Enhancing Total Water Level Forecasting for the Great Lakes and Lake Champlain using the Next Generation Water Resources Modeling Framework (NextGen)

Poster Session #755

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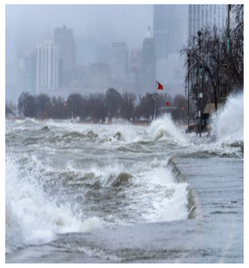
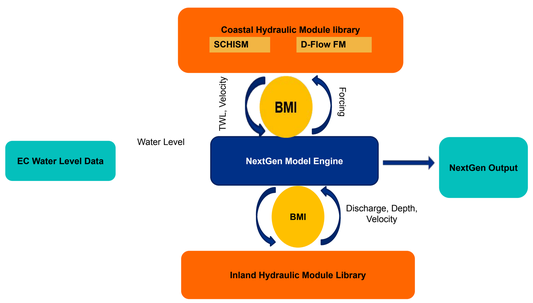
Introduction

- With a population of 34 million, 3,500+ species and 11,000 miles shoreline, the Great Lakes is one of the most important economic and population centers.
- The fluctuations of water levels at the Great Lakes impact the regional economy and ecosystems.



Coastal Module Library in the NextGen Framework



River Discharge Comes from NWM T-Route Model

- Riverine inflows were calculated from Tree-Based Channel Routing (T-Route) Model.
- Great Lakes data assimilation module is implemented within t-route.

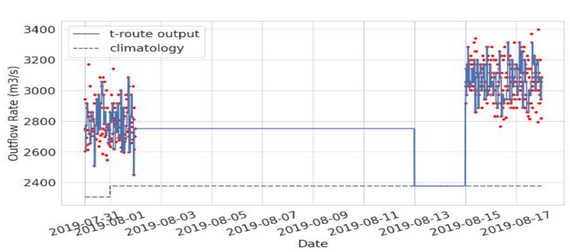
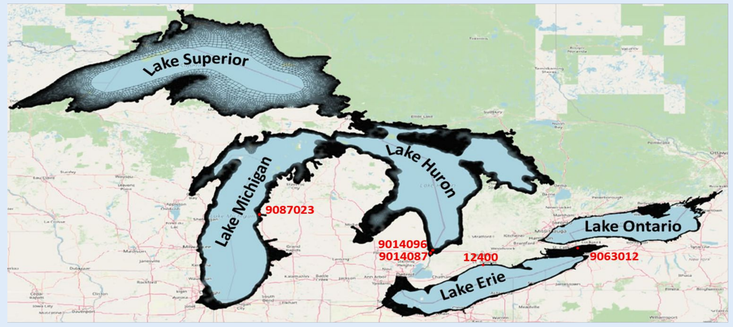


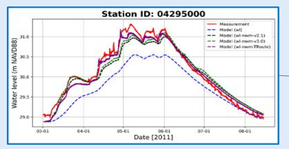
Fig. Sample output for Lake Superior

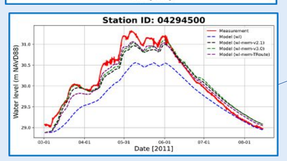
OWP is expanding its TWL Forecast Capability to the Great Lakes and Lake Champlain

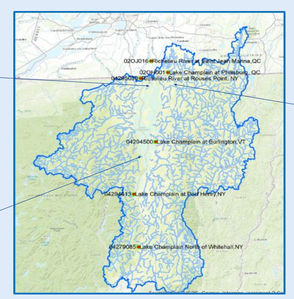
Model Domain

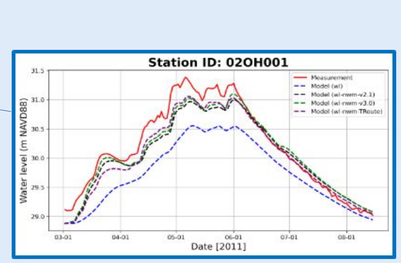


T-Route river discharge gives best results

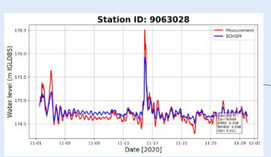


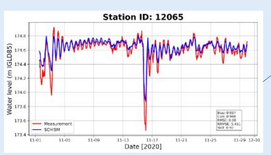


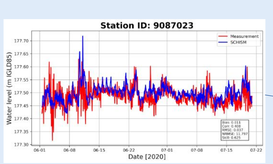


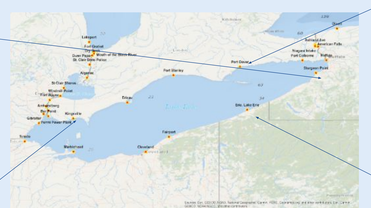


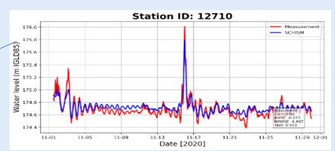
Mode Results (Skill >92%)

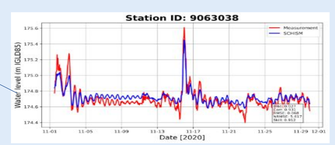


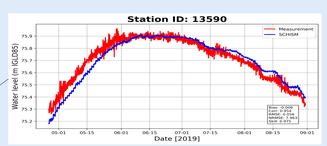




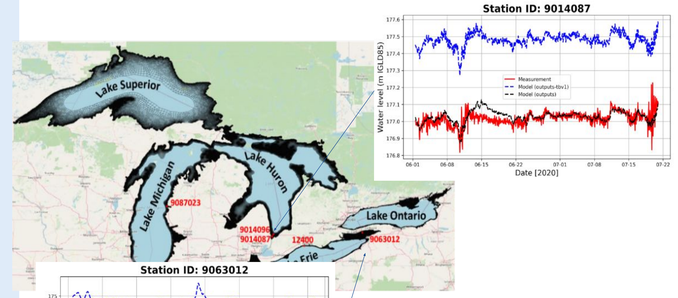


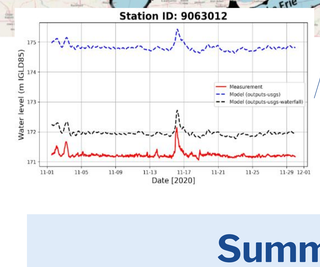






USGS Data Assimilation gives better results





Summary

- The TWL forecast capability developed by OWP can capture water level variations well from daily to monthly scales in the Great Lakes and Lake Champlain.
- TWL forecast is sensitive to the river discharge, and T-route discharge produced the best results in the Lake Champlain simulation.
- Data assimilation in T-route improves TWL accuracy

SUPPORTING INFO

- ***Tuesday, January 7th,1:00-2:00 Jason Ducker,*** Evaluating the Effect of Regridding Methods in Conversion from Grid to Catchment Representation Using the NextGen Forcings Engine
- ***Tuesday, 8:30-10:00 Hassan Mashriqui,*** Evaluation of Alaska's Coastal Zone Total Water Level Modeling System Developed for the Next Generation Water Resources Modeling Framework (NextGen)
- ***Tuesday, 9:00-10:00*: Soroush Sorourian** Advancing Coastal Hydrodynamic Modeling: Integrating D-Flow FM into the NextGen Framework for Lake Champlain's Water Level Predictions

View my poster and other AMS materials

ACKNOWLEDGEMENTS:

REFERENCES::
SCHISM - http://ccrm.vims.edu/w/index.php/Main_Page
Dt-route - https://github.com/NOAA-OWP/t-route
OWP NextGen Hydrofabric - https://github.com/NOAA-OWP/hydrofabric

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