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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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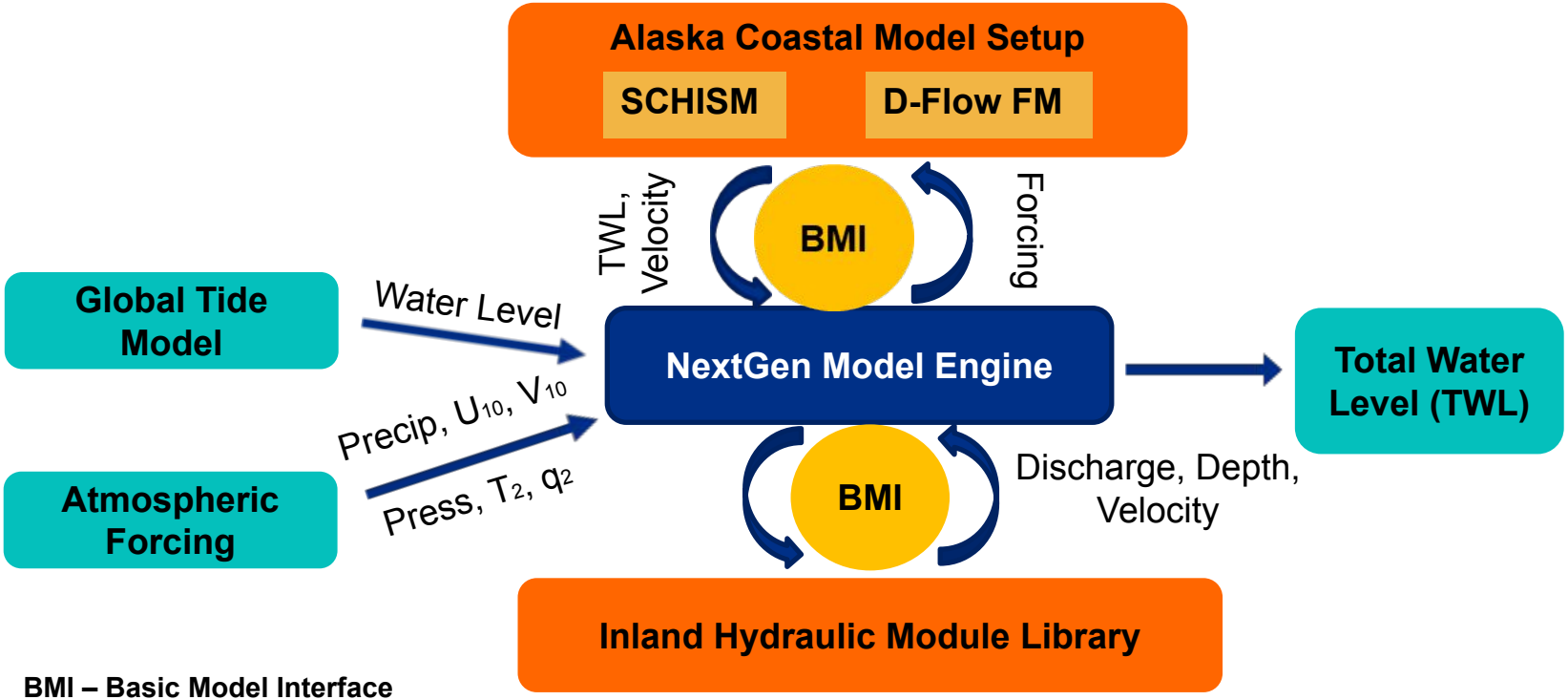
OWP is expanding its TWL Forecast Capability to the Coastal Zones of Alaska

- OWP model domain includes Cook Inlet, Prince William Sound, Icy Bay and nearshore portions of the Gulf of Alaska.
- 1.2 Million Comp. Nodes
- Coastal Alaska experiences some of the largest tidal fluctuations in the world, about **30 feet (9 meters)** in certain areas, particularly around Anchorage.

