SIPN2 (SIO) Lessons Learned
Via Zoom, Monday Oct 11, 2021
Uma Bhatt, U. Alaska Fairbanks

Observed September Arctic sea ice extent 1979–2021, with July SIO medians

- Observed September extent
- Quadratic trend ($R^2 = 0.79$)
- July SIO median

updated from Hamilton & Stroeve (2016) ‘400 predictions’ Polar Geography

Graphic: Larry Hamilton
Sea Ice Prediction Network - Personnel

2018-2021 SIO Contributors Word Cloud

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SIPN Phase 2 - Goals

(1) Evaluate SIO forecast methods
(2) Evaluate the socio-economic value of sea-ice predictions based on stakeholder product needs
(3) Evolve network SIO forecasts and further develop network activities.
(4) Develop new observation-based products to improve sea-ice predictions
(5) Dynamical & Statistical methods, oceanic heat & Pacific sector climate variability
Evaluate SIO forecast methods
SIO does better when Sept SIE close to trend

Observed September extent with July SIO median & IQR 2008–2021

updated from Hamilton & Stroeve (2016) '400 predictions' Polar Geography

[Hamilton & Stroeve 2016]
Evaluate SIO forecast methods
SIO most correlated with observed Sept SIE from previous year (method doesn’t matter)

$r^2 = 0.84$

SIO prediction error vs. observed change from previous year

updated from Hamilton & Stroeve (2016) ‘400 predictions’ Polar Geography
Evaluate SIO forecast methods

Anomaly forecasts showed more variability than expected but RMSE decreased over SIO

September 2021 Mean SIE anomaly = 0.61 million km²

Root Mean Square Error from Observed (0.61)

<table>
<thead>
<tr>
<th>Month</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>0.38</td>
</tr>
<tr>
<td>August</td>
<td>0.40</td>
</tr>
<tr>
<td>July</td>
<td>0.51</td>
</tr>
<tr>
<td>June</td>
<td>0.52</td>
</tr>
</tbody>
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Note: Anomaly defined from observed 2005-2020 linear trend
Evaluate SIO forecast methods
Alaska Regional Forecasts

September 2021 Mean SIE anomaly = 0.81 million km²

Statistical over Dynamical
2020 — too high
2021 — too low

September 2020 Mean SIE anomaly = 0.48 million km²

September 2021 Mean SIE anomaly = 0.81 million km²
Evaluate SIO forecast methods
Including SIPN South reminds us of Arctic advances

François Massonnet
Evaluate the socio-economic value of sea-ice predictions based on stakeholder product needs

• The interest and need for information is out there but still a gap ... but it is shrinking
• Conversations with Bering Sea Crabbers
  • Crabbers have not considered the S2S time scale in their planning. (Would be useful for Federal regulators of the crabbing industry).
• Examples: Tourism industry, open water season or ice roads for industry, environmental safety, human safety
• Sea ice community ==> Mosaic Fram Strait forecasts, SIDFEx
• Continue conversations with stakeholders so they know what we can deliver and we know what they need.
Evolve network SIO forecasts and further develop network activities.

- SIO Forum in January 2021
- A public meeting report appeared in BAMS.
- Team peer-reviewed article is in progress (Bushak)
- *September SIO* and *Anomaly forecasts* are two ideas that emerged from the Forum that we implemented in 2021.
- A strengthened network of SIO contributors that communicated that the SIO should continue.
Sea Ice Prediction Network  - What Next?

• We need to improve sea ice forecasting skill.
• Portal (updated version) needed to serve as a sandbox
• More regional focus, additional seasons besides September, and additional metrics with aid of portal.
• Answer more of the Why? with aid of portal.
• In a future network, we could produce a SIO multi-model forecast (weighted forecast), & additional collaborative activities.
• SIO report will continue for September, with possible brief reports for other seasons.
• Trying to figure out how to manage 2022 SIO since proposal timing will not be resolved in time.