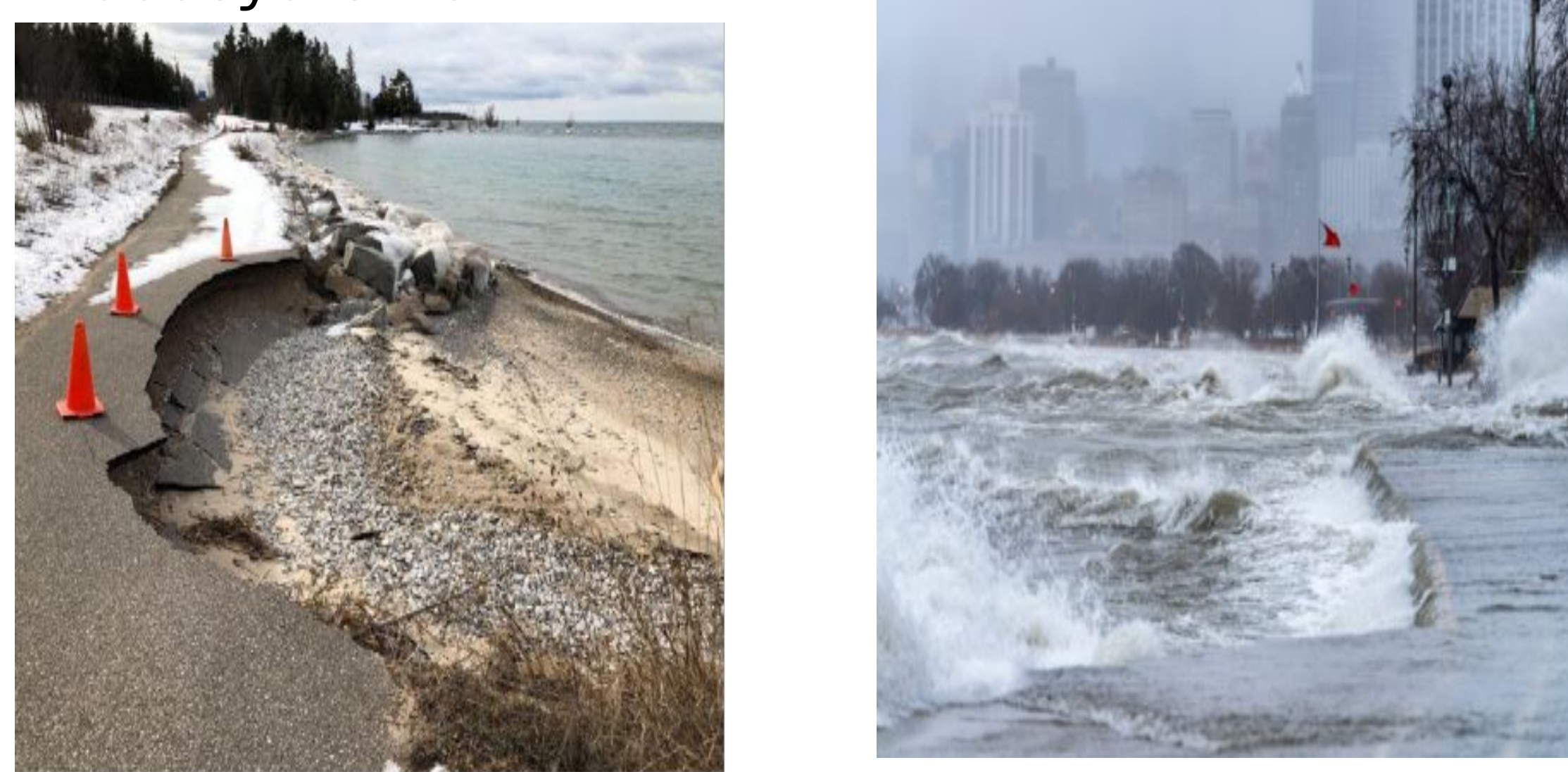


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1 National Water Center, Office of Water Prediction, National Weather Service, NOAA, Tuscaloosa, AL, USA | 2 Lynker, Leesburg, VA, USA | 3 Cooperative Institute for Research to Operations in Hydrology, Tuscaloosa, AL, USA | 4 Office of Water Prediction, National Weather Service, NOAA, Silver Spring, MD, USA

- 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.



The diagram illustrates the NextGen Model Engine architecture. At the center is a dark blue box labeled "NextGen Model Engine". To its left is a teal box labeled "EC Water Level Data", with an arrow pointing from it to the engine. Above the engine is an orange box labeled "Coastal Hydraulic Module library", which contains two sub-modules: "SCHISM" and "D-Flow FM". A circular flow of arrows connects the engine to this library, with labels "TWL, Velocity" and "Footing". Below the engine is another orange box labeled "Inland Hydraulic Module Library", also connected by a circular flow of arrows with labels "Discharge, Depth, Velocity". An arrow points from the engine to a teal box on the right labeled "NextGen Output".

