Hydrodynamic Modeling in the Great Lakes: Huron-Erie Connecting Waterways Forecasting System

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Background

Background

- Great Lakes Coastal Forecasting System (GLCFS)
  - Covers 5 Great Lakes
  - Hydrodynamic nowcasts/forecasts of water-level, currents, temperature, waves
- Gap in modeling system!
  - Huron-Erie Corridor
  - Hydraulically connects Lake Huron-Michigan to Lake Erie

Huron-Erie Corridor

St. Clair River

Lake St. Clair

Detroit River

Introduction

Huron-Erie Connecting Waterways Forecasting System (HECWFS)

- Transient 2D/3D operational model of HEC
- Produce nowcasts and forecasts of water levels and currents in Lake St. Clair, St. Clair River, and Detroit River
- Link model with output from GLCFS
- Run 4x per day (updated every 6 hrs)

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1, 9014098 - Fort Gratiot, MI
2, 9014096 - Dunn Paper, MI
3, 9014090 - Mouth Of The Black River, MI
4, 9014087 - Dry Dock, MI
5, 9014080 - St Clair State Police, M
6, 9014070 - Algonac, MI
7, 9034052 - St Clair Shores, MI
8, 9044049 - Windmill Point, MI
9, 9044036 - Fort Wayne, MI
10, 9044030 - Wyandotte, MI
11, 9044020 - Gibraltar, MI
Image © 2008 TerraMetrics
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34 km
©2007 Google™
Pointer lat 42.561667° lon -82.778354°
Streaming 100%
Eye alt 116.66 km

HECWFS - Nowcasts

Real-time model - start Sept. 2007

Boundary Conditions:

- Water level - Dunn Paper and Gibraltar - 6 min
- Wind - CMAN station on Lake St. Clair - 1 hour
- Tributary flows
  - Clinton River - Daily Average
  - Thames River - Clinton flow x month-scale (scale ~ 3x Clinton)
  - Other tributaries - constants, annual average

Huron to Erie Connecting Waterways Forecasting System, HECWFS

http://www.glerl.noaa.gov/res/hecwfs/

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UNDER DEVELOPMENT USING FVCOM

***Nowcast* Timestamp: 05/13/2008 (DOY 134) 18:00 GMT**

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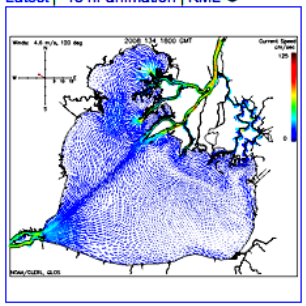
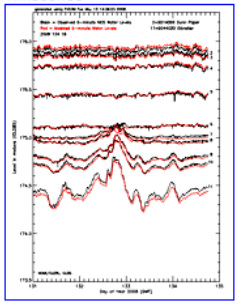
Water Currents:
Latest | -48 hr animation | KML



Water Level at NOS Gauges:
Timeseries



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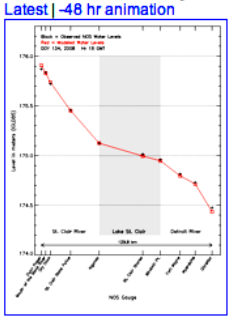

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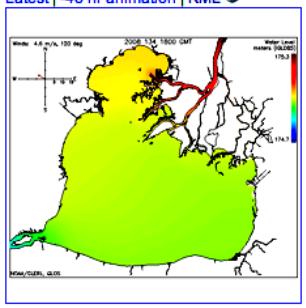
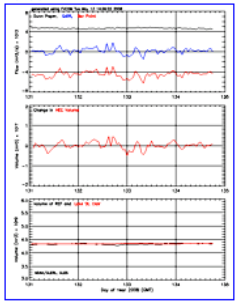
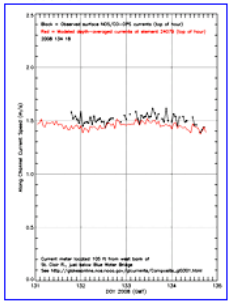


FVCOM Flows and Volumes:
Latest



NOS/CO-OPS Current Meter:
Timeseries



See also: St. Clair River & Detroit River Page

Grid Information: grid1 | grid2 | grid3 | grid4 (KML)
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Comments? gregory.lang@noaa.gov

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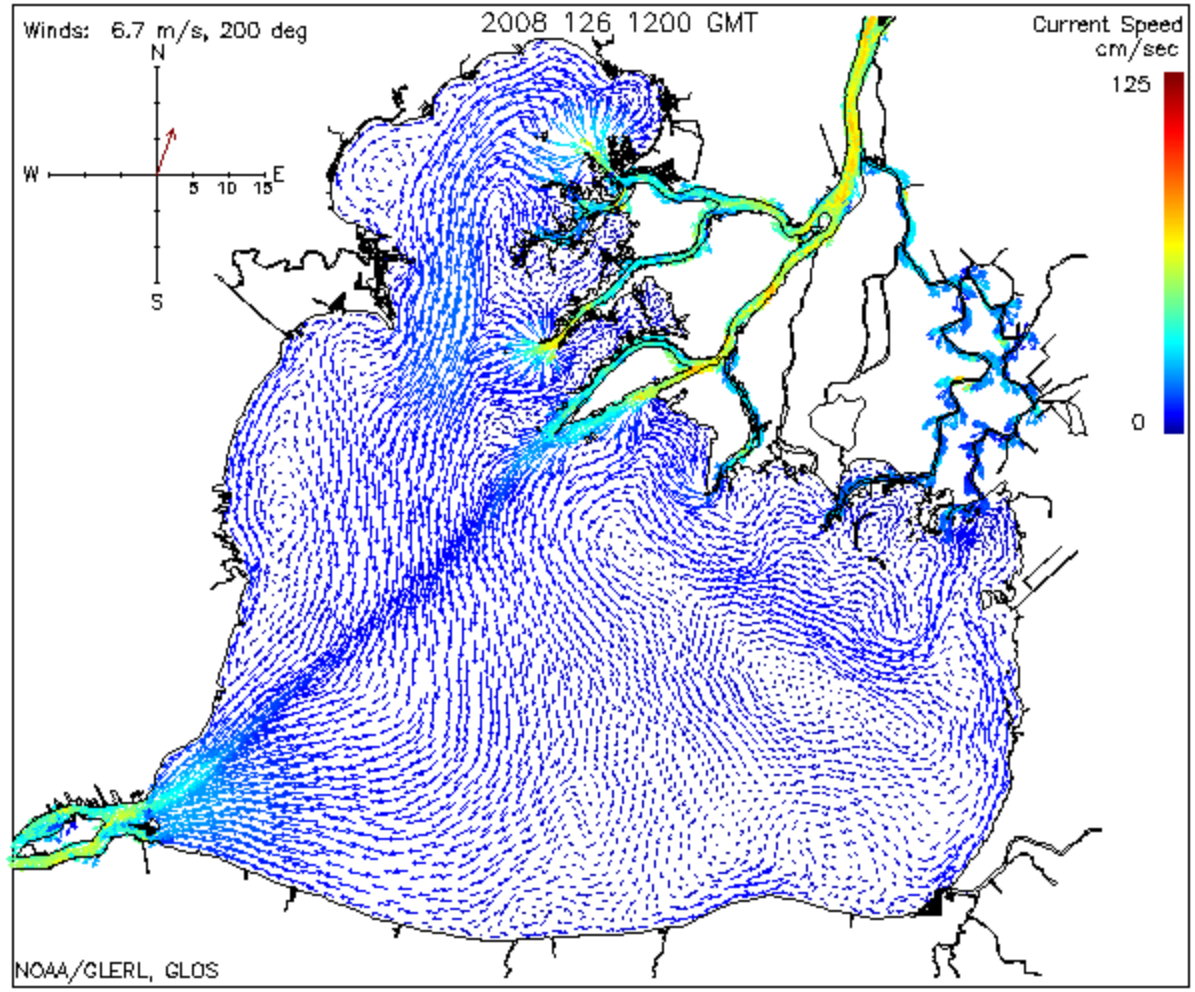

