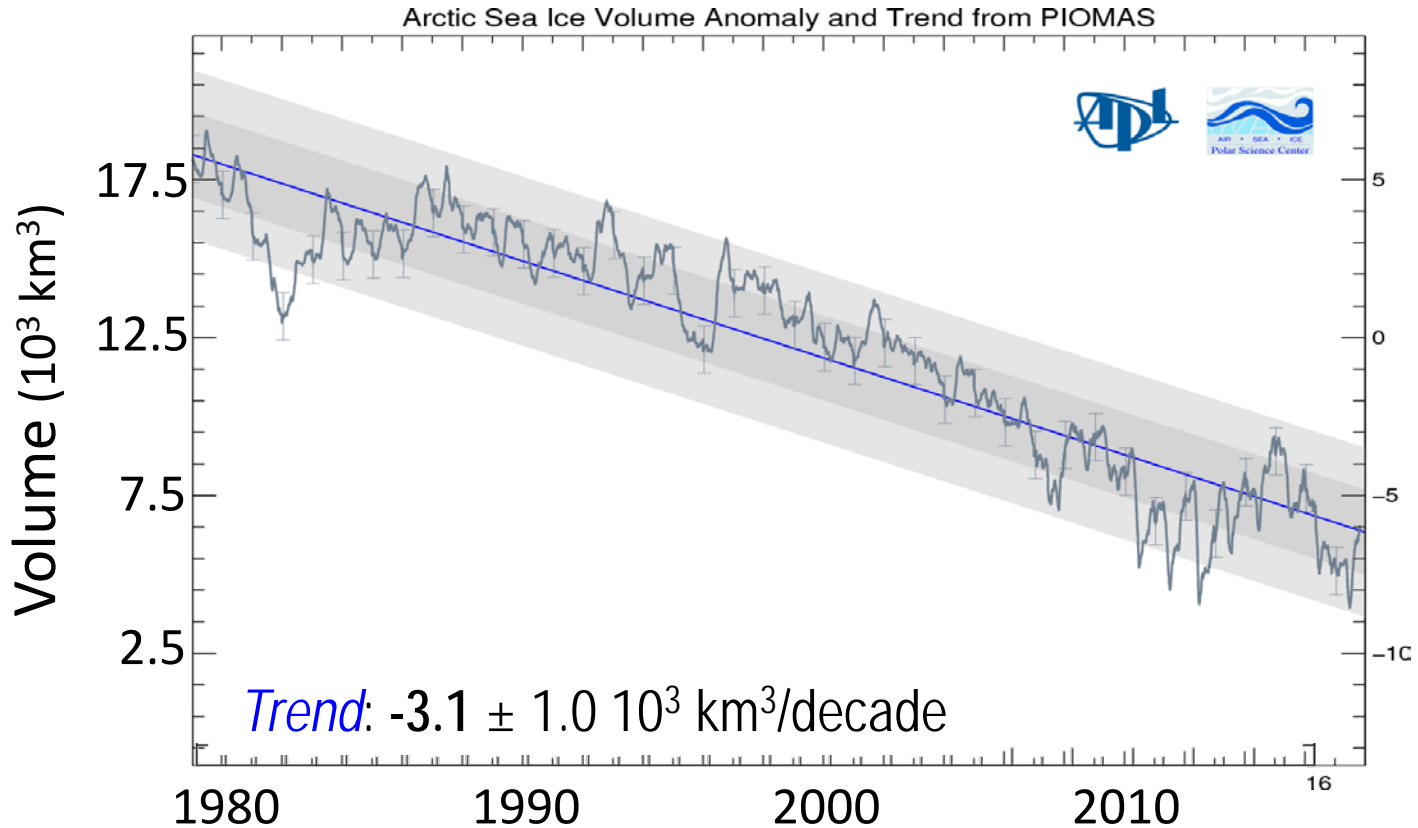
BEST = **Bering** Ecosystem Study (*N. Pole in AK*)

BIO = **Biology**/Ice/Ocean (*AK*)

MIZ = **Marginal Ice Zone** (*AK*)

HIO = **High Resolution** Ice/Ocean (*AK*)

A consistent ice volume time series from PIOMAS



Sea Ice – Ocean Modeling:

1. High resolution

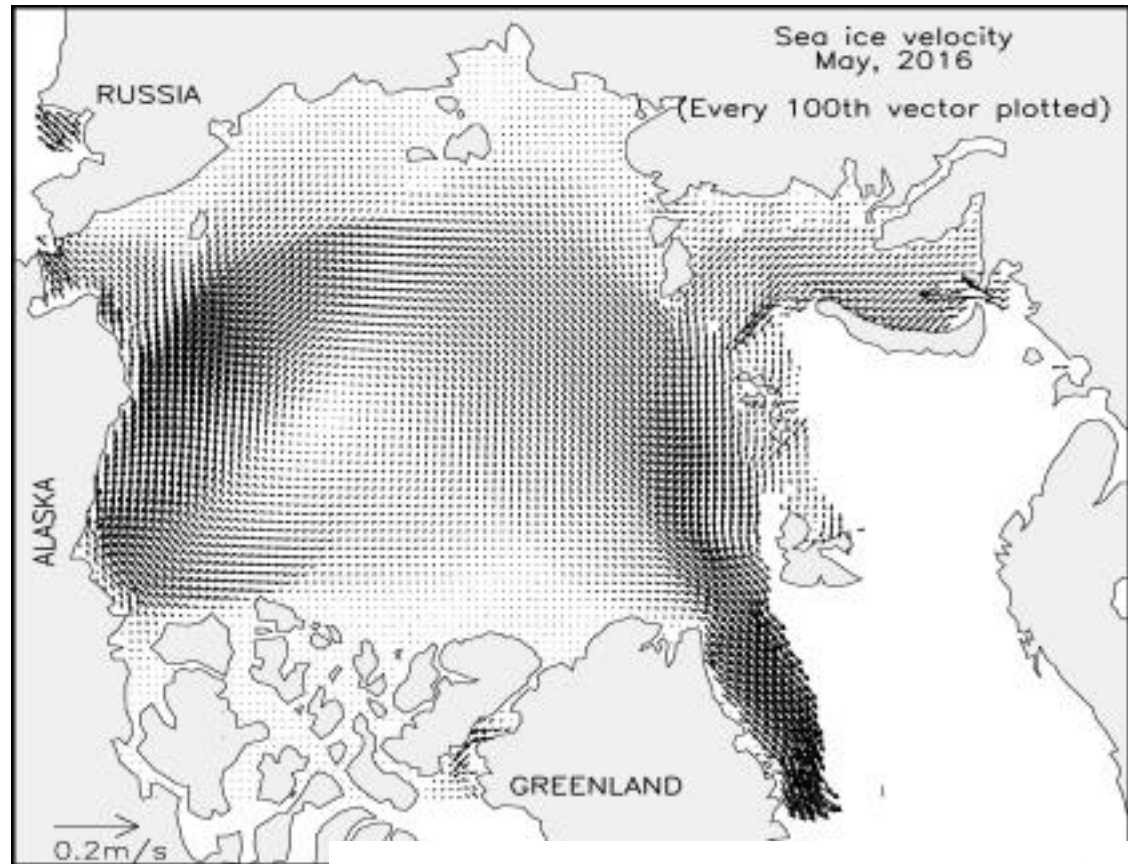
HIOMAS

=

High resolution
Ice/Ocean
Modeling &
Assimilation
System

(2 km)

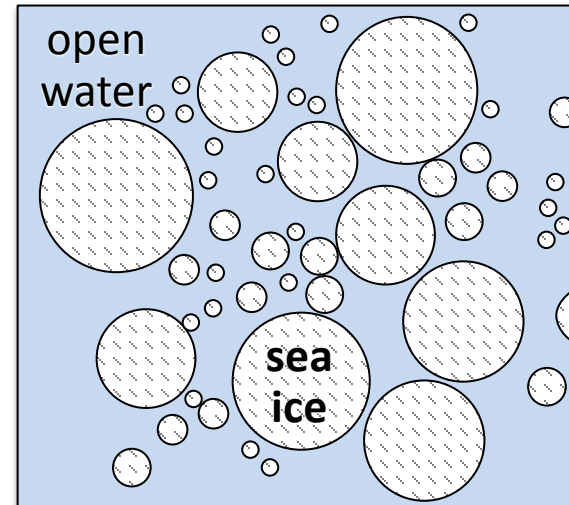
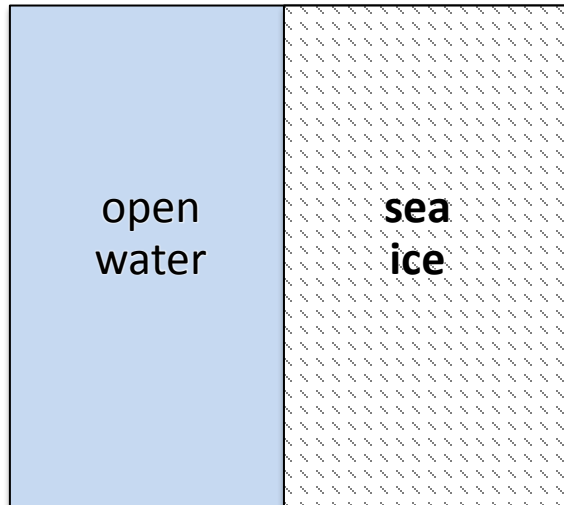
Short-term
analysis &
forecasting



