Evaluation of Alaska's Coastal Zone Total Water Level Modeling System Developed for the Next Generation Water Resources Modeling Framework (NextGen)

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Alaska NextGen Coastal Models

- The Office of Water Prediction (OWP) has developed a coupled modeling system (using SCHISM and D-Flow FM) to simulate total water levels (TWL) in the coastal regions of Alaska.
- That model domain includes Cook Inlet, Prince William Sound, the Copper River estuary, Icy Bay and nearshore portions of the Gulf of Alaska.
- This poster is supplement to other works shown by Shi et. al., Sorourian et al., Gibbs et al., and Ducker et. al. at the AGU 2024.
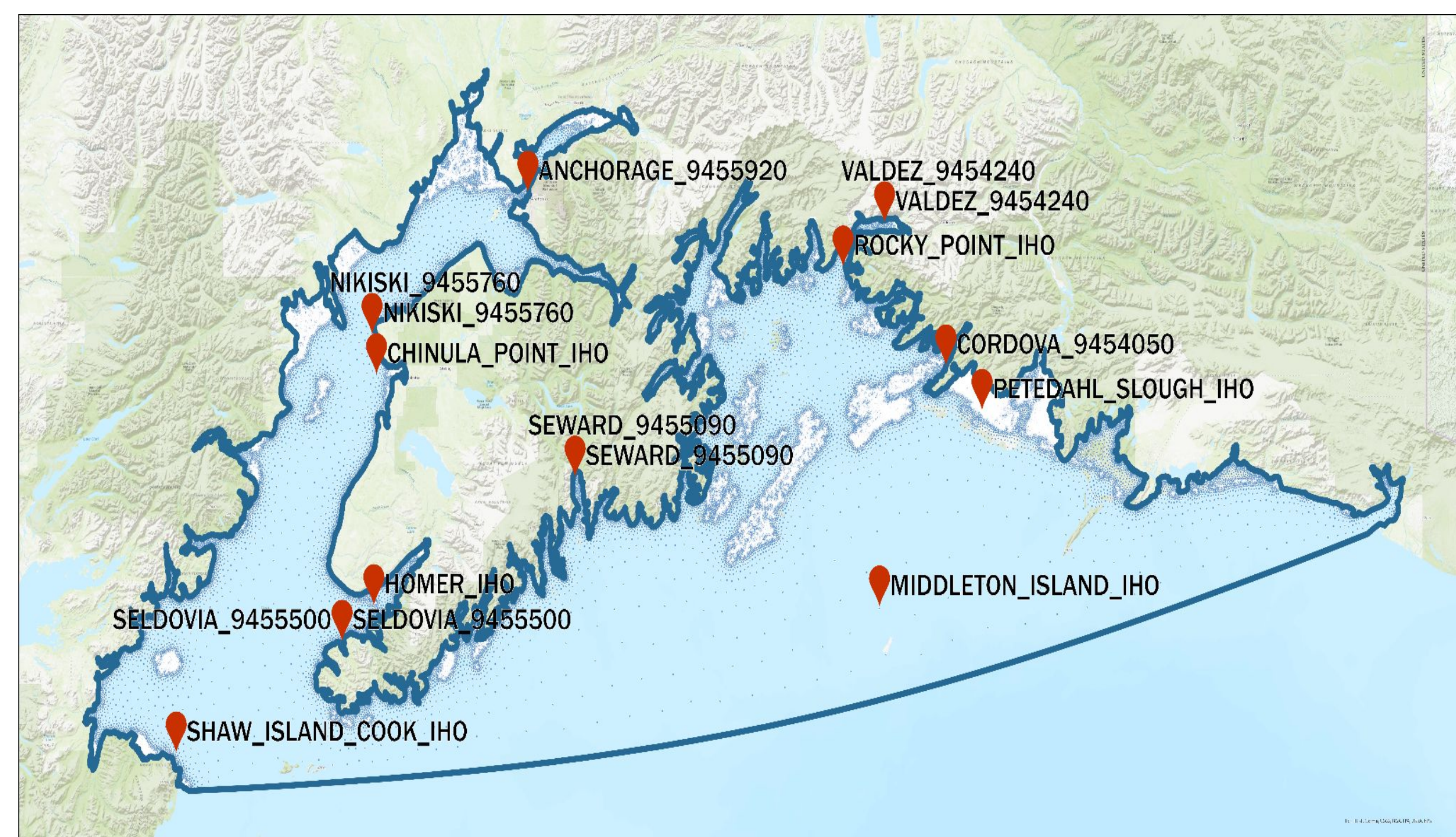
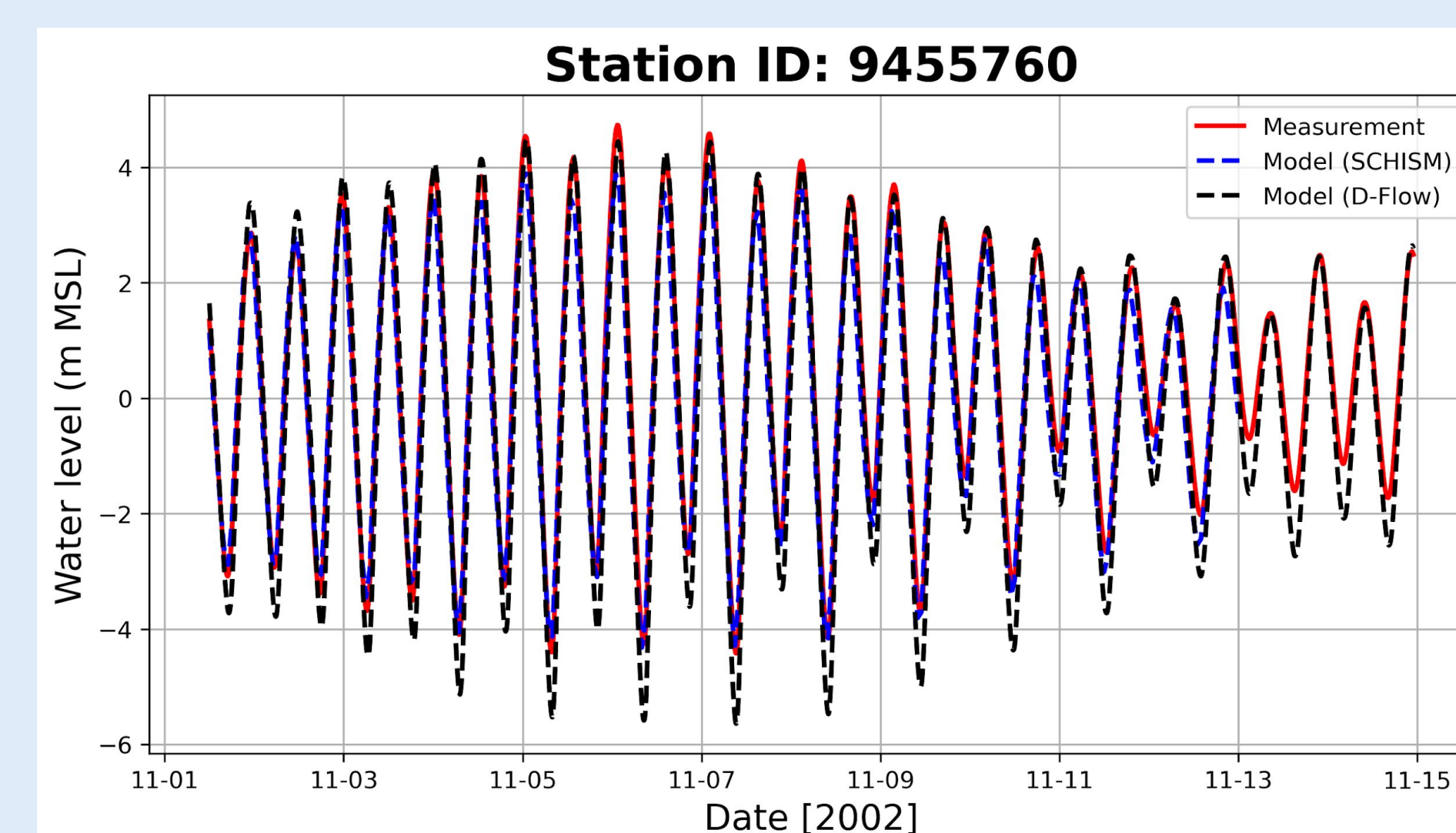Alaska model domain, tide and TWL evaluation stations
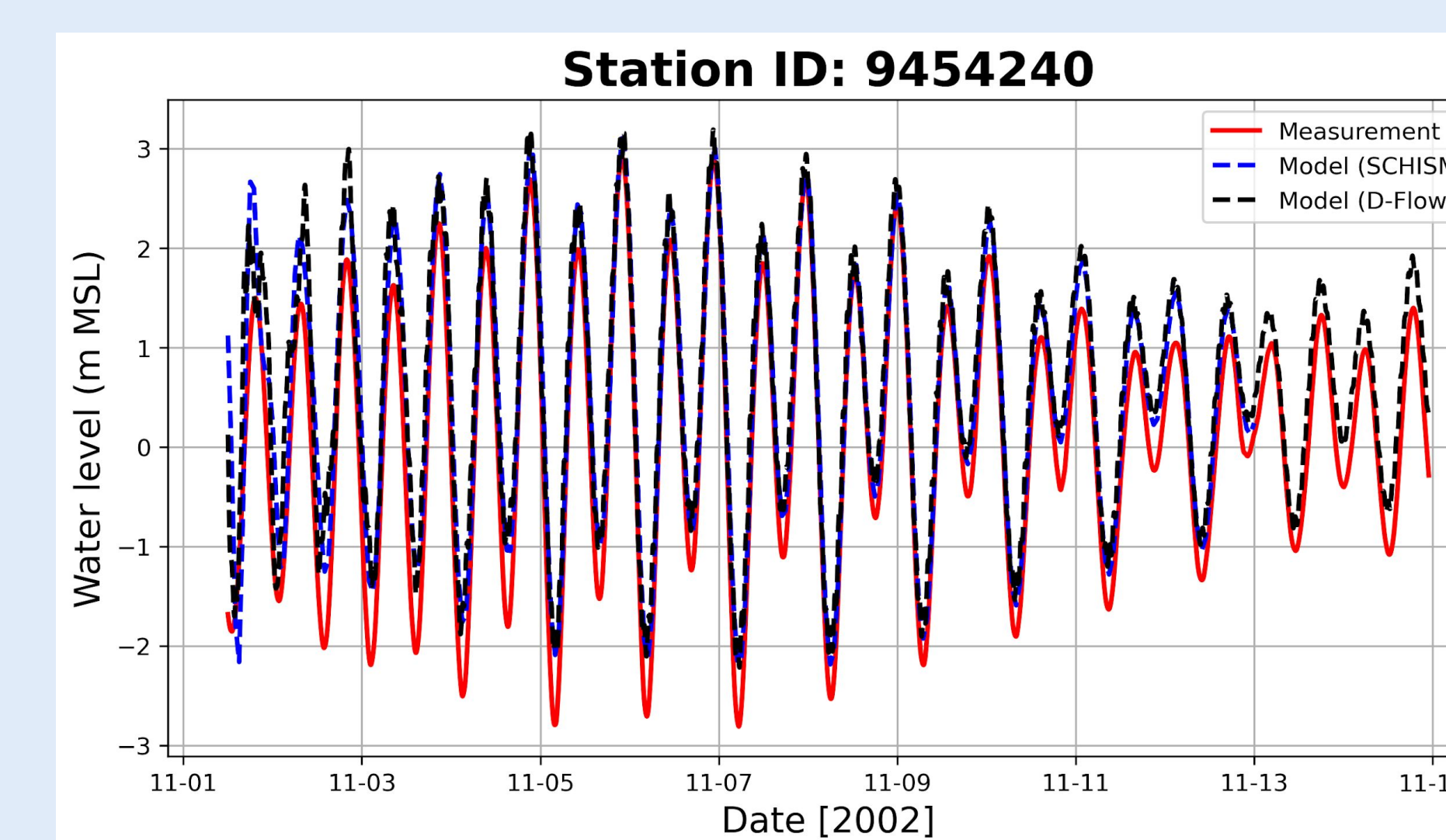
Model Development
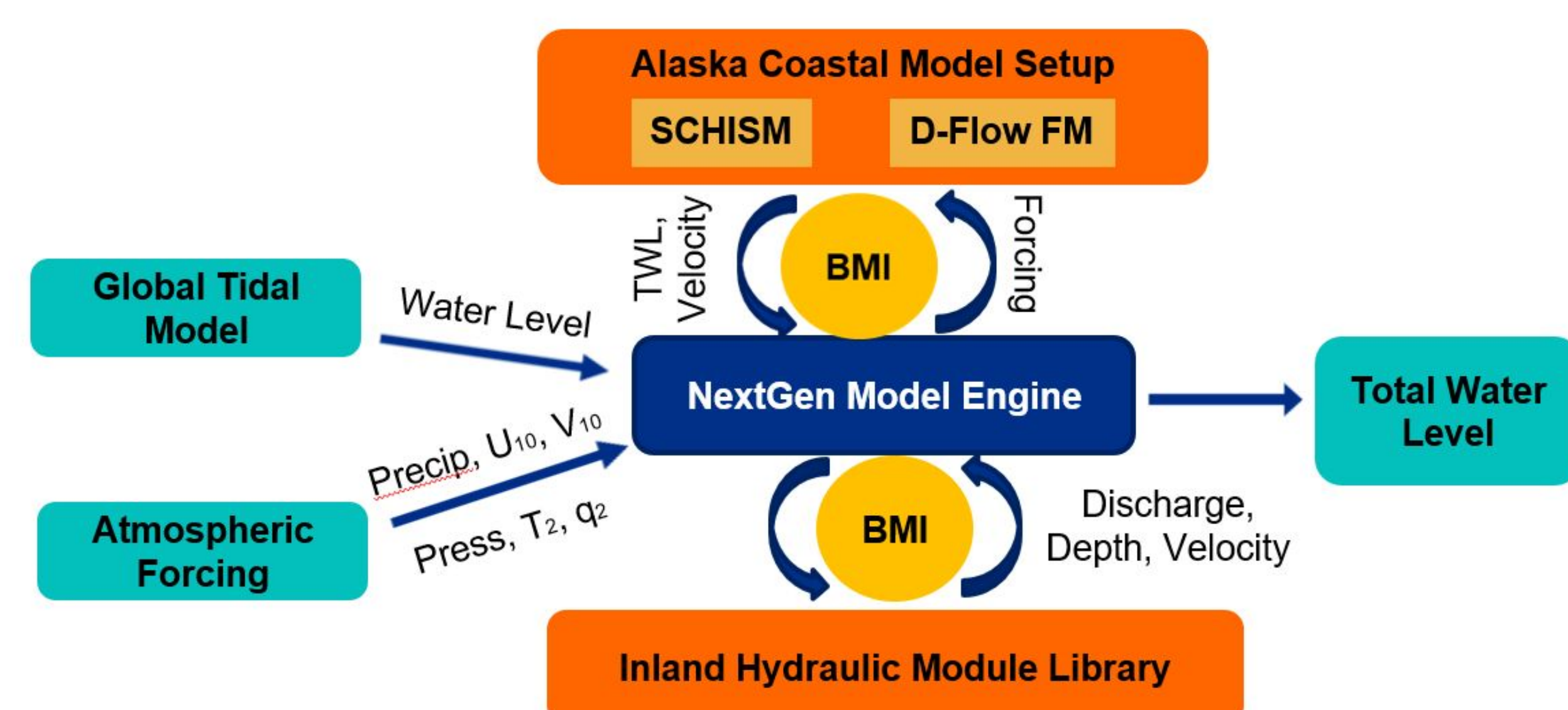