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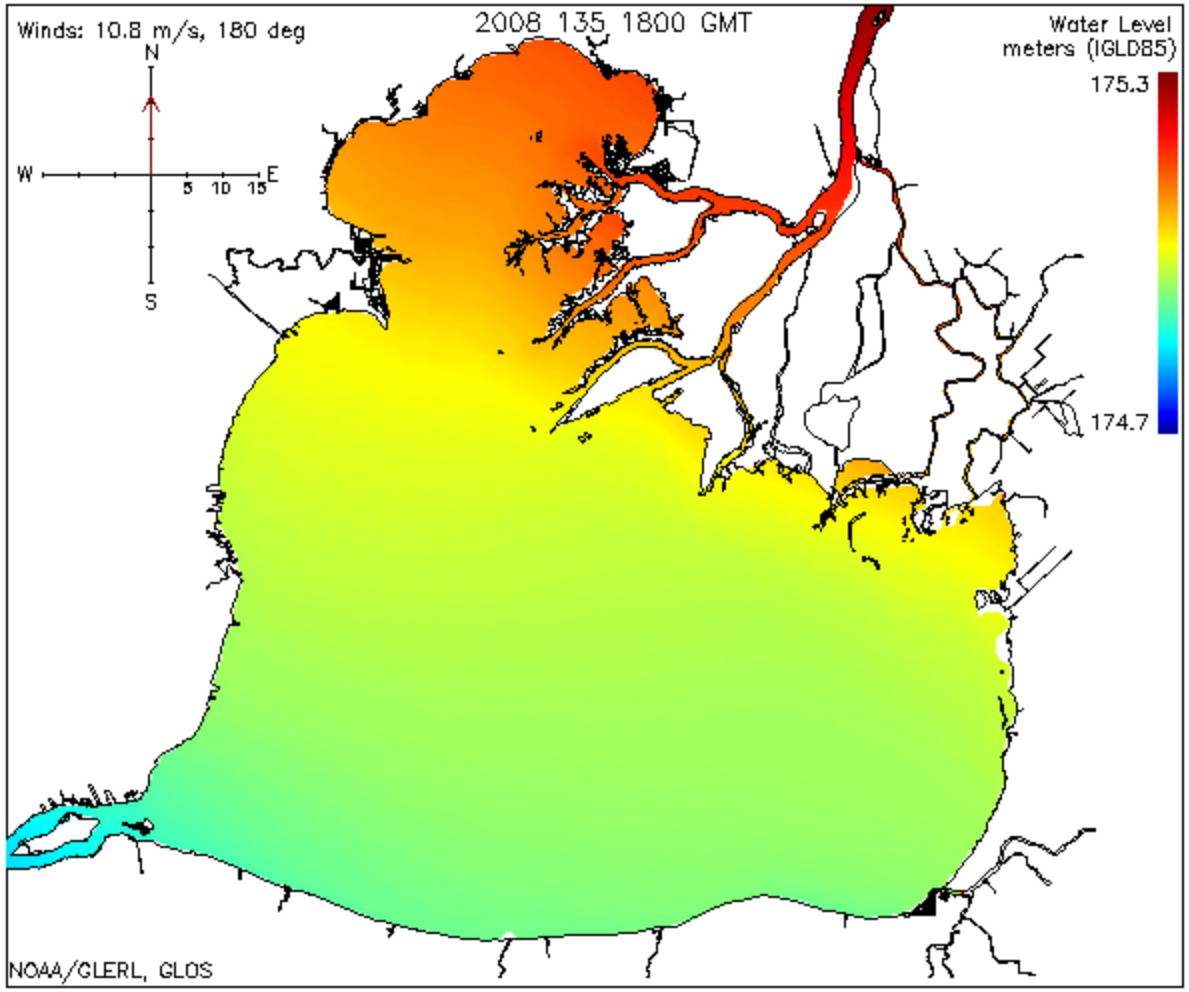

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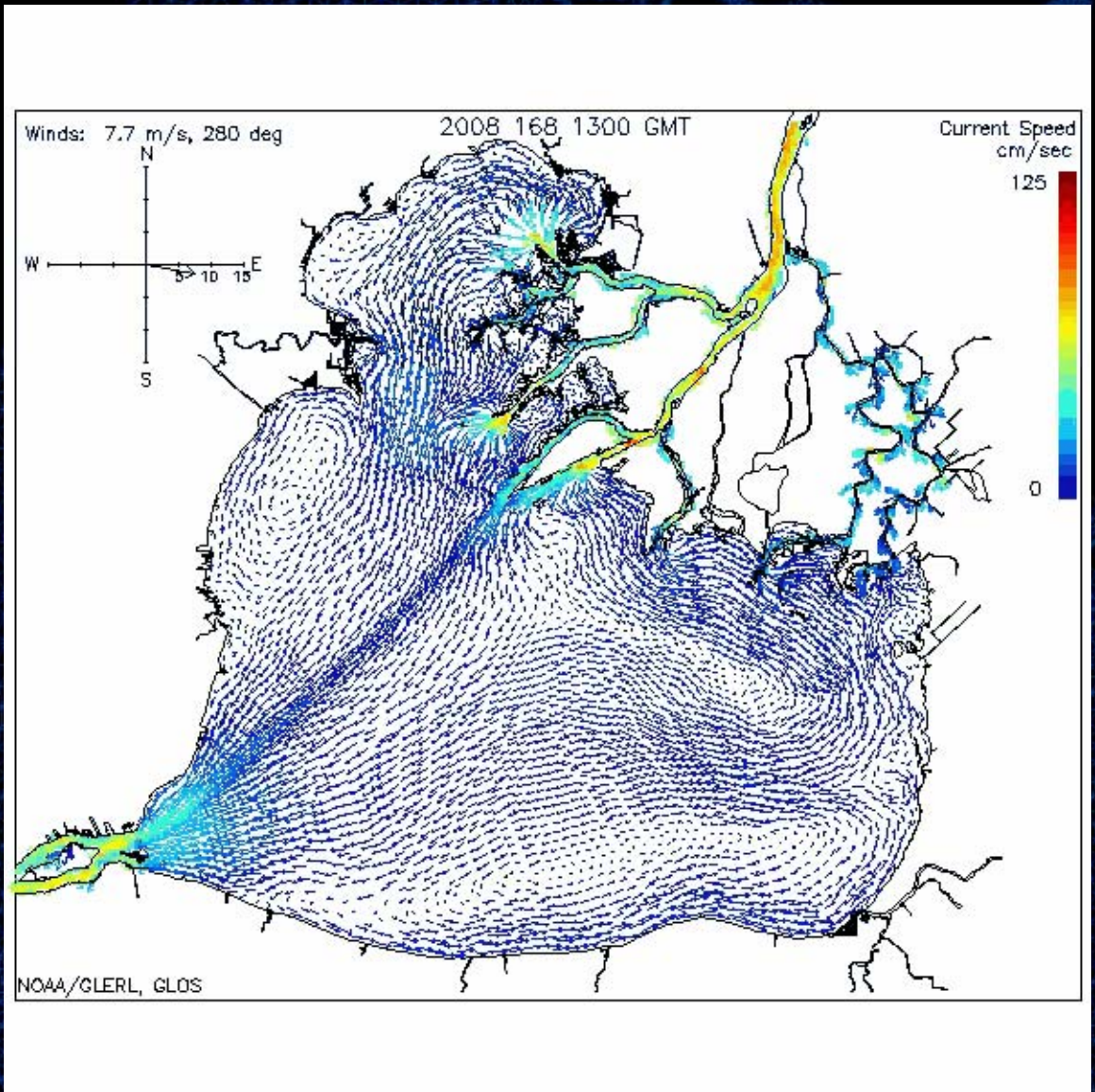