Dept of Homeland Security (DHS)
Arctic Domain Awareness Center (Anchorage, AK)

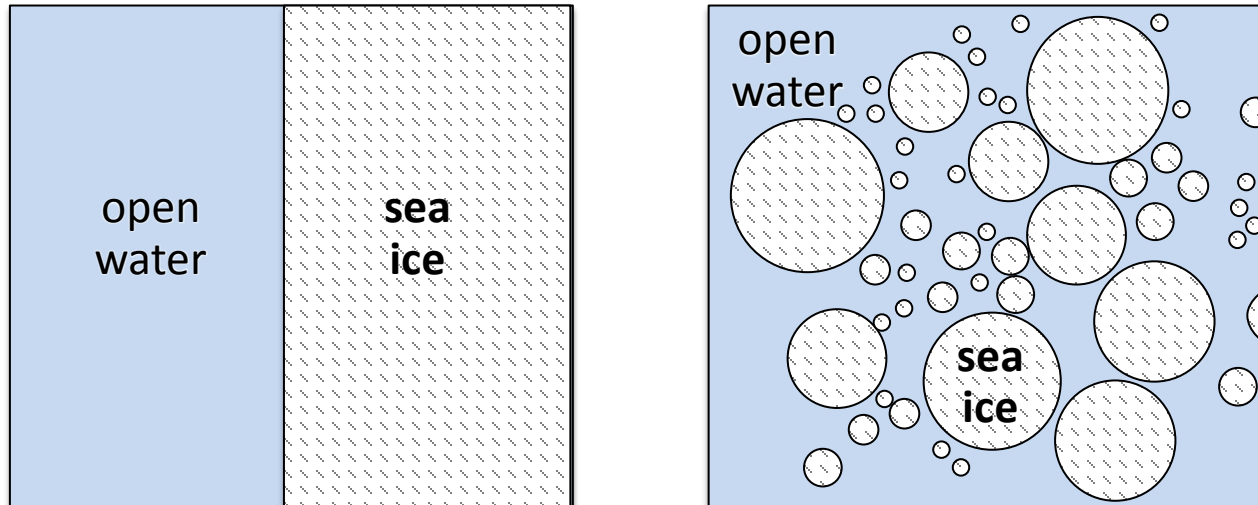
How do models simulate sea ice floe geometry?

“50% ice concentration; 1 m thick”



How do models simulate sea ice floe geometry?