Coastal Module Library in the NextGen Framework

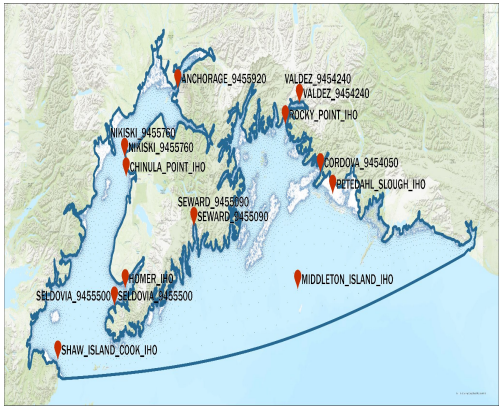


BMI – Basic Model Interface

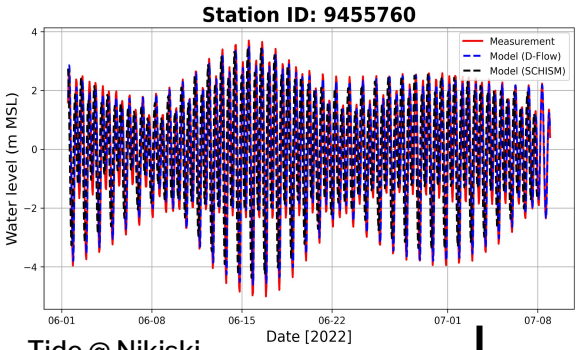
Model Forcing

- Topography and bathymetry - NOAA, USGS and local data sources.
- Riverine inflows - Tree-Based Channel Routing (T-Route) Model
- Tidal boundary - Global tide model.
- Bottom roughness values - Land cover and land use data.
- Meteorological forcing - Analysis of Record and Calibration (AORC) retrospective dataset

Tidal Evaluation



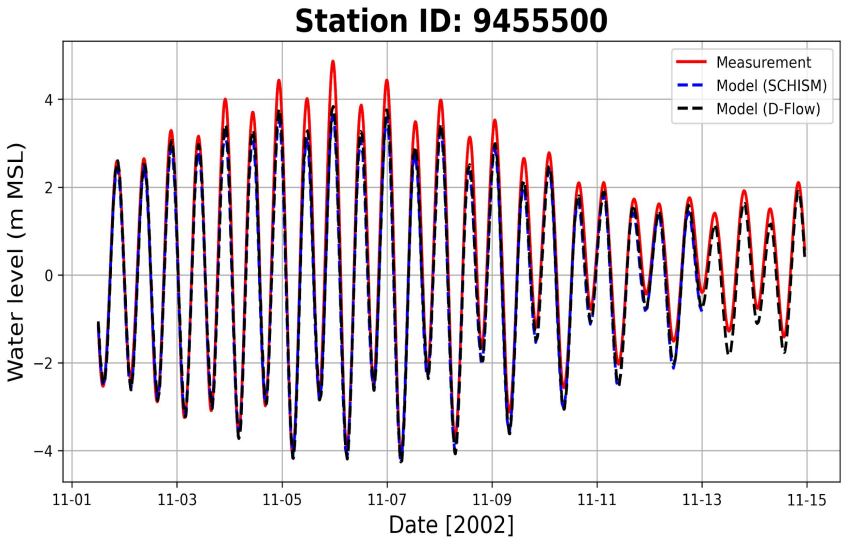
6 NOAA stations
14 sup. Stations
Skill ~ 95%