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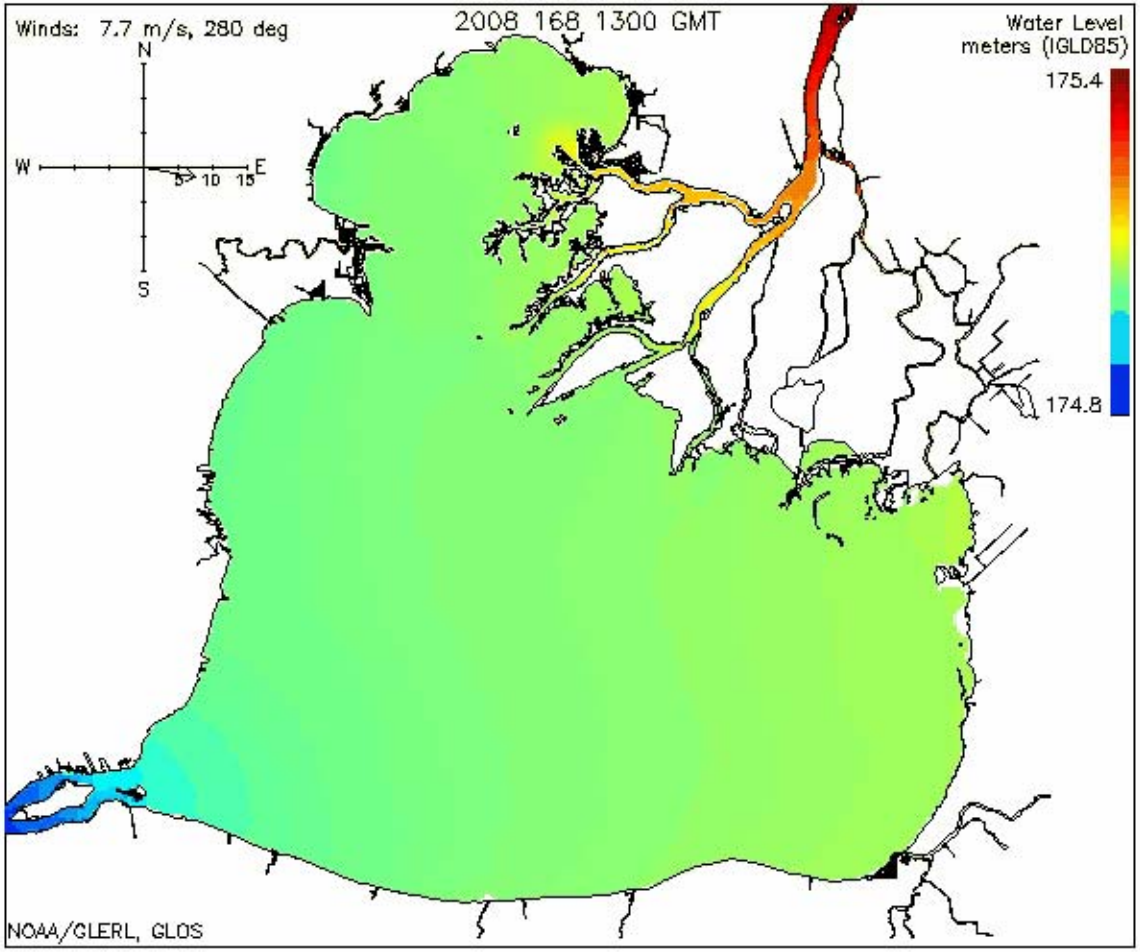

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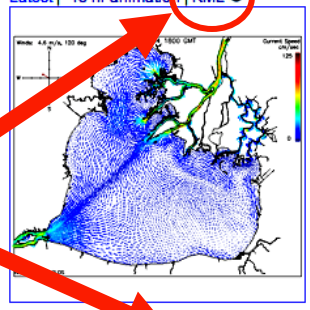

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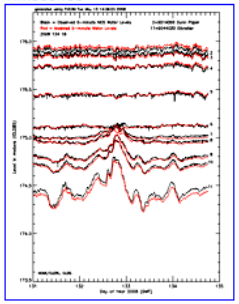

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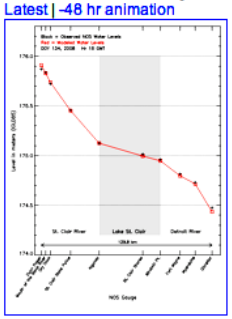

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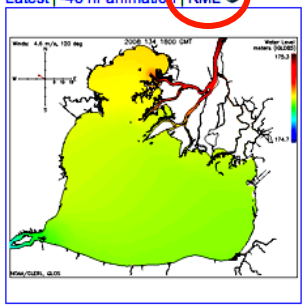

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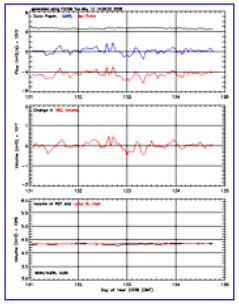
Latest



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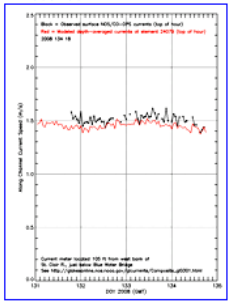

