

Short-Term (Seven-Day) Beaufort Sea-Ice Extent Forecasting with Deep Learning



Four-day forward ice extent: model forecast vs. actual



Results demonstrated improvement (decrease) in ice edge error with day of forecast over persistence model An APL-developed deep learning forecast model of sea-ice extent for one- to sevendays-ahead successfully predicted changes in sea-ice significant for navigation in the Beaufort Sea during freeze-up.

- Ships in the Arctic require timely, accurate sea-ice location data to complete their transits safely.
- Our short-term (seven-day) forecast process uses existing observations of ice extent, atmospheric and oceanic conditions, and appropriate machine learning models.
- The results showed improvement in short-term forecasts of ice locations over current methods.
- The analysis process suggests a potential way forward for predicting sea-ice motion and location in the most difficult of polar seasons, the summer melt.

Keller, Piatko, Clemens-Sewall, Eager, Foster, Gifford, Rollend, and Sleeman, 2023, Artificial Intelligence for the Earth Systems, DOI: https://doi.org/10.1175/AIES-D-22-0070.1