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

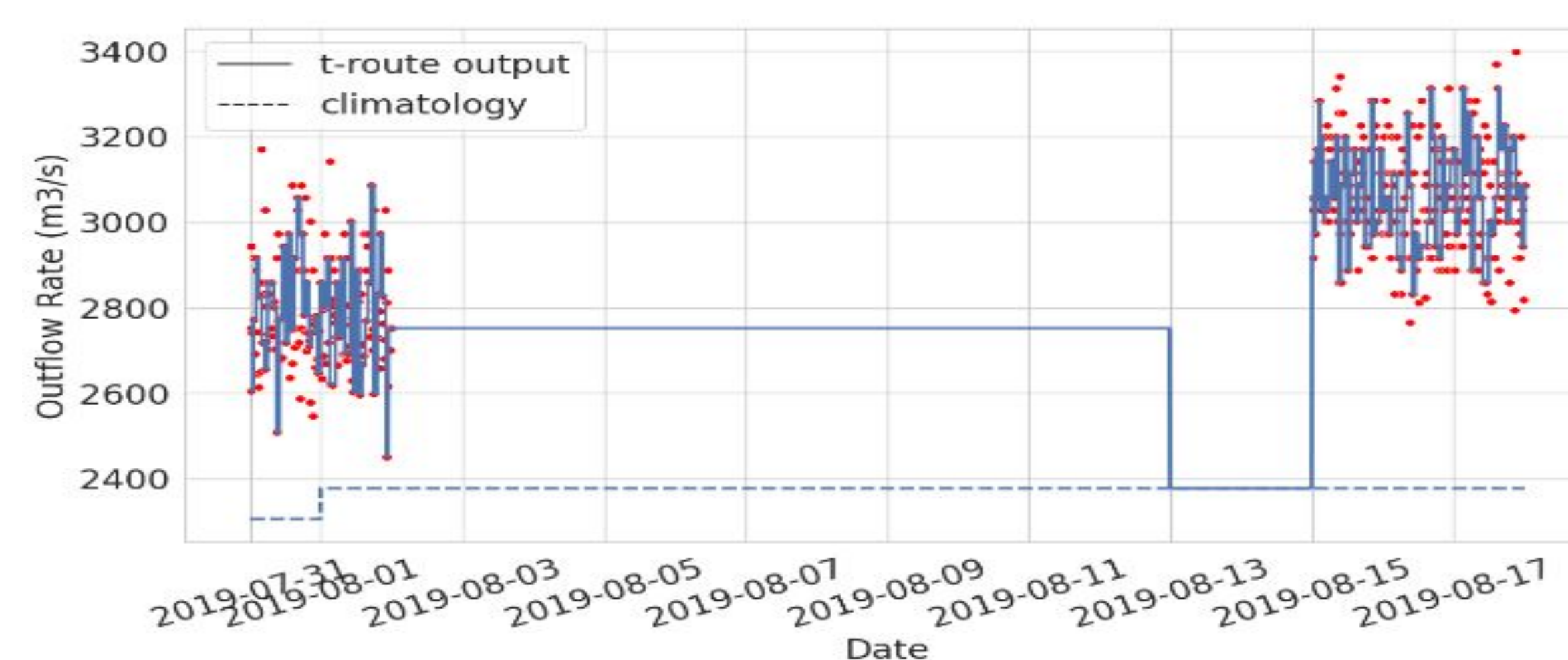
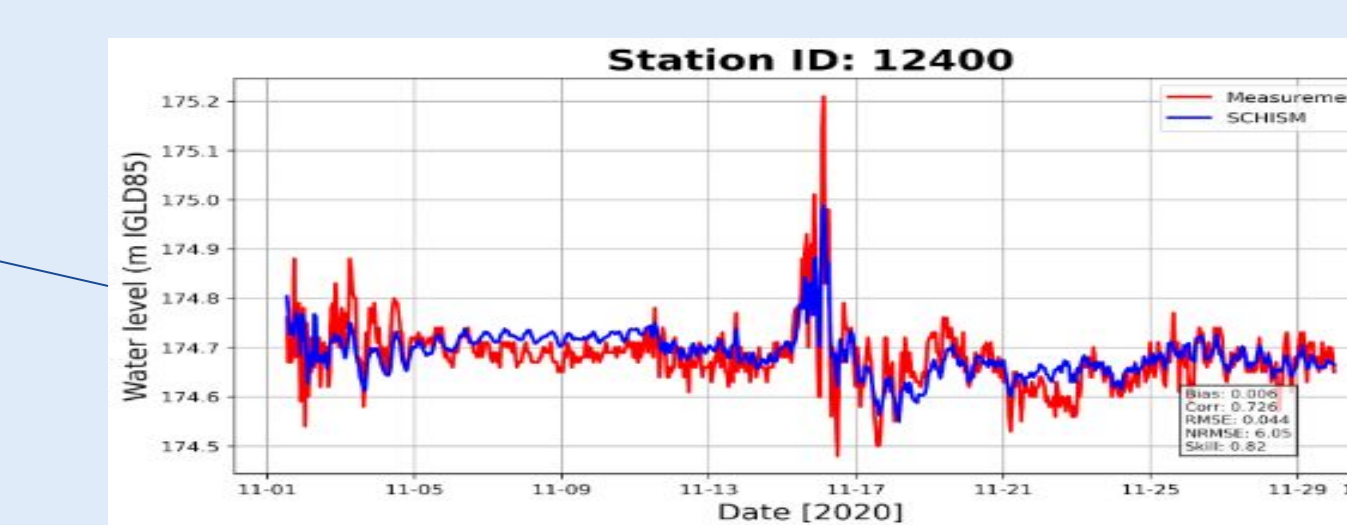
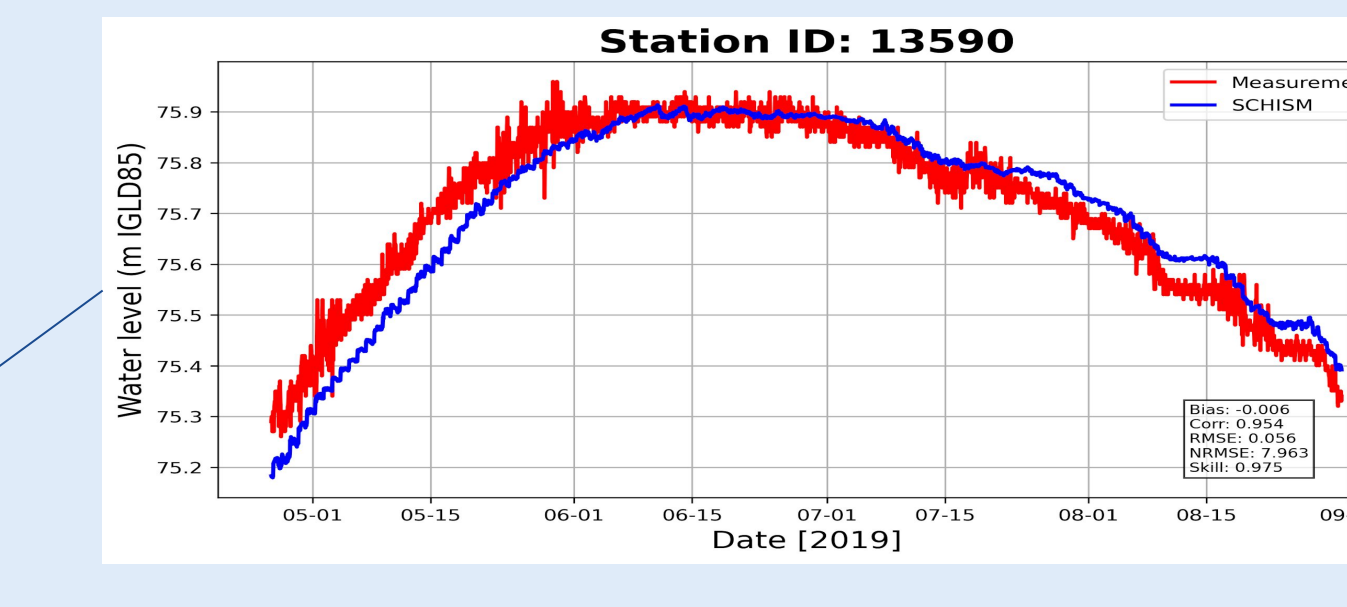
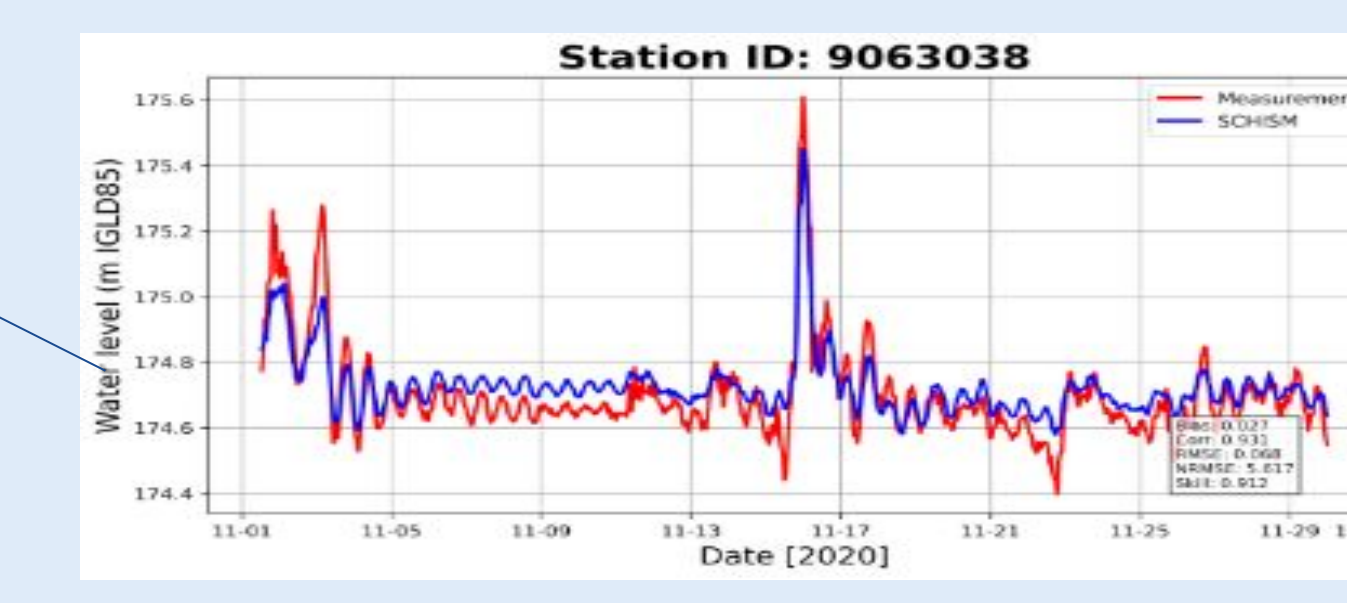
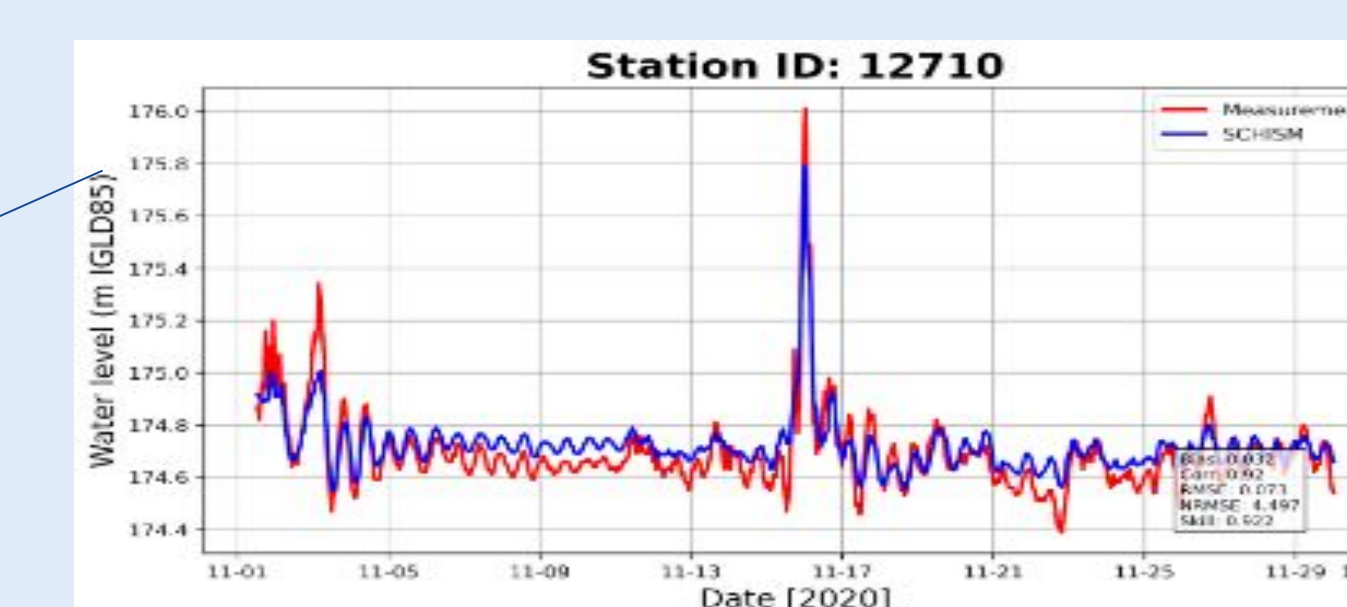