See also: St. Clair River & Detroit River Page

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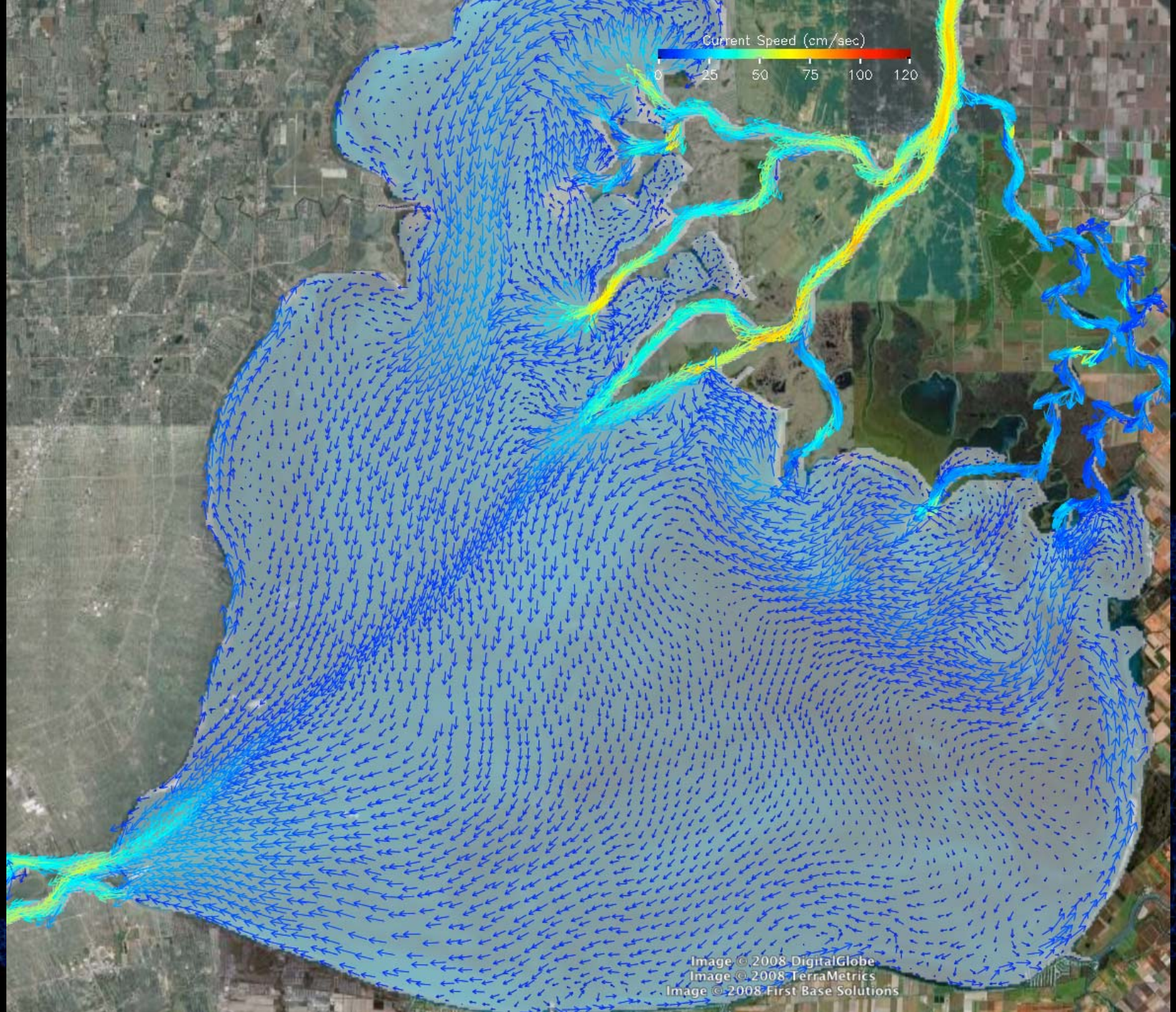
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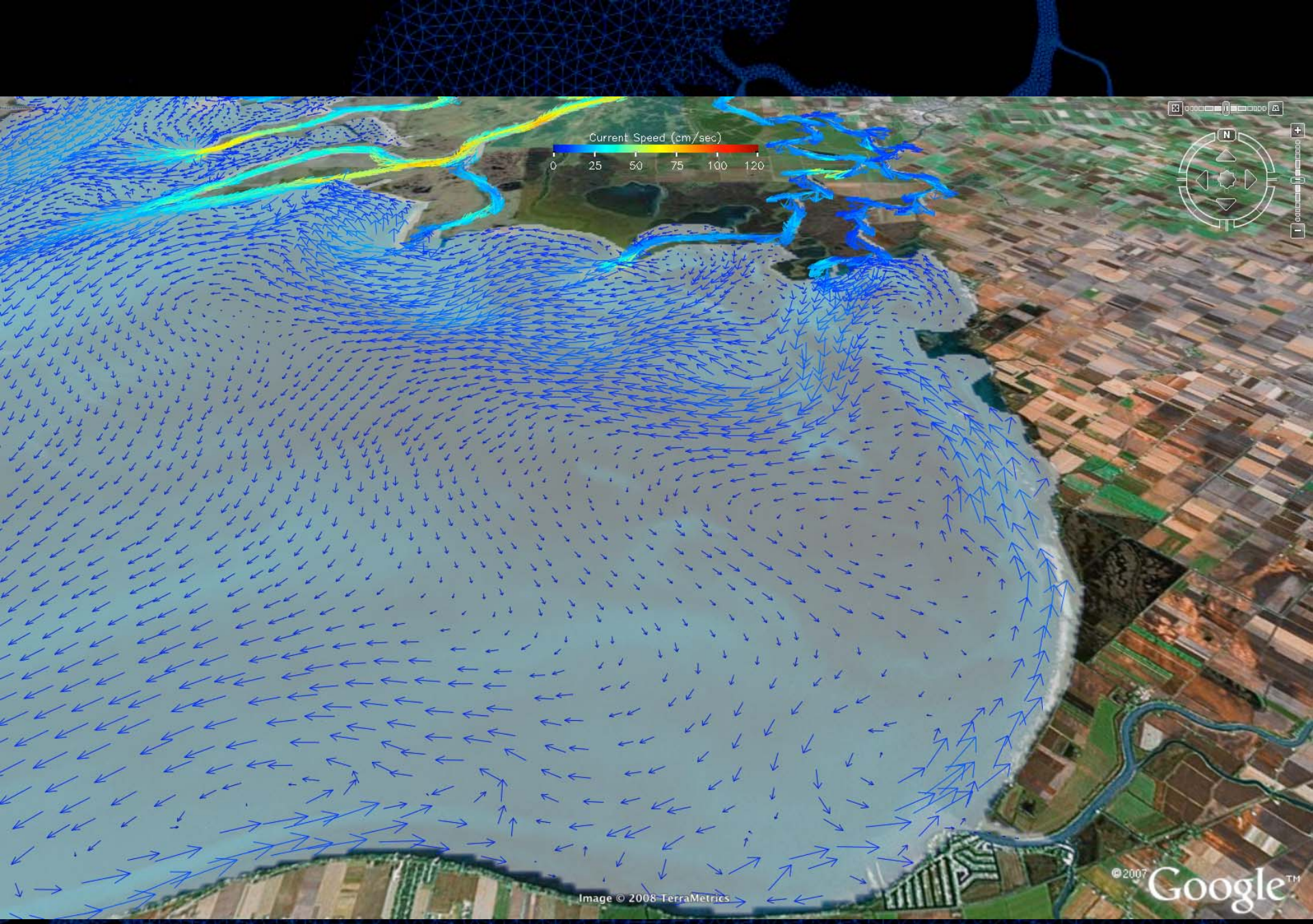
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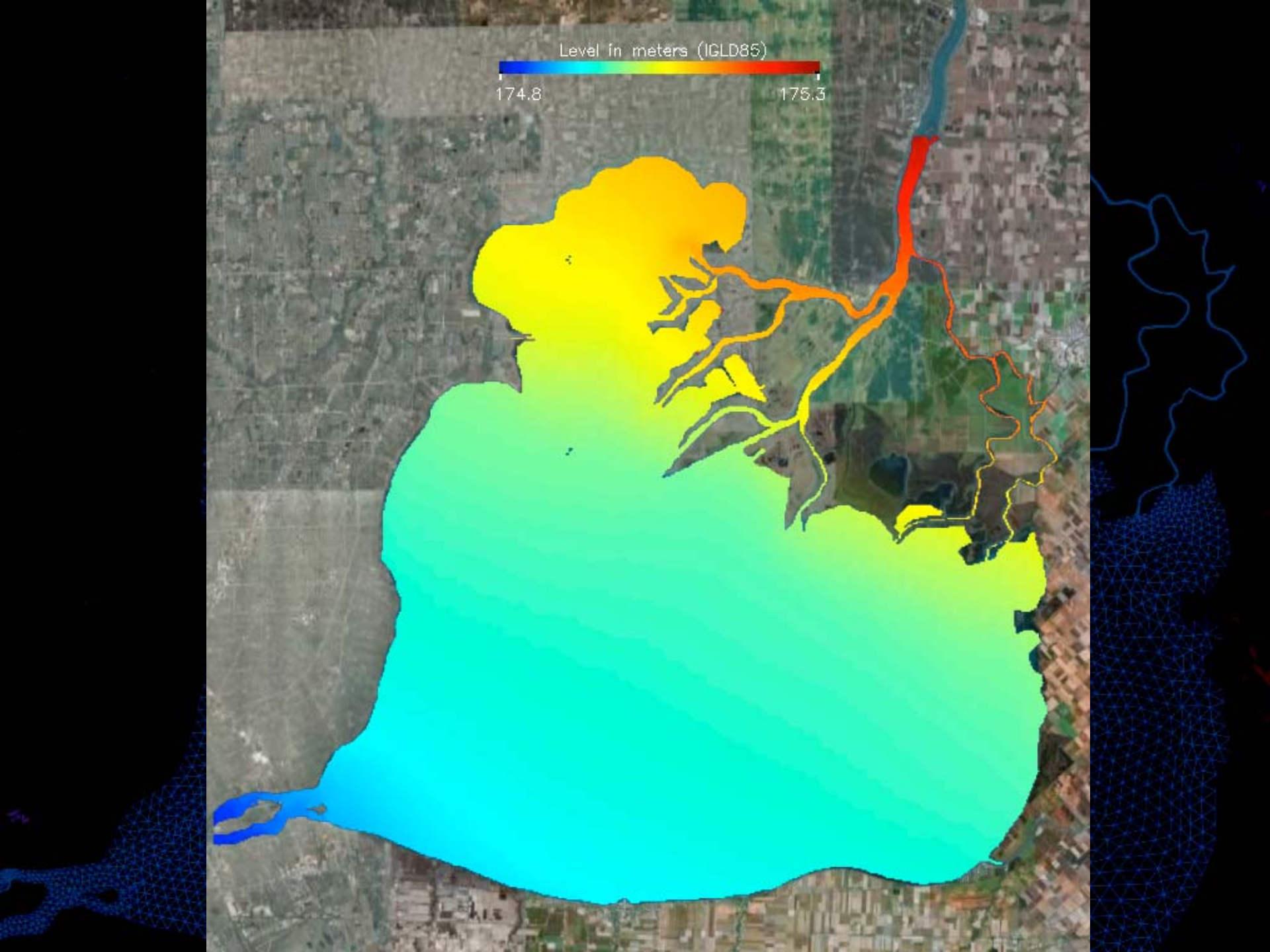
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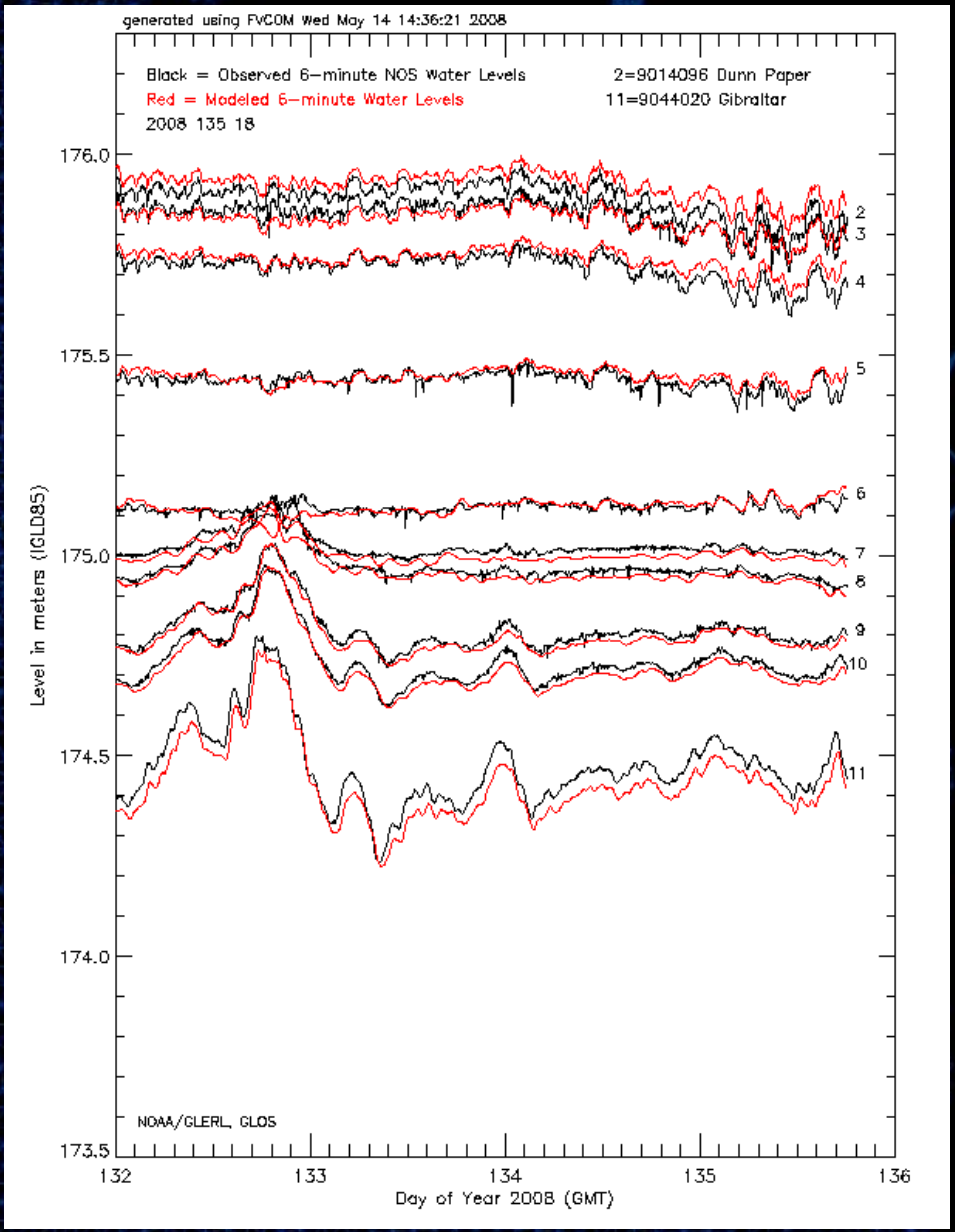