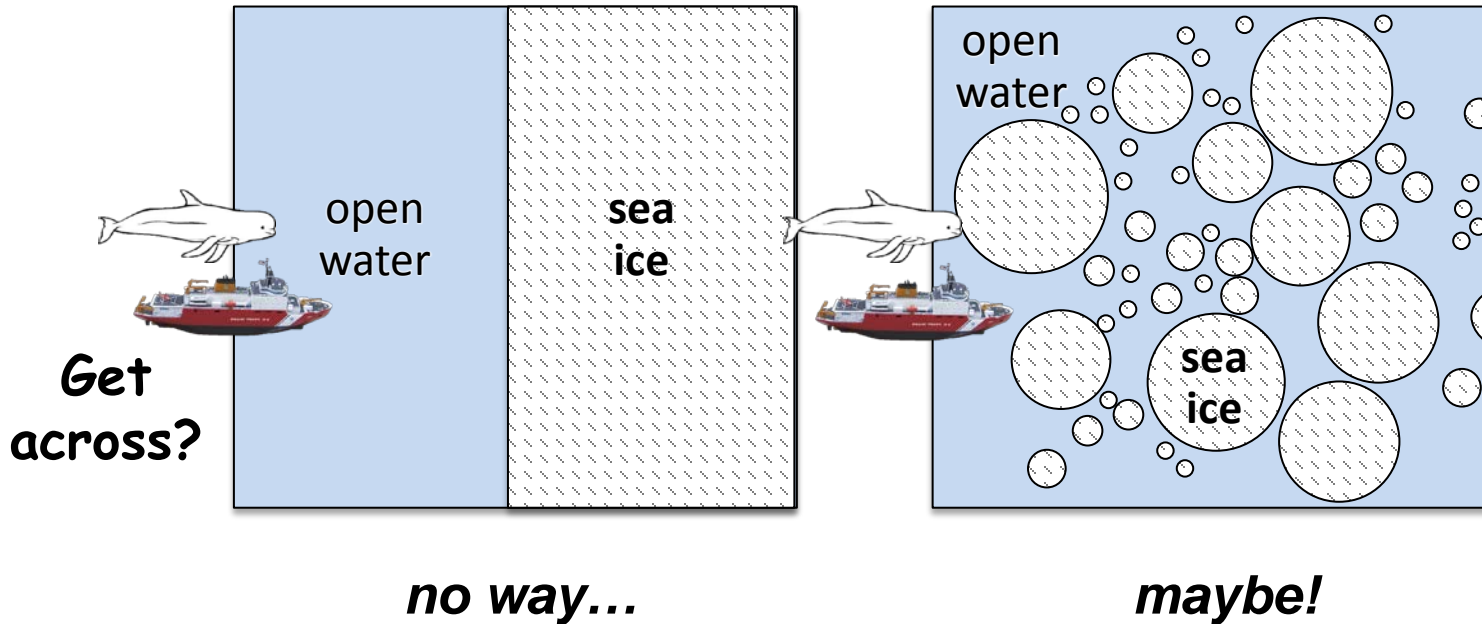
“50% ice concentration; 1 m thick”



They don't!