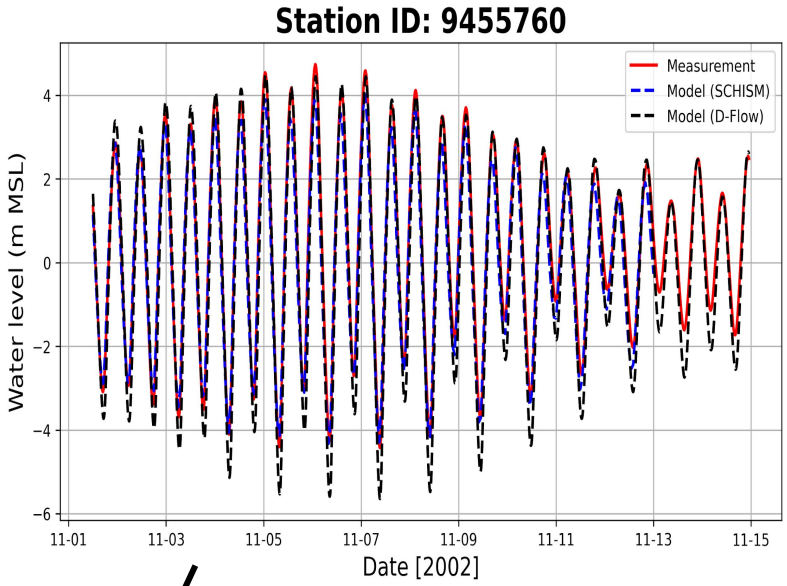
Tide @ Nikiski

Tide @ Seldovia

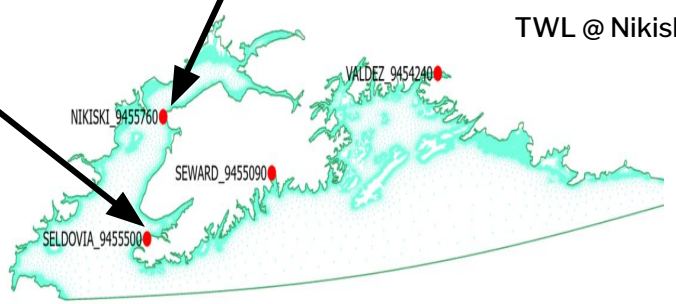
Total Water Evaluation



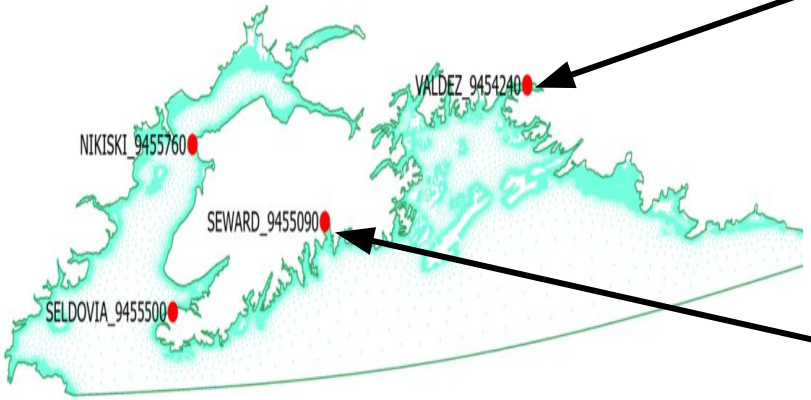
TWL @ Seldovia (skill = 0.99)

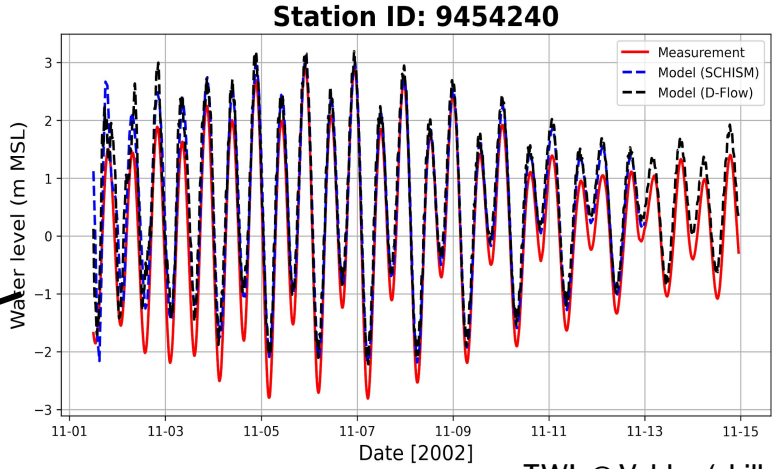


TWL @ Nikisk (skill = 0.98)