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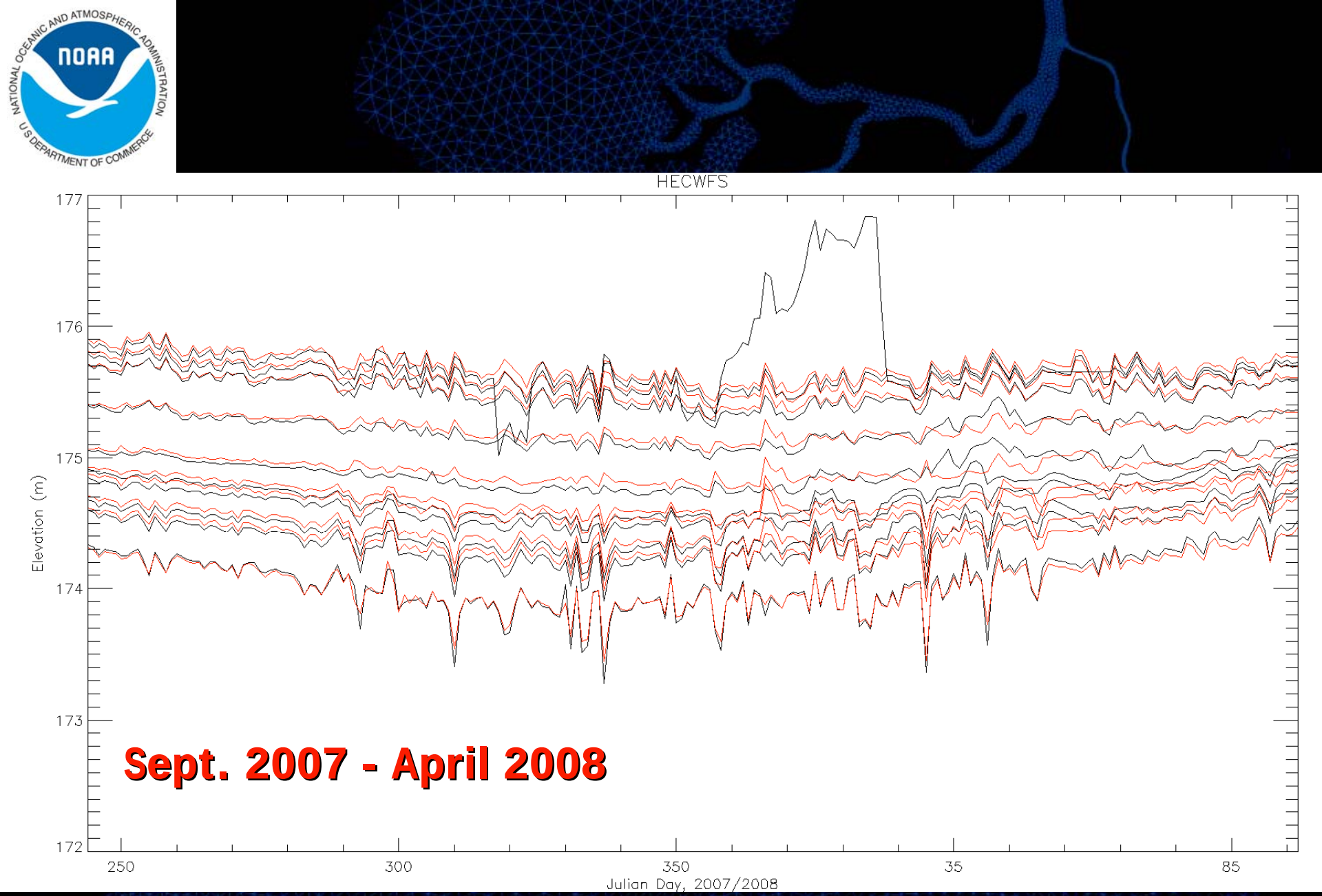