Coastal Alaska Model within the NextGen Framework

For the First Time a Total Water Level forecast Capability has been Developed for Coastal Alaska
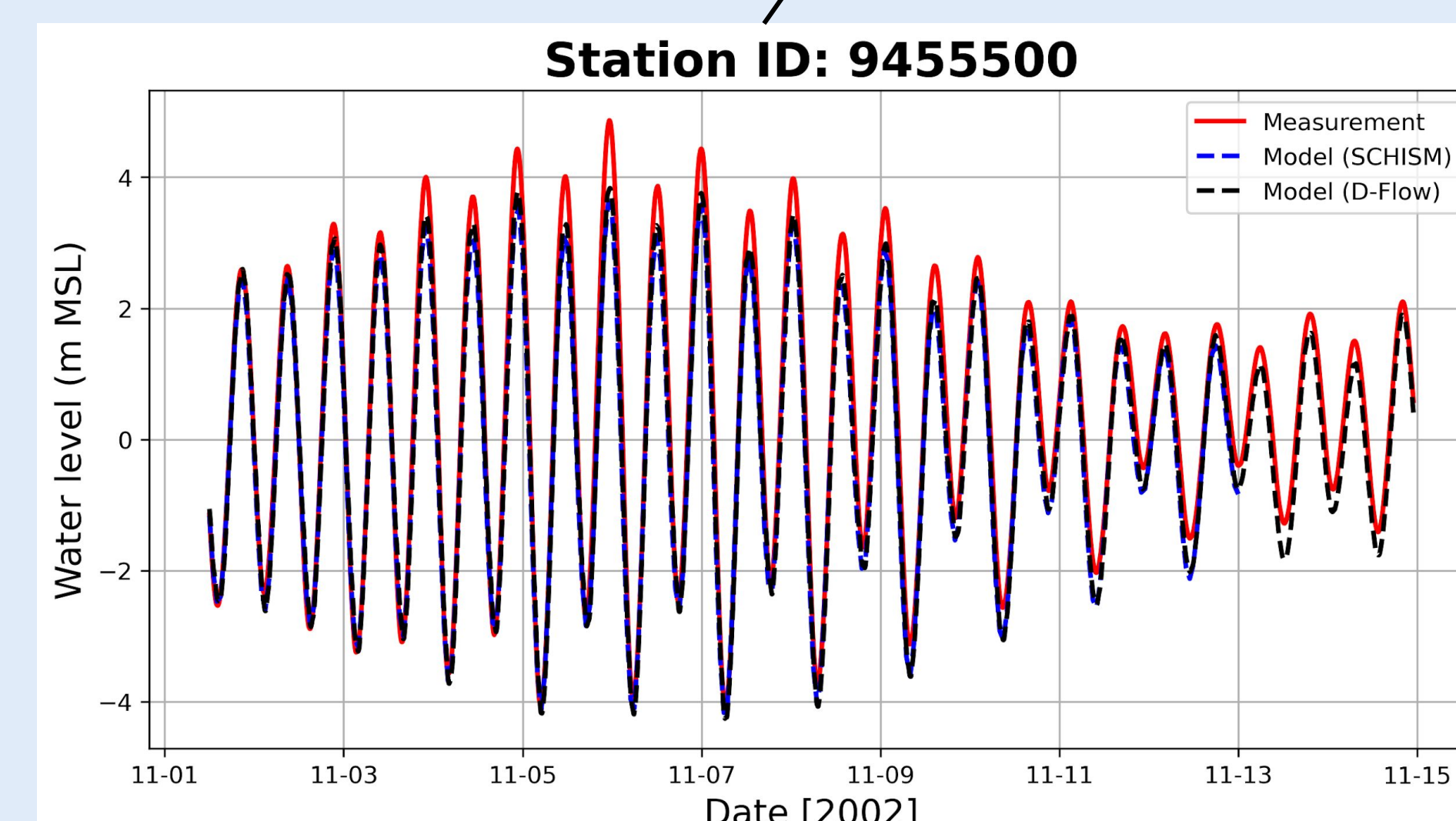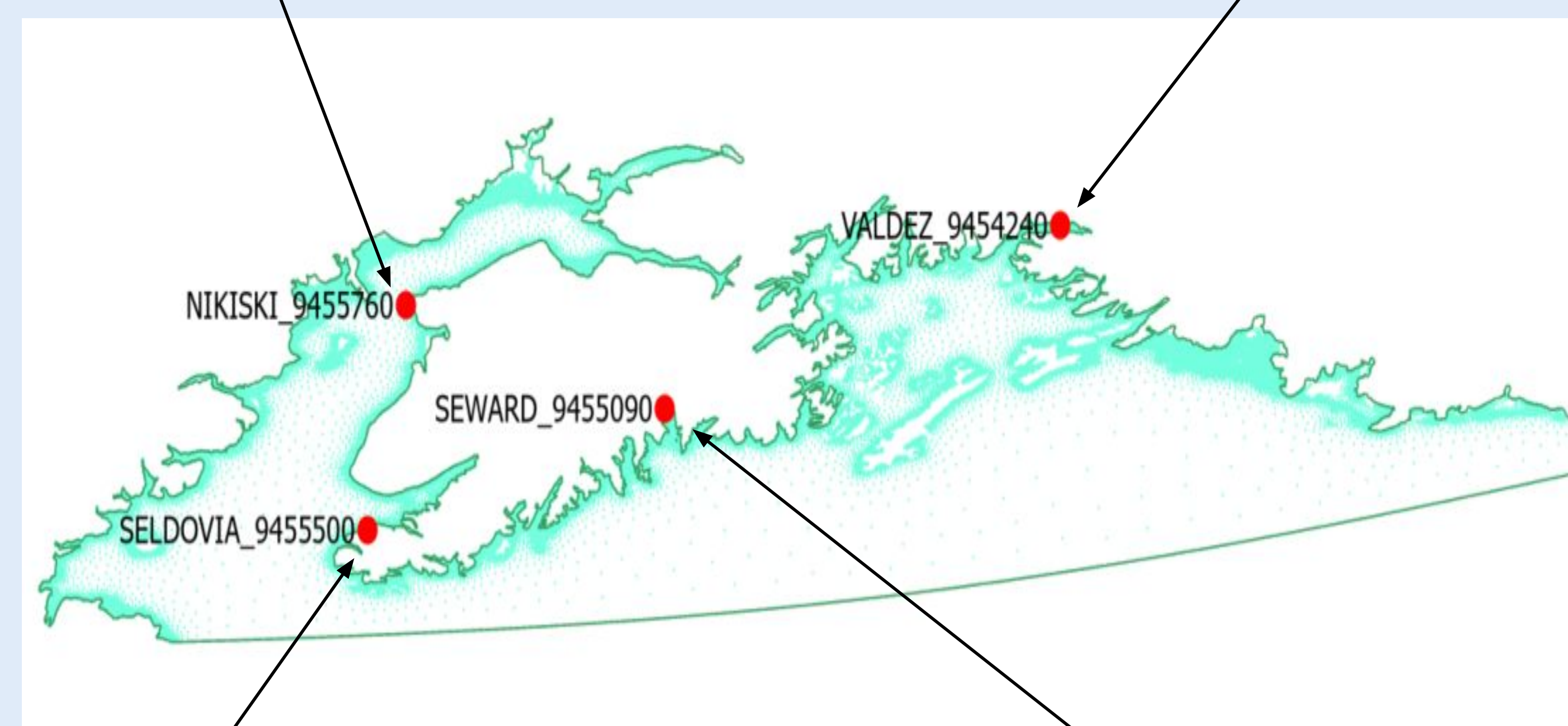
A well-performing total water level model provides confidence for a successful expansion of NextGen's coastal prediction capabilities