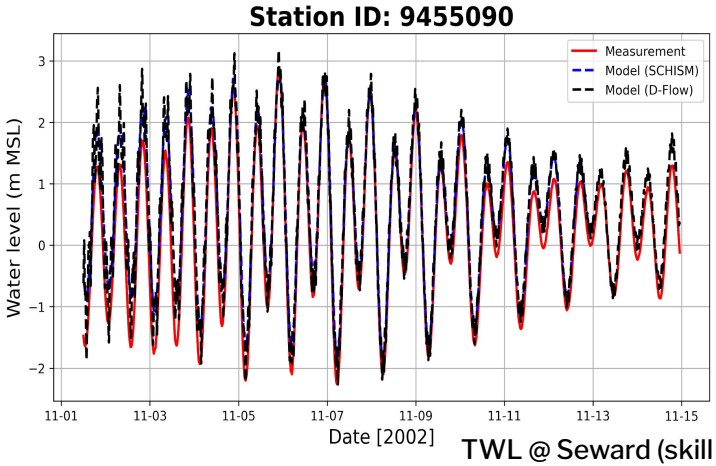


Total Water Evaluation





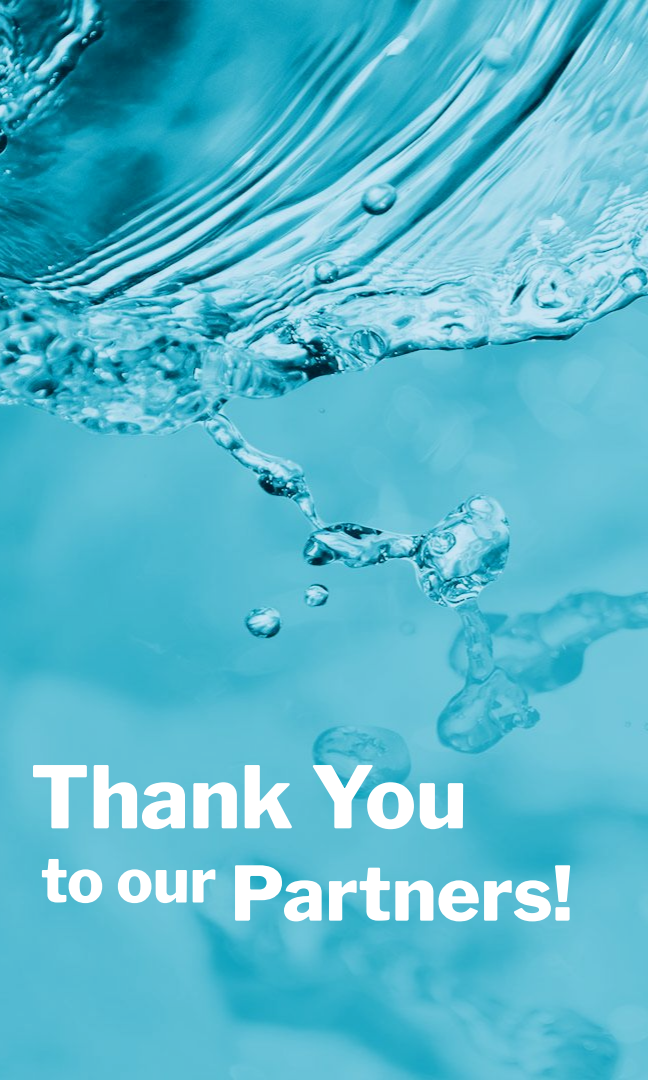
TWL @ Valdez (skill = 0.95)



TWL @ Seward (skill = 0.97)

Summary

- The NextGen TWL forecast capability developed by OWP can capture water level variations well.
- For most of the stations, both the SCHISM and the D-Flow FM models perform above 95% skill level.
- TWL predictions depends on tide prediction skill.
- Channel alignments and topo-bathy data are lacking in the Alaska.
- High resolution mesh along the inland rivers and accurate topo-bathy will be included in future work.



Related Presentations on Tuesday & Wednesday

- ***Tuesday, 8:30-10:00 Soroush Sorourian*****,** "Advancing Coastal Hydrodynamic Modeling: Integrating D-Flow FM into NextGen Framework for Lake Champlain's Water Level Predictions."

- ***Wednesday, 3:00-4:30*****: Tayebeh Sangchoulie,** "Enhancing Total Water Level Forecasting for the Great Lakes and Lake Champlain using the Next Generation Water Resources Modeling Framework (NextGen)."

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