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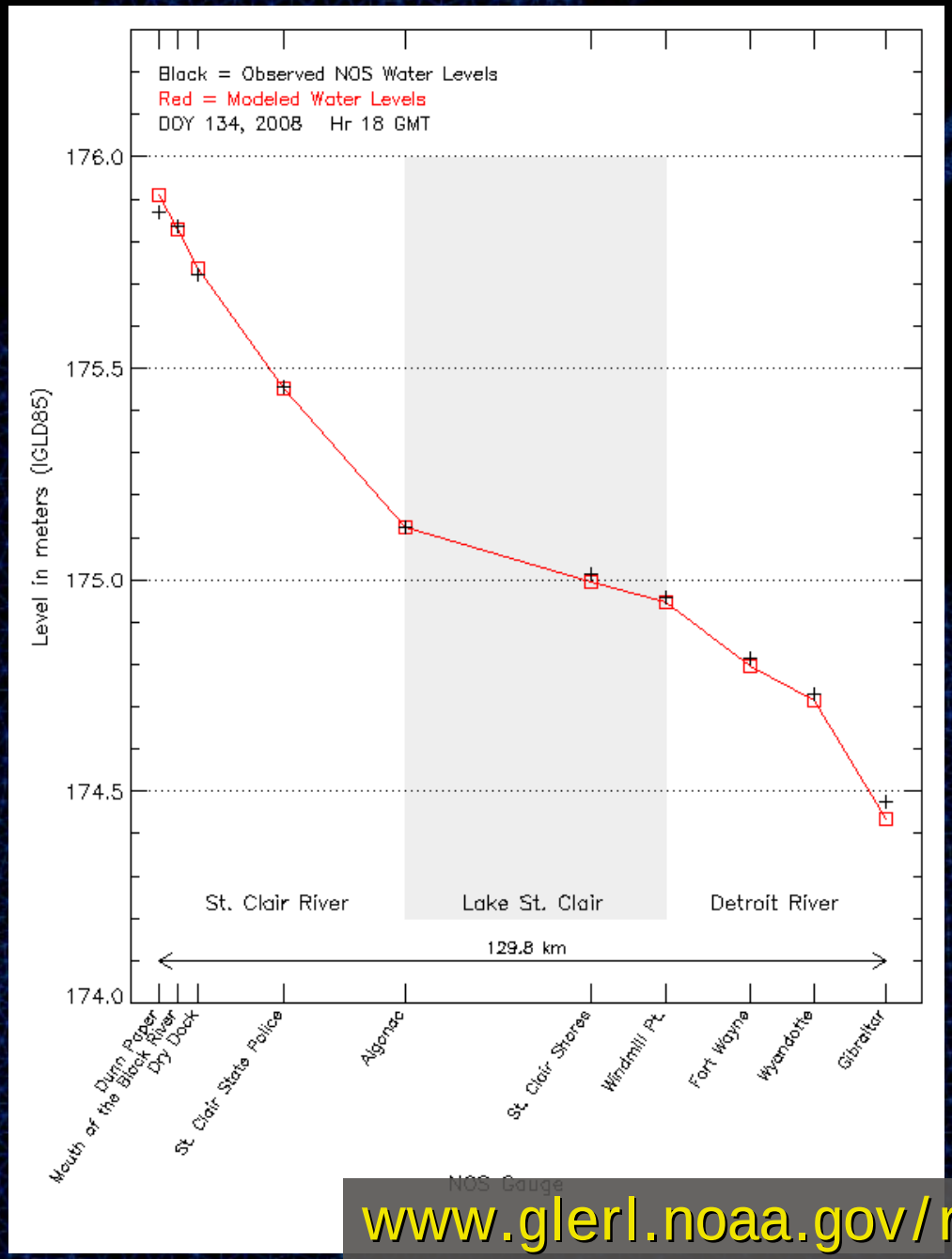

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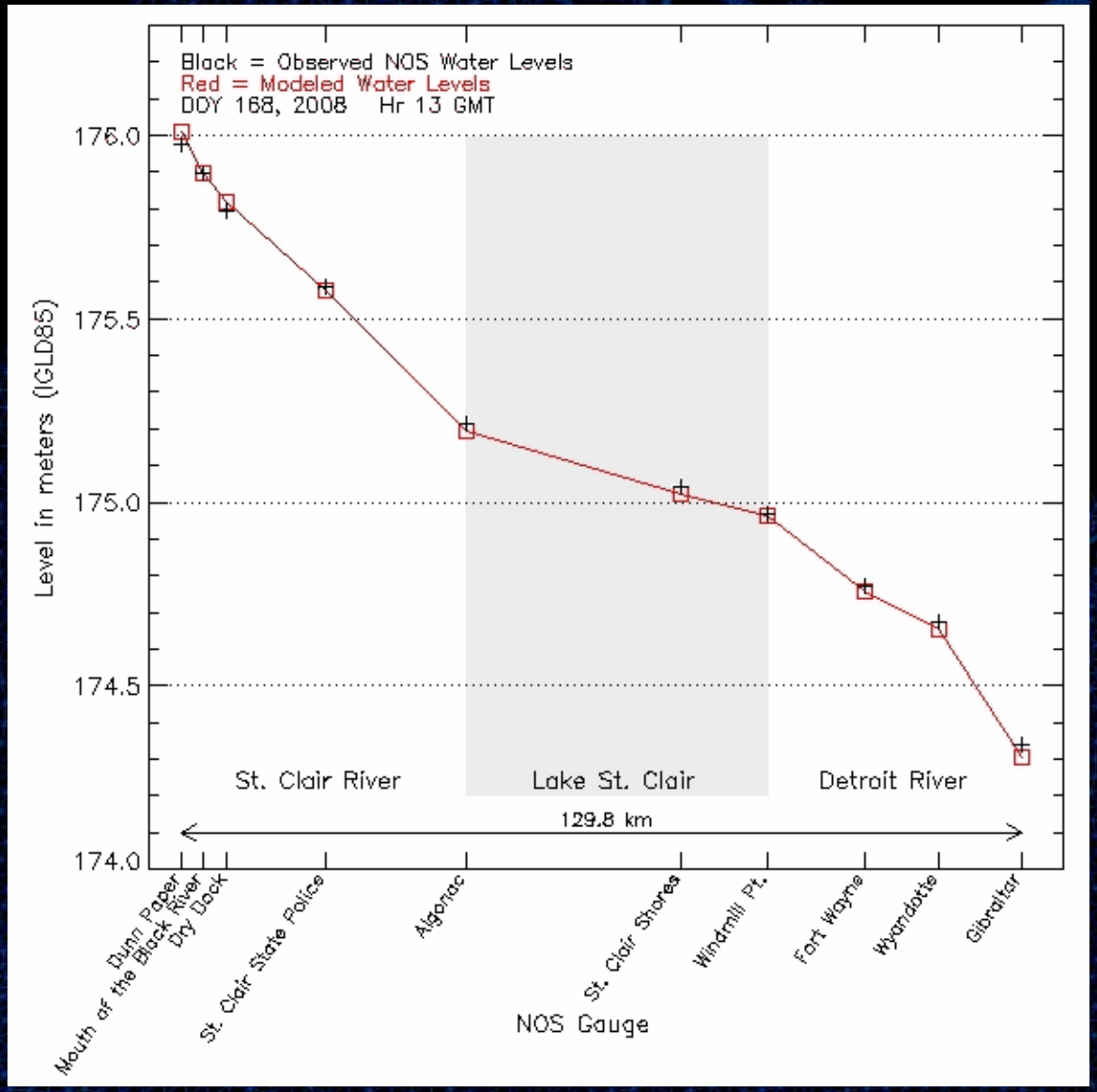