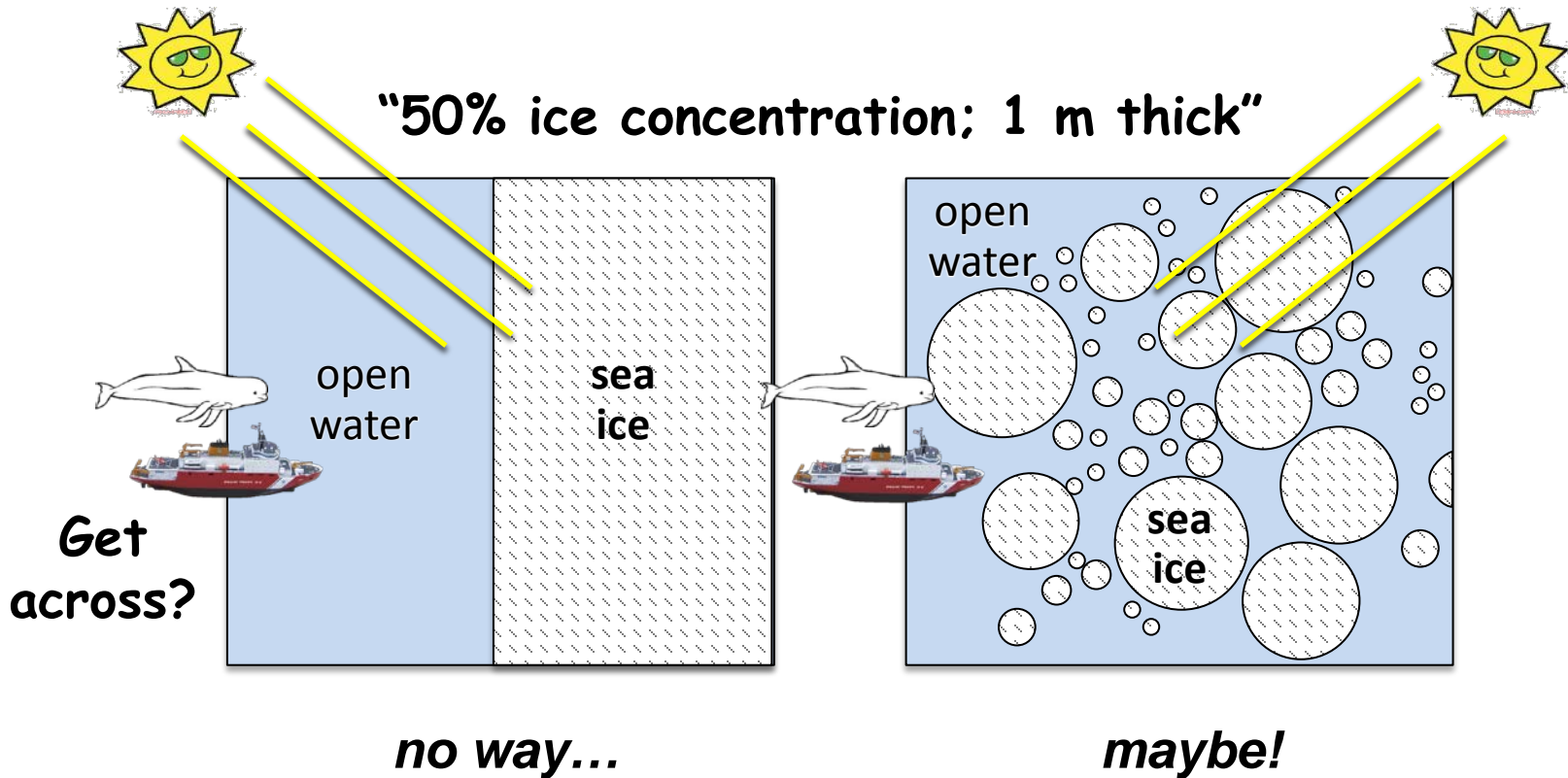
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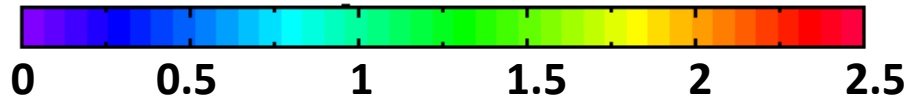
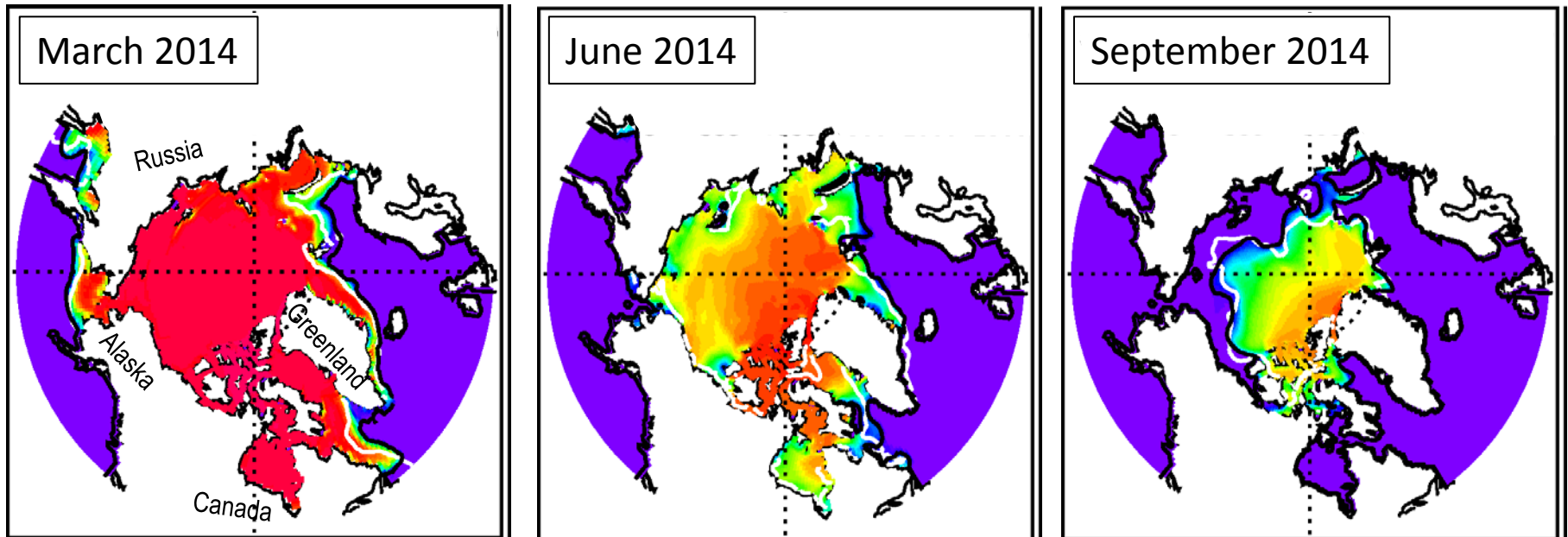
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How do models simulate sea ice floe geometry?