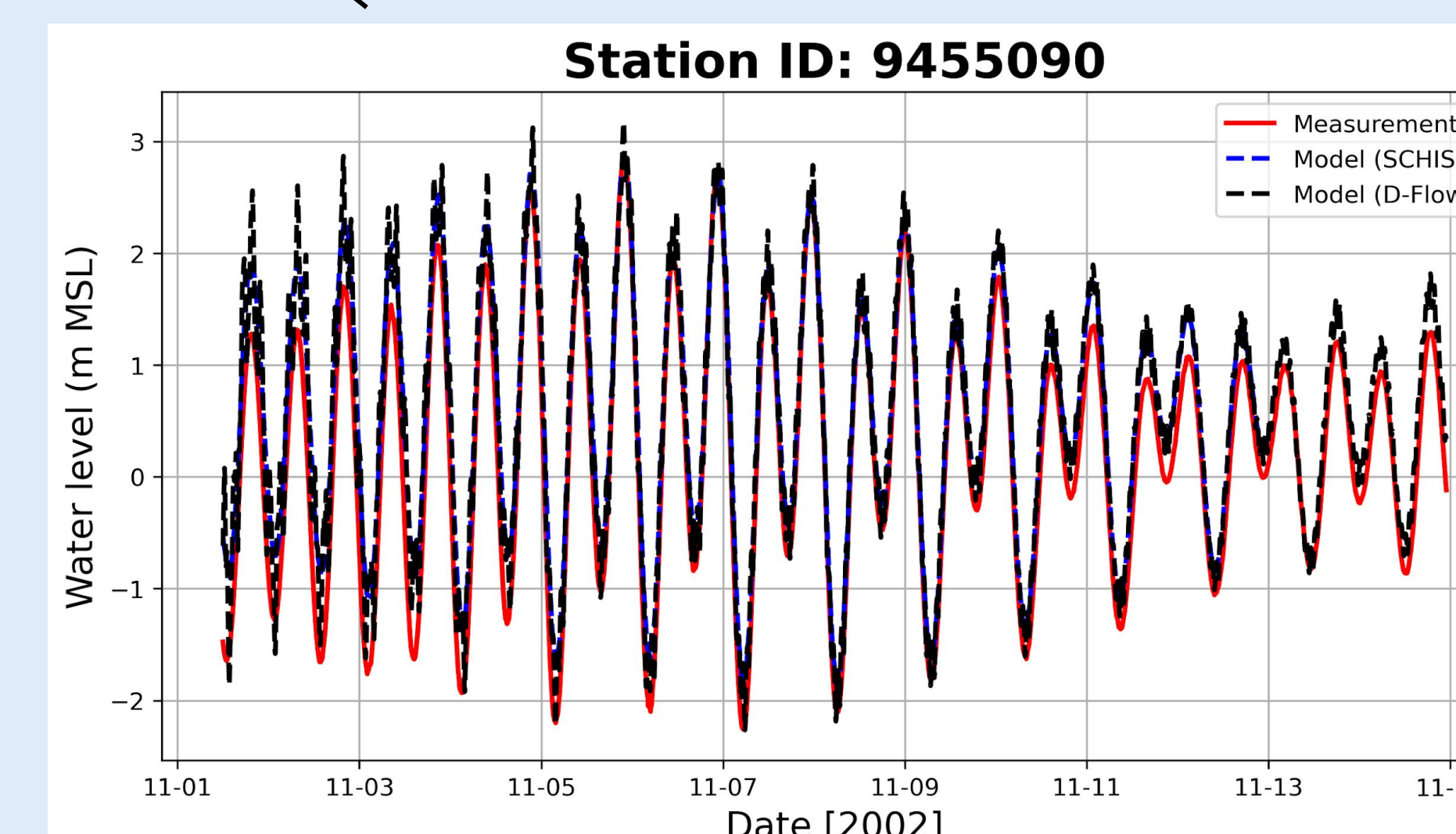

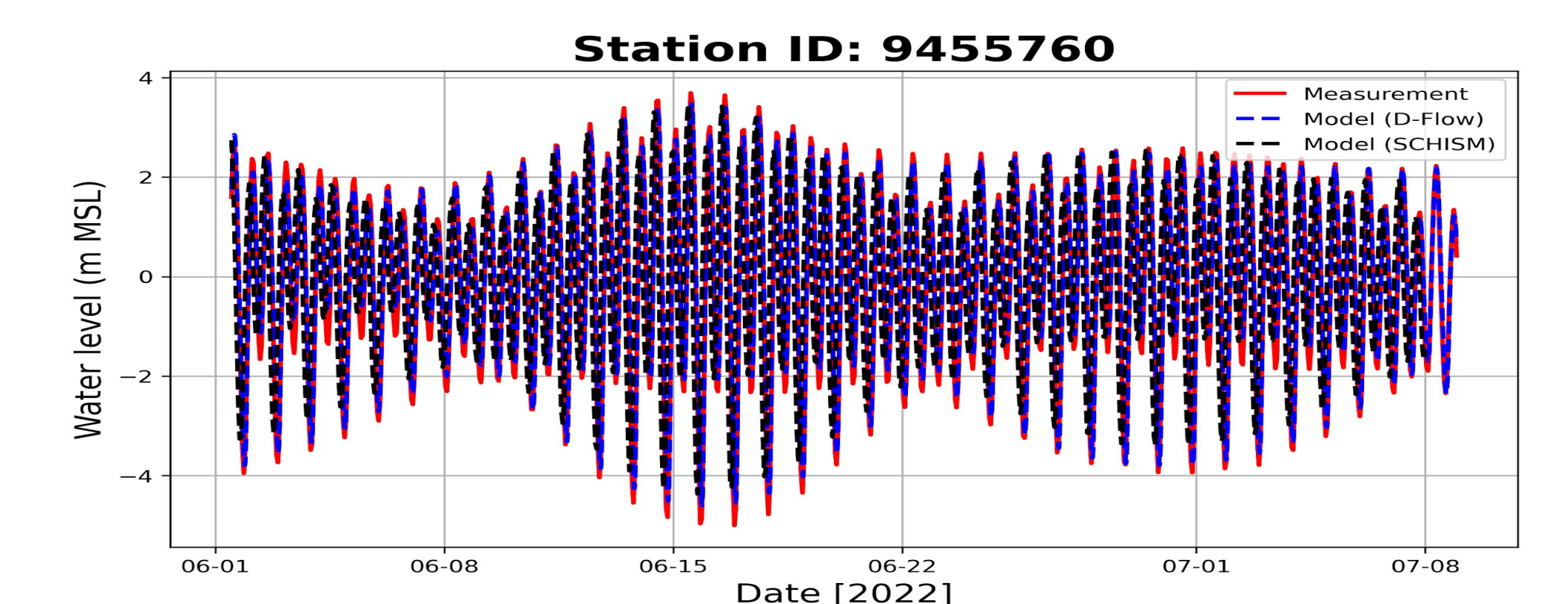TWL @ Nikisk (skill = 0.98)

TWL @ Valdez (skill = 0.95)

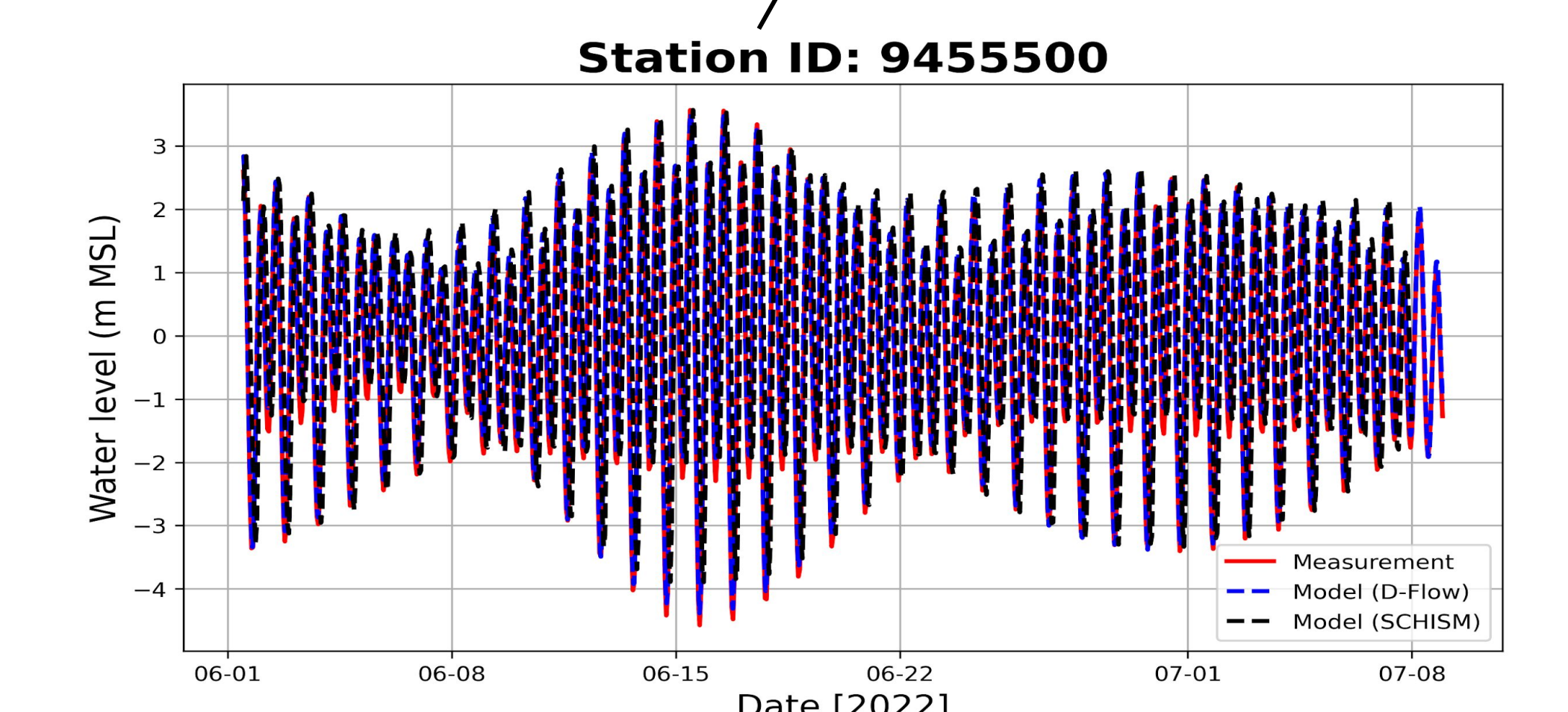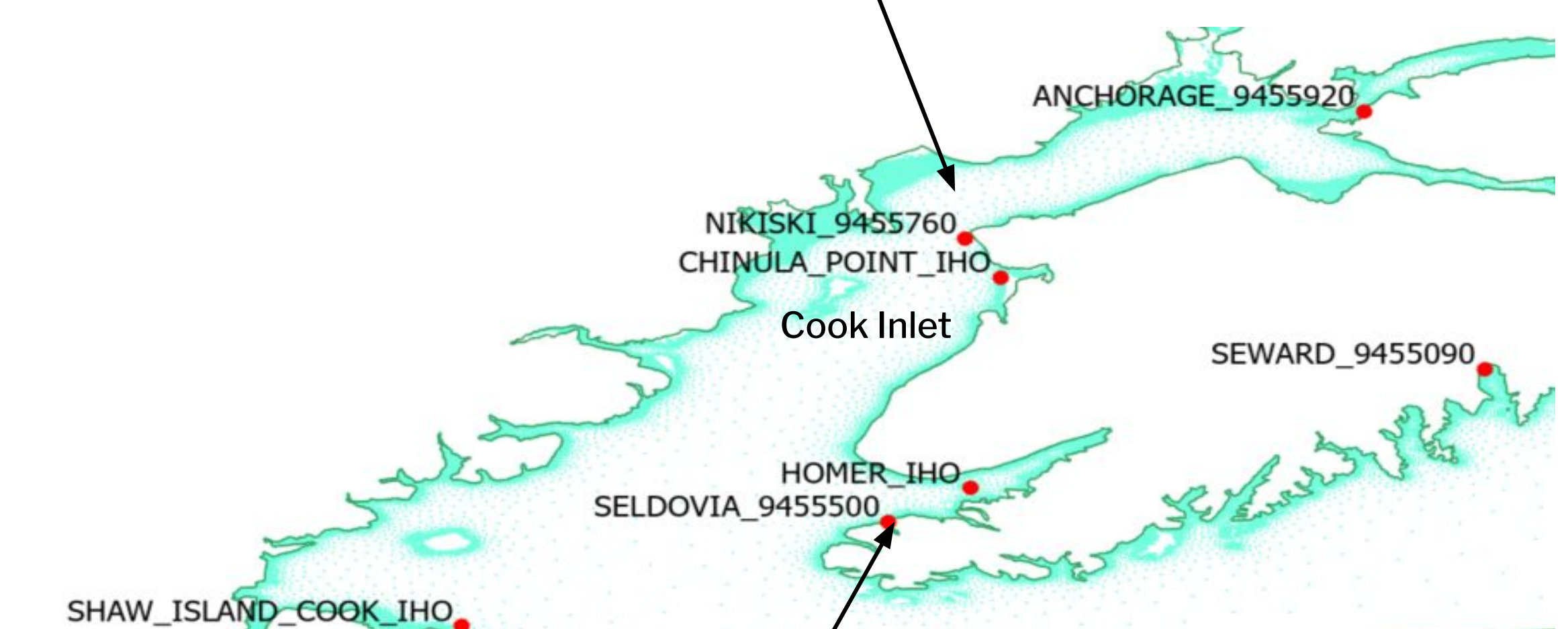
TWL @ Seldovia (skill = 0.99)

TWL @ Seward (skill = 0.97)

Model skills for tide prediction along the Cook Inlet

Tide @ Nikiski

Tide @ Seldovia

Conclusions and future work

1. For most of the stations, both the SCHISM and the D-Flow FM models perform above 95% skill level.
2. TWL predictions depends on model's skills for tide prediction. As tide propagates inland, amplitude increases along the Cook Inlet. The model captures this phenomenon accurately. However, model skill deteriorates close to inland stations due to lack of accurate bathymetric information.
3. Channel alignments and topo-bathy data are lacking in the Alaska model domain, and additional data are required to improve model skills.
4. High resolution mesh along the inland rivers and accurate topo-bathy will be included in future work.

REFERENCES:
SCHISM - http://ccrm.vims.edu/w/index.php/Main_Page
D-Flow FM - https://oss.deltares.nl/web/delft3dfm/manuals

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