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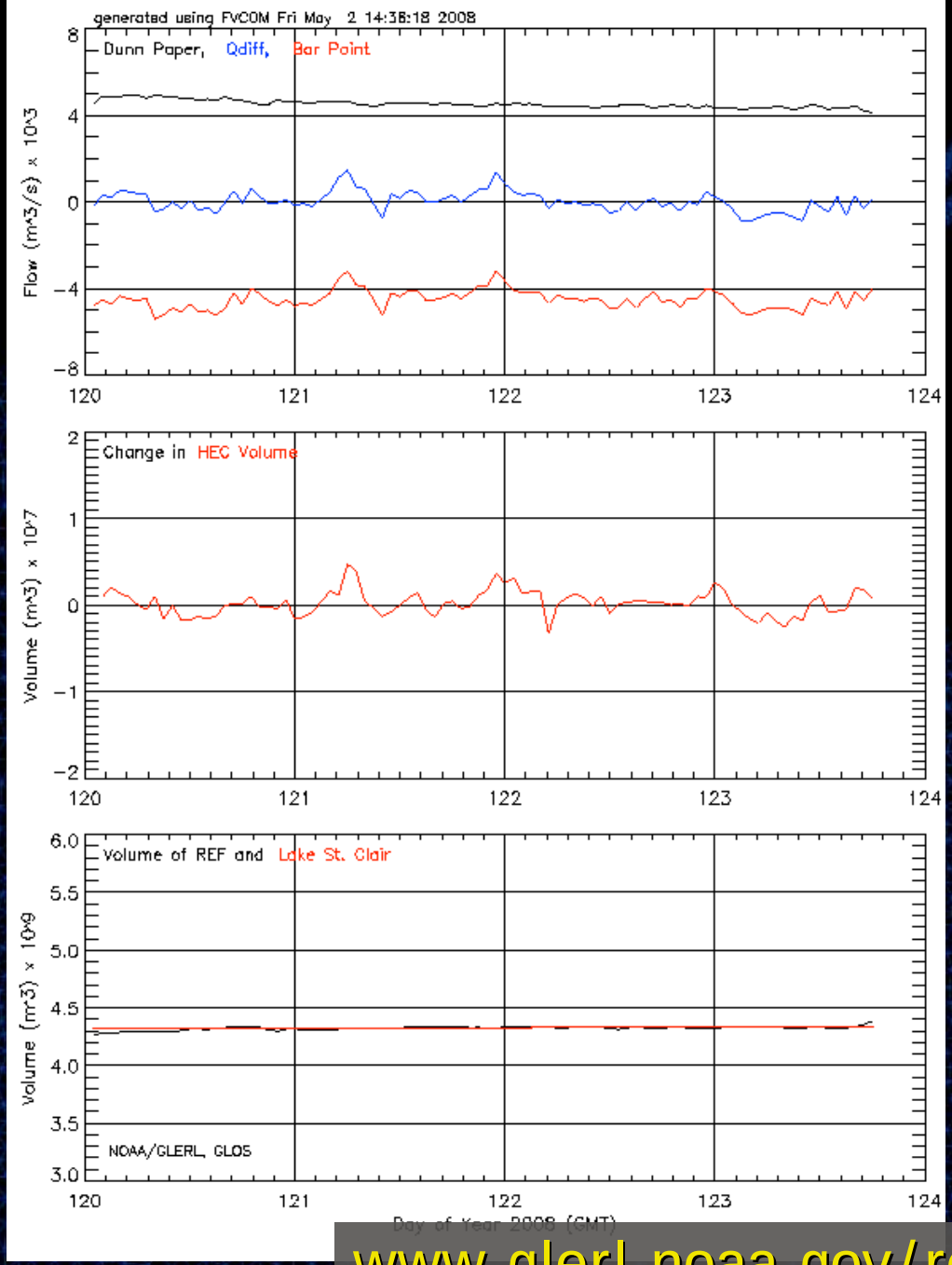

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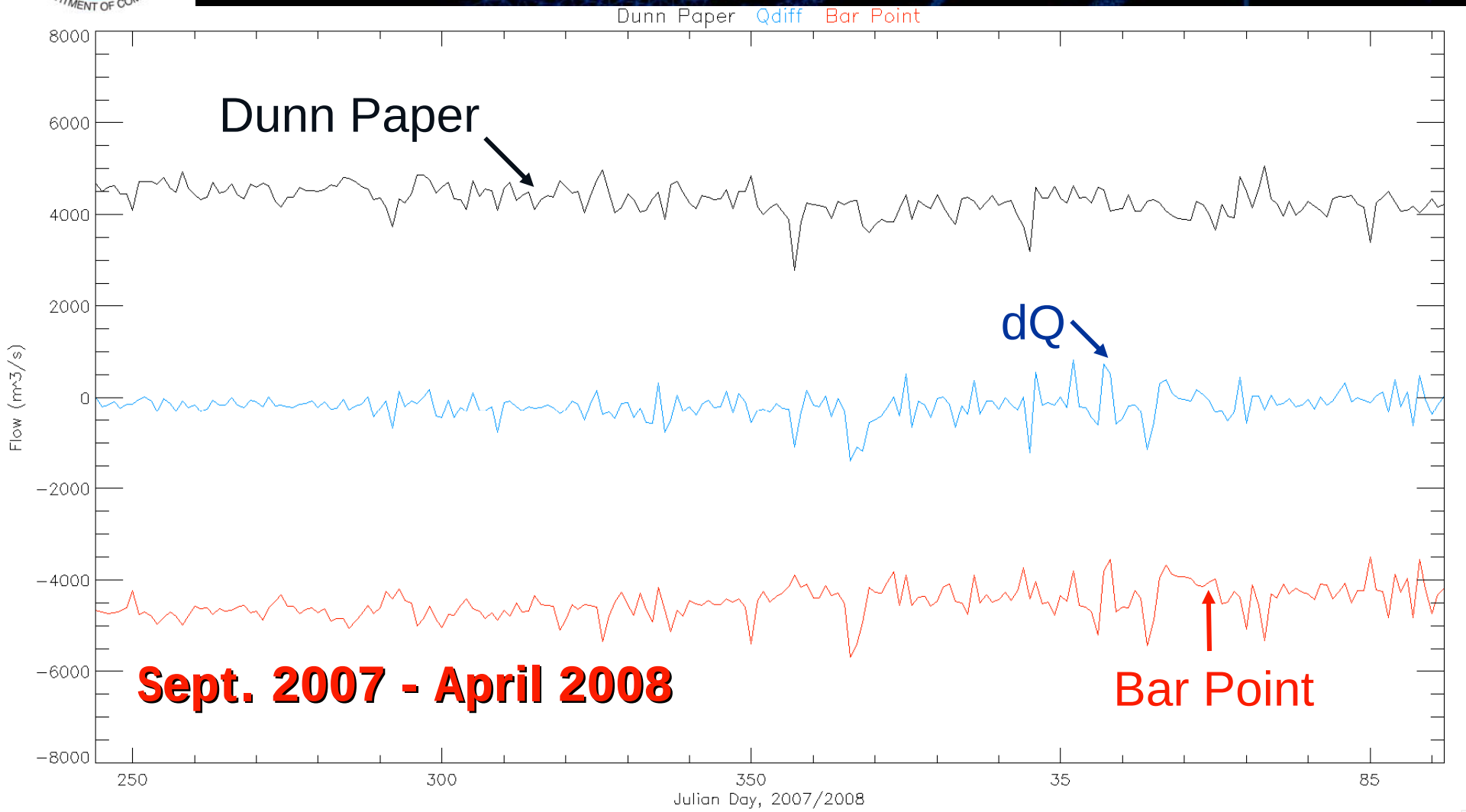