They don't!

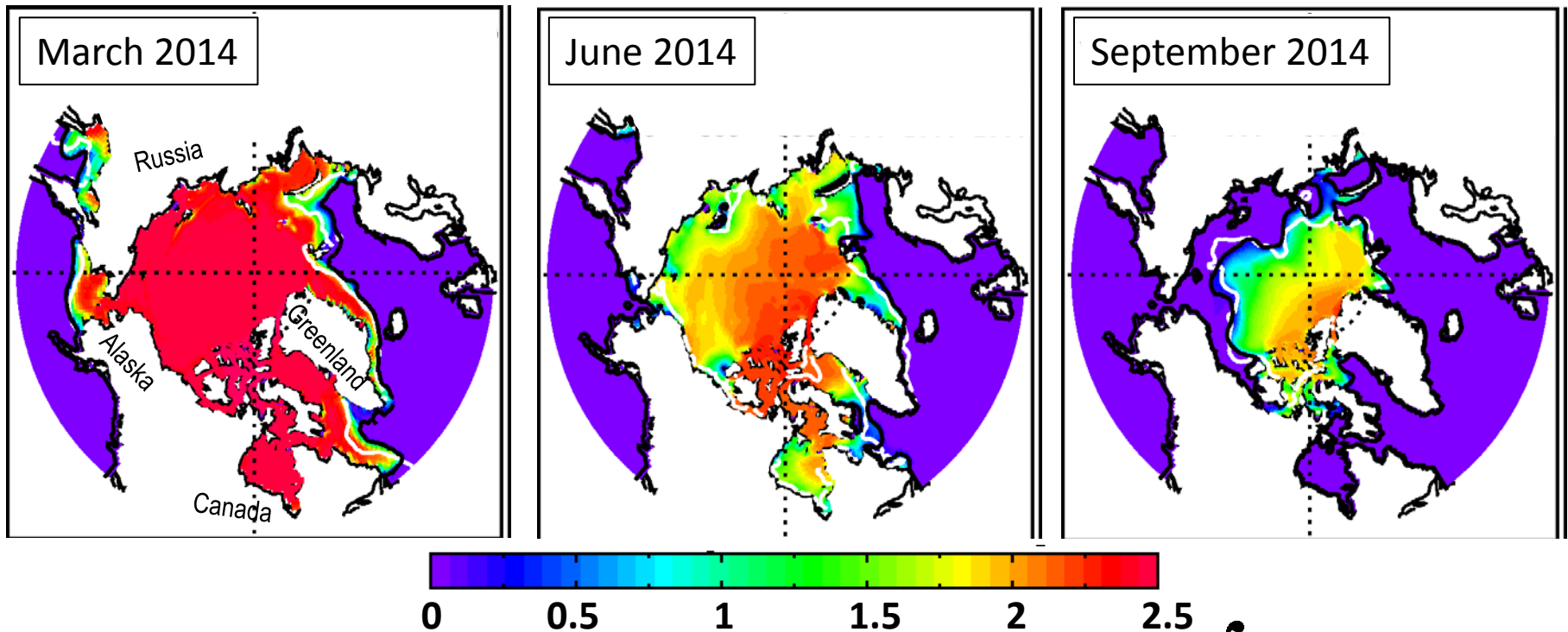
Floe diameter in MIZMAS



$$\text{Mean Floe Diameter (km)} = \int_{12 \text{ sizes}} g_l(l) l dl$$

10 cm → 3 km

Floe diameter in MIZMAS



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10 cm → 3 km

- Zhang et al. (JGR, 2015): **theory**
- Zhang et al. (Elementa, 2016): **first pan-arctic simulations**
- Stern et al. (Elementa, in review, 2017): **floe diameter obs from MODIS, SAR, hi-res visible**
- Future: **More model-obs studies, impact on ocean properties, bio ??**