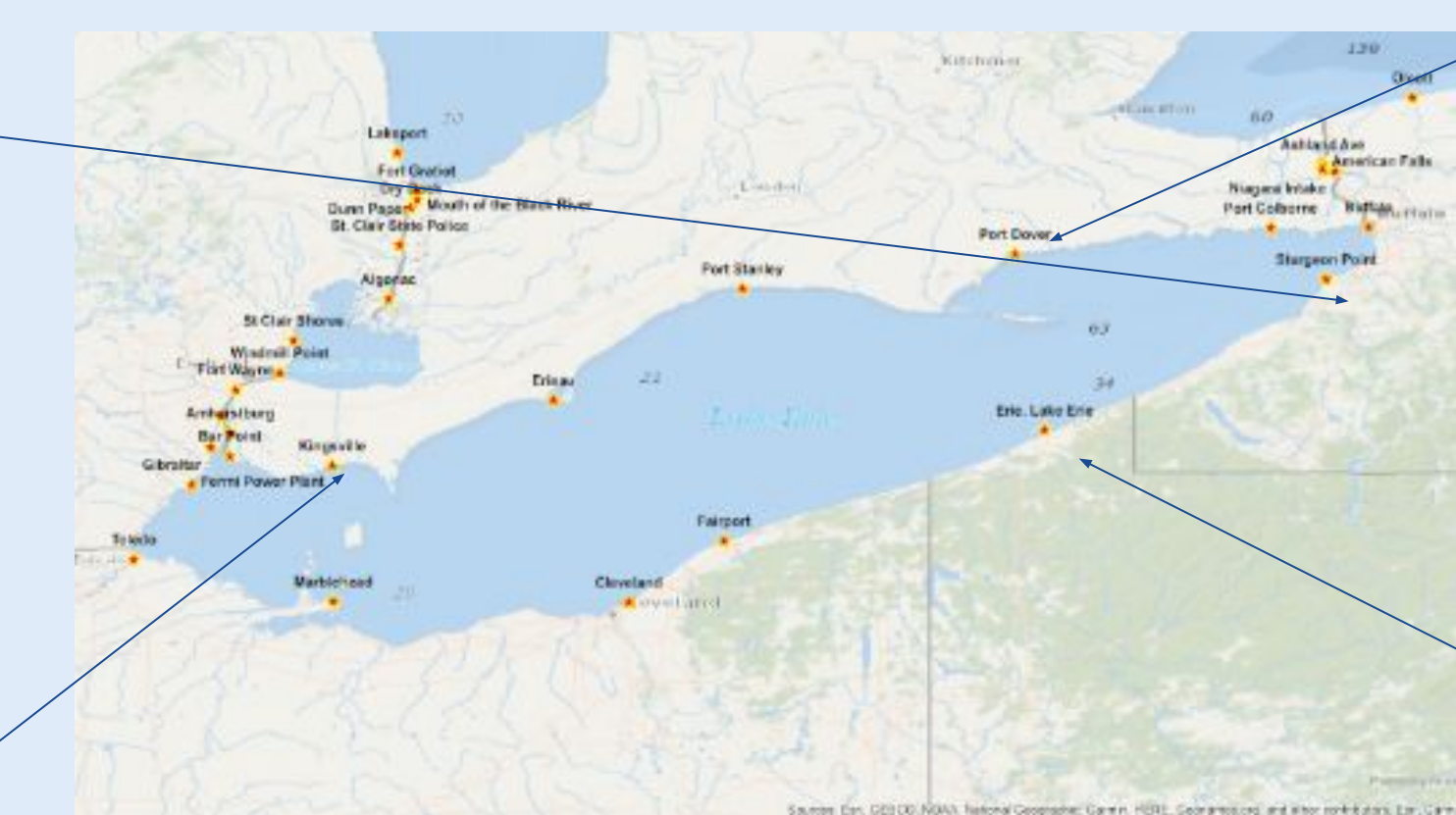
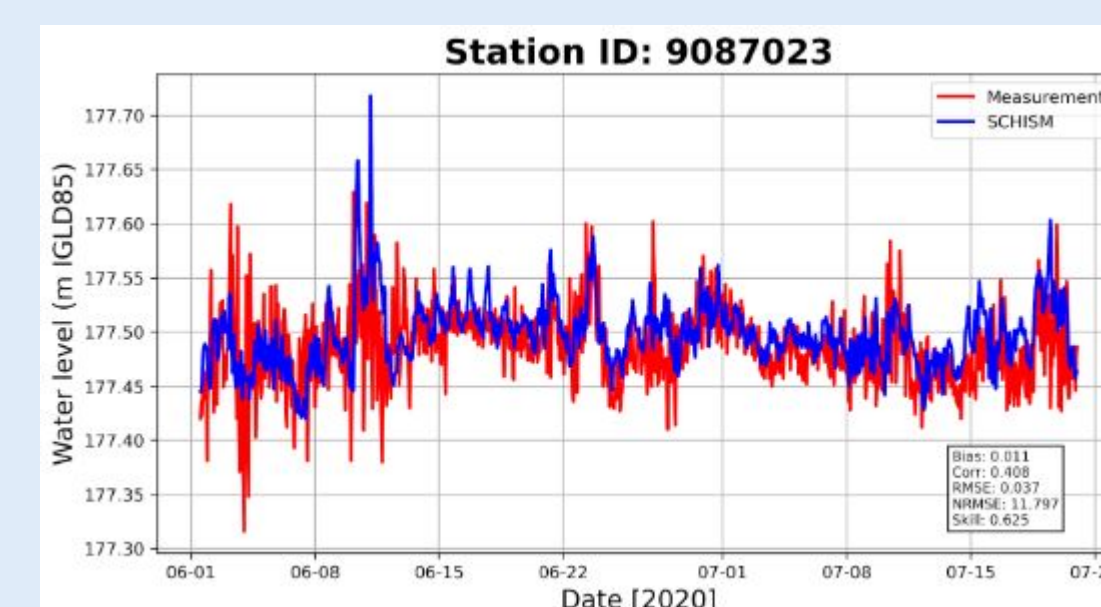
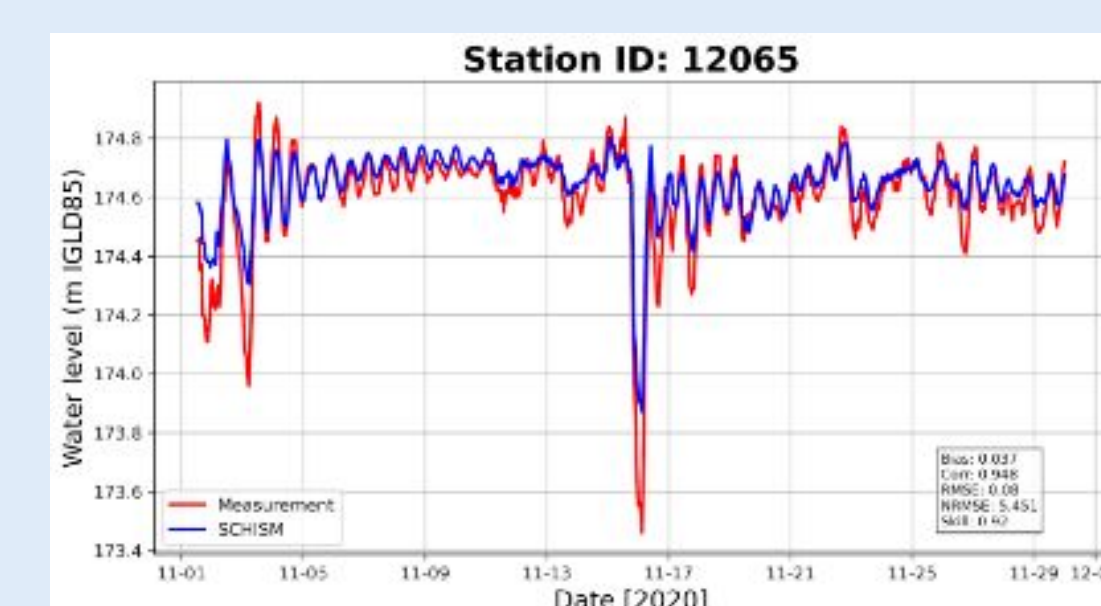
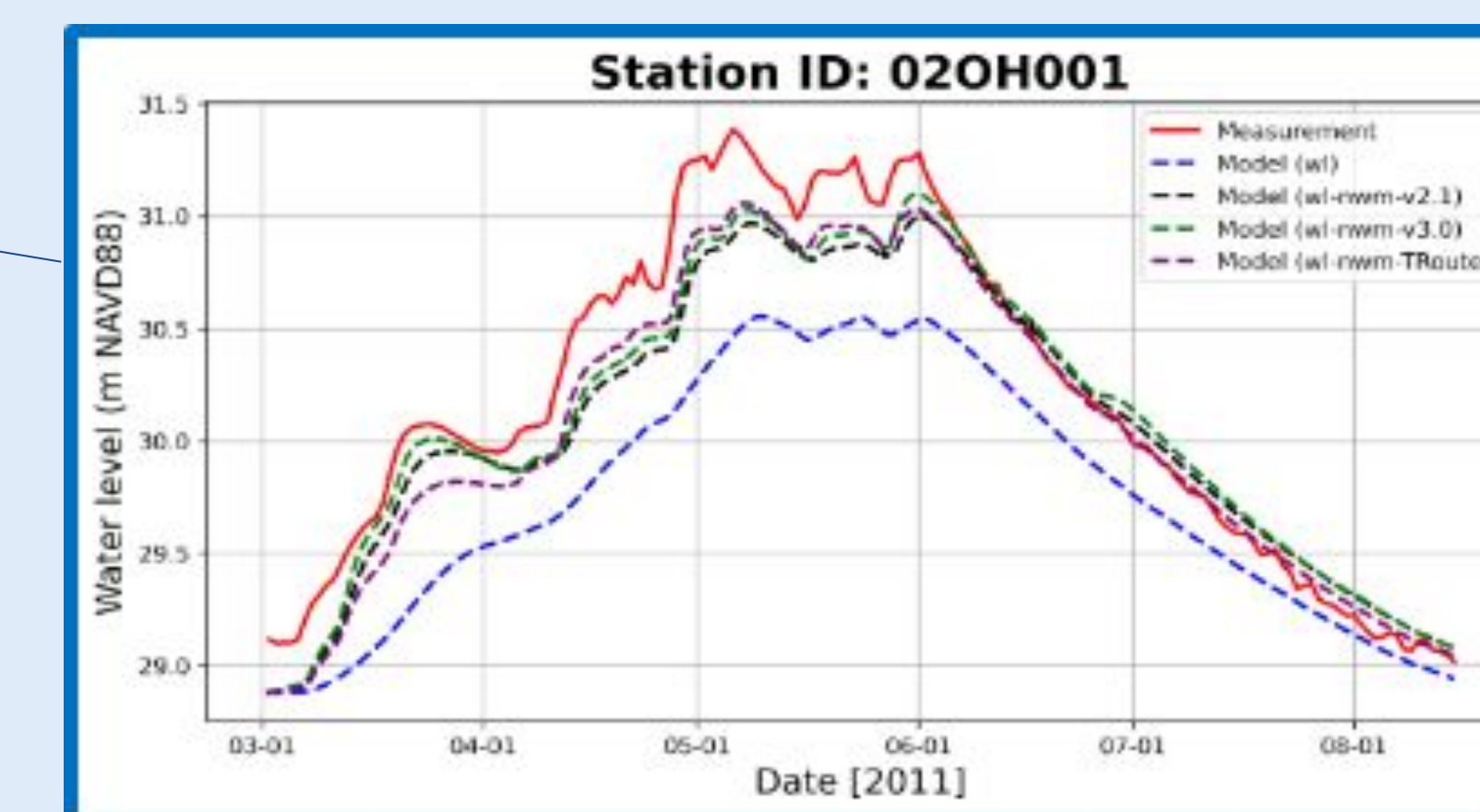
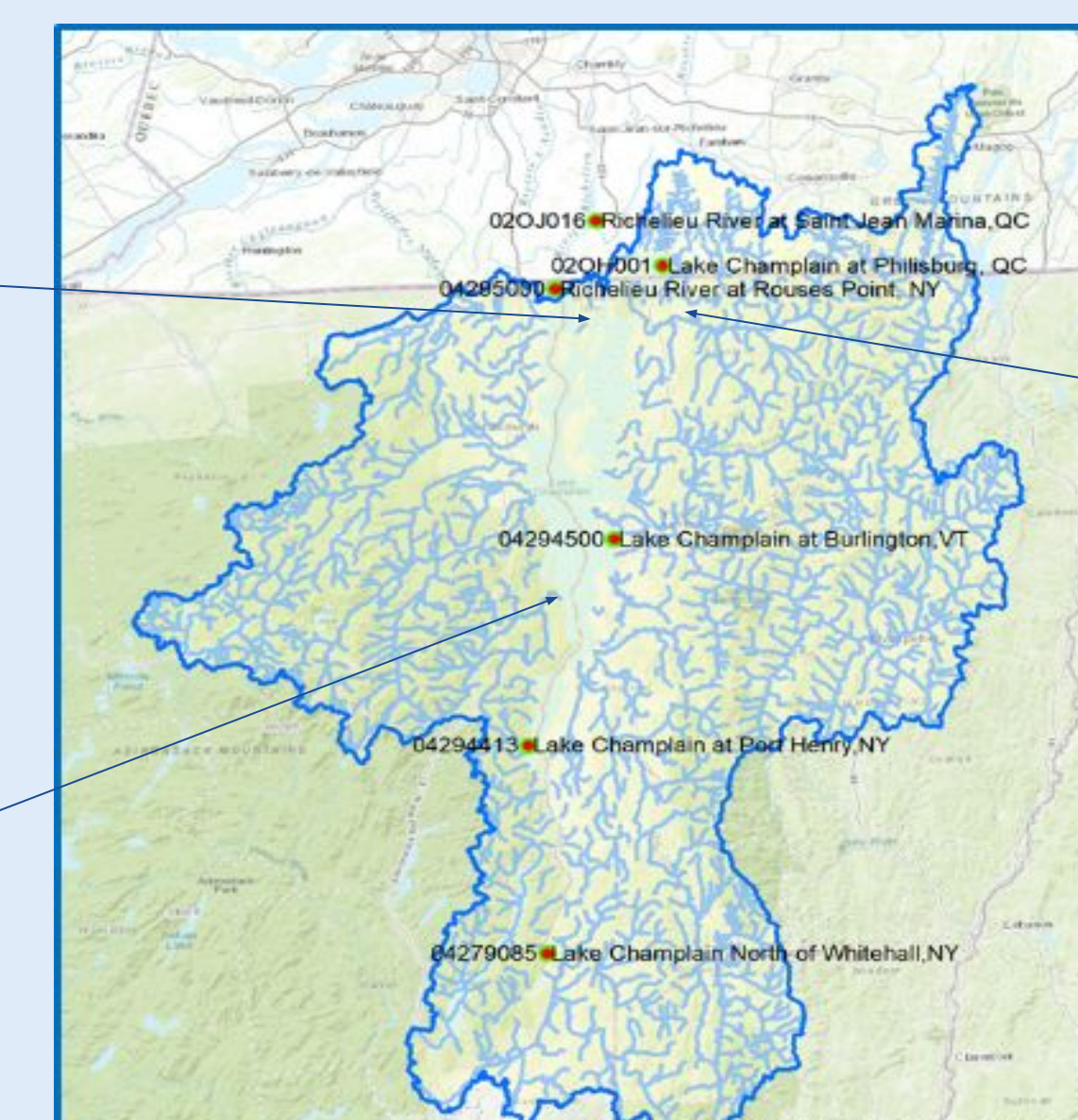
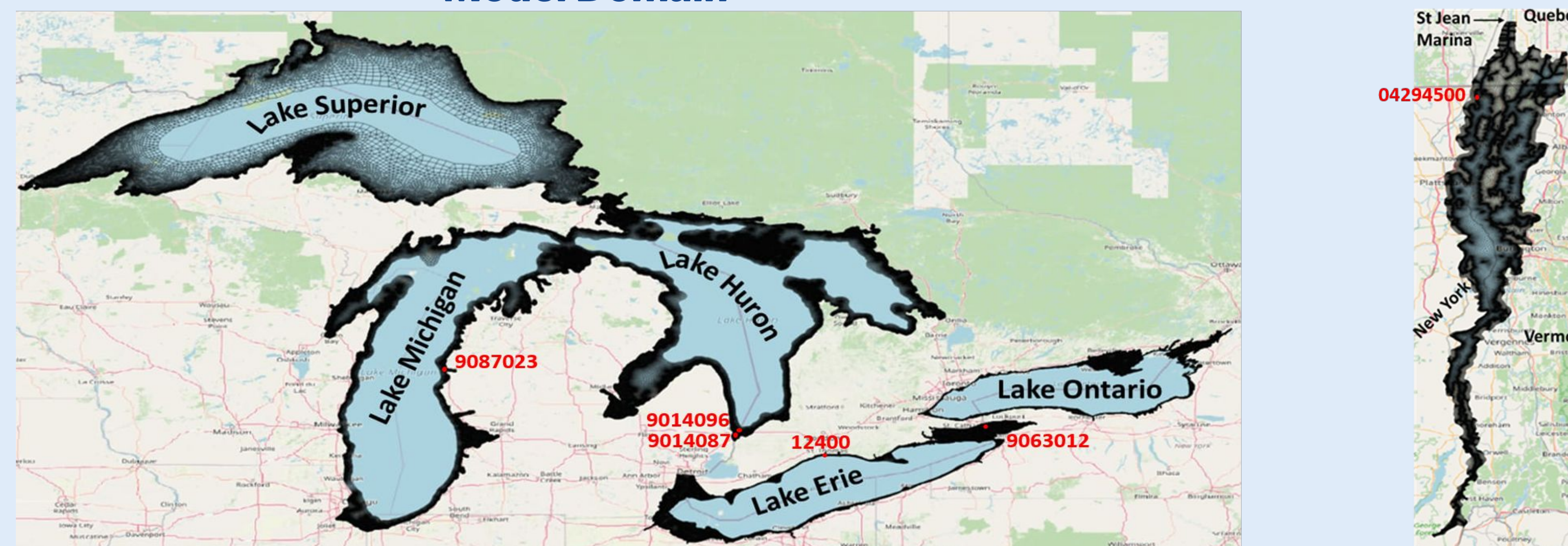


Fig. Sample output for Lake Superior

Model Domain



The figure displays a map of the Great Lakes region with five stations marked: 9087023 (Lake Michigan), 9014096 (Lake Michigan), 9014087 (Lake Michigan), 12400 (Lake Huron), and 9063012 (Lake Ontario). Two zoomed-in plots show water level data (m IGLD85) over time (Date [2020]).

Station ID: 9014087

The plot shows water level data from 06-01 to 07-07. The y-axis ranges from 176.8 to 177.6 m IGLD85. The legend indicates: Measurement (red line), Model (outputs:flow) (blue line), and Model (outputs) (black line). The measurement data shows significant fluctuations, while the model outputs are relatively stable.

Station ID: 9063012

The plot shows water level data from 11-01 to 11-21. The y-axis ranges from 171 to 175 m IGLD85. The legend indicates: Measurement (red line), Model (outputs:flow) (blue line), and Model (outputs:avg-waterfall) (black line). The measurement data shows a sharp peak around 11-13, while the model outputs are relatively stable.

- 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

- **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

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AMS materials**



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>

Website: <https://water.noaa.gov>
Email: nws.nwc@noaa.gov