

An aerial photograph of a vast expanse of sea ice, composed of numerous irregular floes of varying sizes. The ice floes are a pale, milky blue color, contrasting with the darker, open water between them. The horizon is visible in the distance, where the ice meets a sky filled with soft, grey clouds. The overall lighting is diffused, suggesting an overcast day or twilight.

# **SEA ICE PREDICTION NETWORK**

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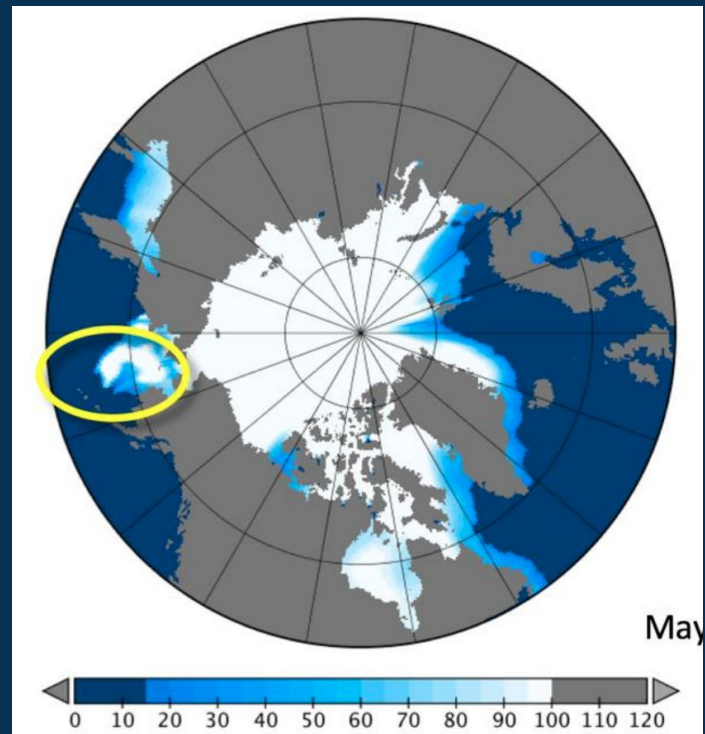
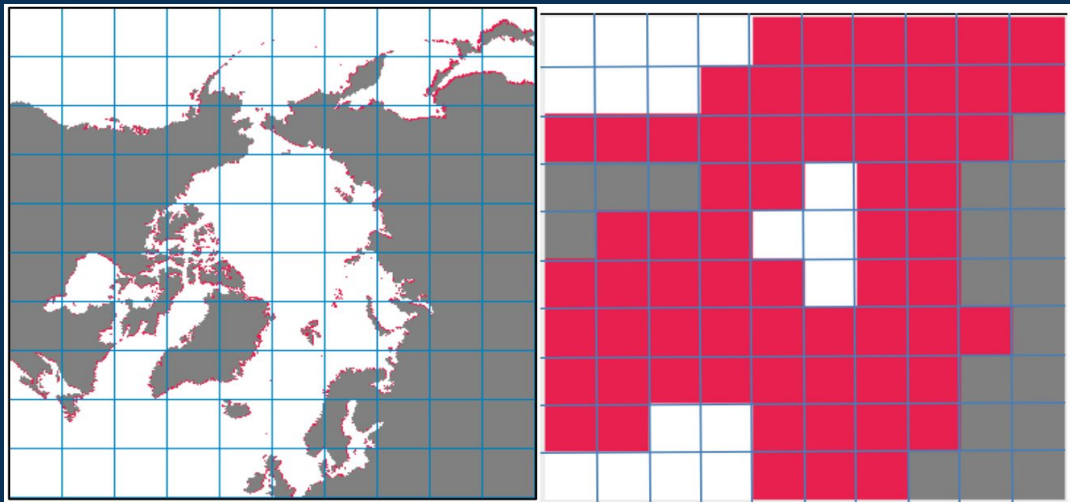
# Background

- Climate change→ decrease in sea ice concentration at all times of the year
  - forecasting sea ice extent is becoming increasingly difficult
- Sea ice prediction network based on a CNN
  - binary classification on ice concentration data to forecast sea ice locations in the Arctic



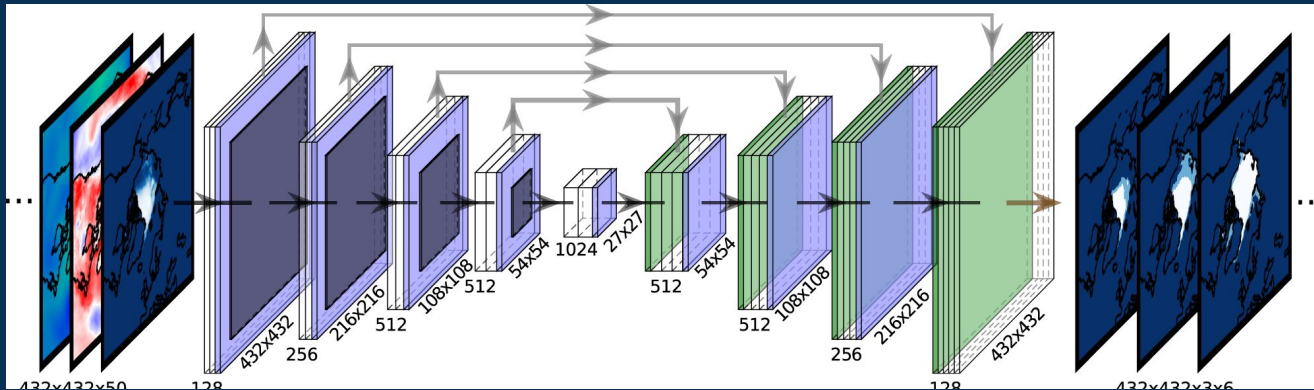
# Dataset

- NSIDC- Sea ice concentration data and satellite imagery 1979-2017
- 240 x 1140 grid of the Arctic- pixels between 0-100
  - Concentration  $\geq 15$  = sea ice
  - Concentration  $< 15$  = open water



