

Sea-ice deformation forecasts for the MOSAiC Arctic drift campaign in the SIDFEx database

Valentin Ludwig, Helge Goessling and the SIDFEx team

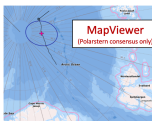
Alfred-Wegener-Institut

May 25, 2022
EGU General Assembly

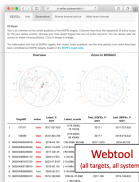
Sea Ice Drift Forecast Experiment

NRT products

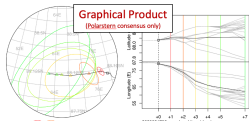
including
multi-model
„consensus“
forecasts!



non-public URL



<https://sidex.polarprediction.net/>



see links at <https://www.polarprediction.net> -> SIDEx

spheRlab

R-package
[everything]

<https://github.com/helgegoessling/SIDEx>

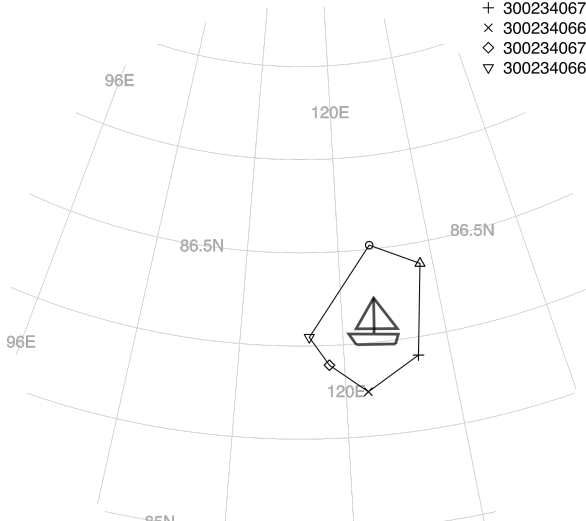
© H. Goessling

- ▷ Started in 2017 (YOPP)
- ▷ 13 forecast centers contributing drift forecasts for selected buoys/points
- ▷ More than 200k forecasted trajectories
- ▷ Applications: Navigation support, model evaluation...
- ▷ So far: predict **location of single buoys**
- ▷ Now: predict **deformation of buoy array**

Movement of Distributed Network

DN on 2019–321

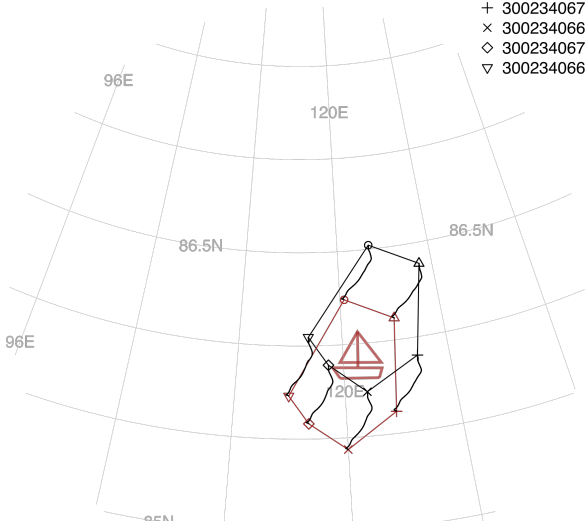
- 300234066089220
- △ 300234066087220
- + 300234067509680
- × 300234066417330
- ◇ 300234067700760
- ▽ 300234066084230



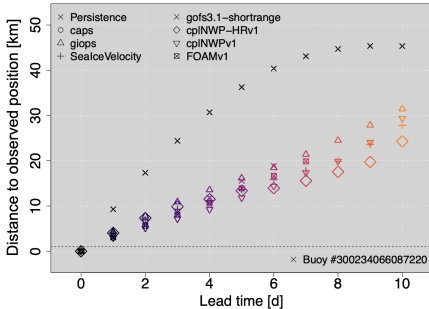
Movement of Distributed Network

DN between 2019–321 and 2019–322

- 300234066089220
- △ 300234066087220
- + 300234067509680
- × 300234066417330
- ◇ 300234067700760
- ▽ 300234066084230



Predicting location



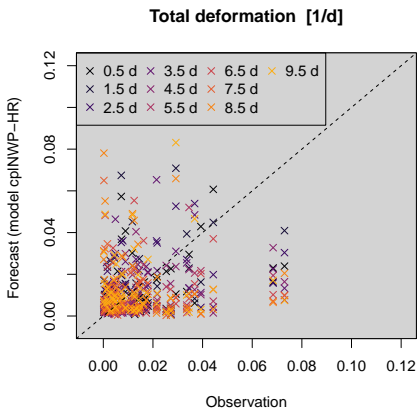
- ▷ Location errors from ≈ 2 km (1d) to ≈ 25 km (10d)
- ▷ Outperforms persistence
- ▷ Conclusion: skillful forecasts for single buoys



How about forecasts of deformation?

$$\text{Deformation} = \sqrt{\text{div}^2 + \text{shear}_{\text{pure}}^2 + \text{shear}_{\text{normal}}^2}$$

Predicting deformation



- ▷ Not too much skill so far
- ▷ Correlations 0.3–0.5, decreasing for leadtimes $> 6d$
- ▷ Possible reasons:
 - ▷ Model resolution too coarse → look into large-scale arrays
 - ▷ Ice deformation dominated by noise → look into wind deformation

In a nutshell



- ▷ Can we predict the location of single buoys? Yes.
- ▷ Can we predict the deformation of an array of buoys? Not satisfactorily yet.
- ▷ But we're working on it.
- ▷ Stay tuned: valentin.ludwig@awi.de