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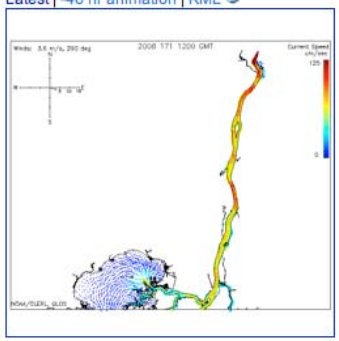

St. Clair River Water Levels:
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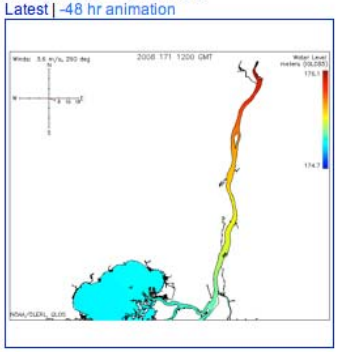

Detroit River Water Currents:
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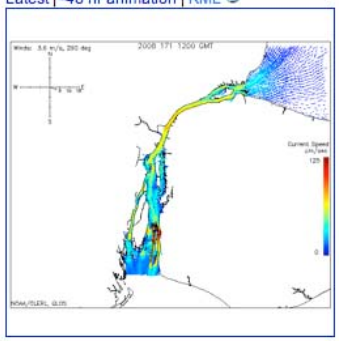
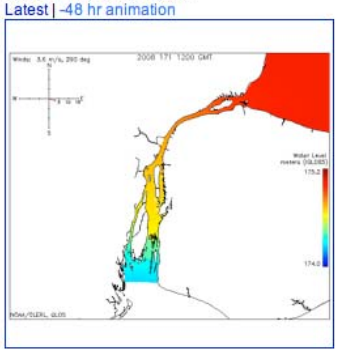


Detroit River Water Levels:
Latest | -48 hr animation



See also: Lake St. Clair Page

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Web/Data Manager:

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NOAA
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Done

Huron-Erie Connecting Waterways Forecasting System (HECWFS)

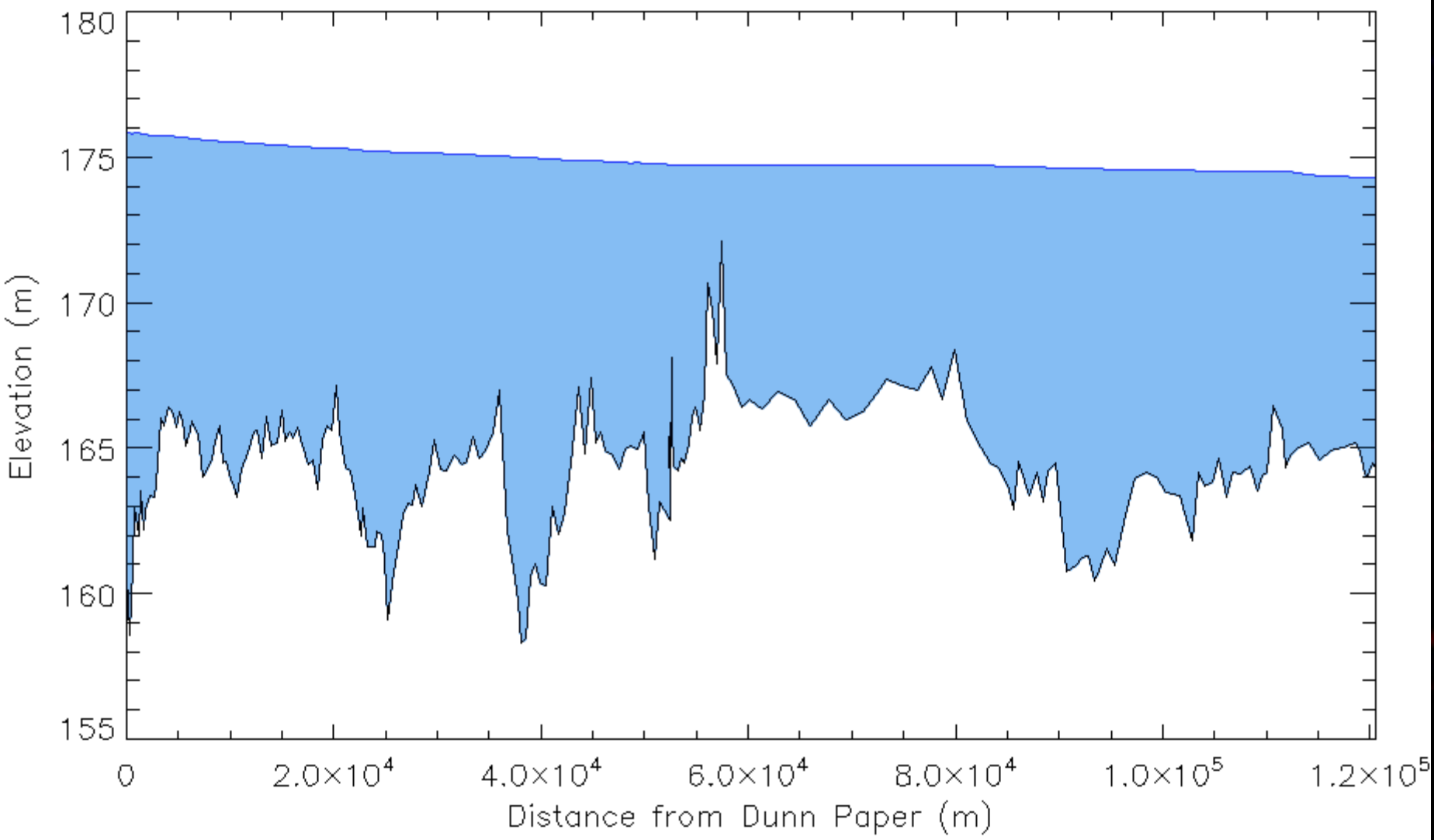
- Nowcast model operational
- Predicts water levels and currents for entire system (Lake St. Clair, St. Clair River, Detroit River)
- Real-time results available publicly every 6 hours
- Fills gap in GLCFS

Huron-Erie Connecting Waterways Forecasting System (HECWFS)

Future work:

- Produce forecasts for HECWFS
- Perform seasonal calibration
- Define user requirements

Huron-Erie Connecting Waterways Forecasting System (HECWFS)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8.0×10^4
1.0×10^5
1.2×10^5
Distance from Dunn Paper (m)