# Method

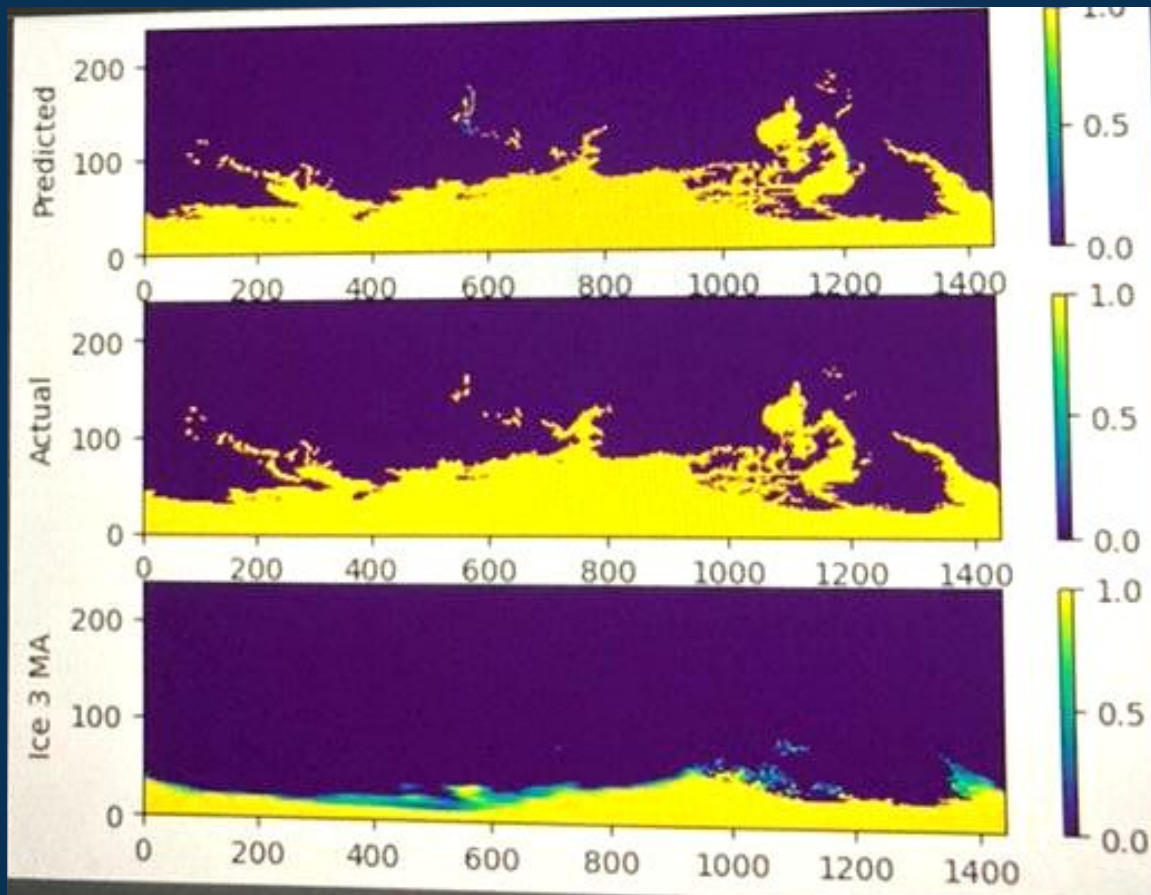
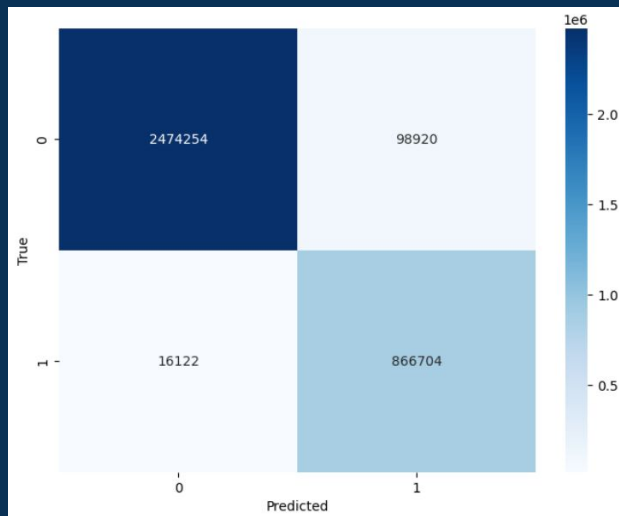
- CNN trained on dataset
  - Computer vision problem
  - Train = sea ice concentration 3 months earlier, predictions = current sea ice concentration
  - Randomized years
- Evaluation Metrics: Accuracy, Precision, Recall, and F1





# Results

- Validation Loss: 0.132
- Accuracy in predicting sea ice locations: 98%



# Impact

- Feasibility of utilizing CNN-based approaches for improving sea ice prediction capabilities
  - Further research required to enhance the accuracy and performance
- CNN aids in Arctic weather forecasting, climate modeling, and resource management
  - better understanding of the Arctic environment

