NOAA Great Lakes CoastWatch Program

CoastWatch is a nationwide National Oceanic and Atmospheric Administration (NOAA) program within which the Great Lakes Environmental Research Laboratory (GLERL) functions as the Great Lakes regional node. In this capacity, GLERL obtains, produces, and delivers environmental data and products for near real-time observation of the Great Lakes to support environmental science, decision making, and supporting research. This is achieved by providing Internet access to near realtime and retrospective satellite observations, in-situ, and modeled Great Lakes data. Clients include Federal, state, and local (decision-making and regulatory) agencies, academic institutions, and the public. The goals and objectives of the CoastWatch Great Lakes Program directly support NOAA's statutory responsibilities in estuarine and marine science, living marine resource protection, and ecosystem monitoring and management.

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CoastWatch Great Lakes Node

http://coastwatch.glerl.noaa.gov

CoastWatch Regional Nodes

Goes SST

AVHRR SST

Goes VIS/IR

RADARSAT

MODIS True Color

Turbidity

GLSEA

Scatterometer Ice (prototype)

Scatterometer Winds (prototype)

SAR Ice (prototype)

Chl, CDOM, Mineral (prototype)
Welcome to the NOAA CoastWatch Great Lakes Node

Great Lakes CoastWatch Node
NOAA/Great Lakes Environmental Research Laboratory
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http://coastwatch.glerl.noaa.gov

George A. Leshkevich,
Manager

Songzhi Liu,
Operations Assistant
CoastWatch Great Lakes Products

CoastWatch Great Lakes Image Products Received

**AVHRR**
- Sea Surface Temperature SST
- Visible Channel 1
- Infrared Channel 2
- Channel 3
- Channel 4
- Channel 5
- Solar Zenith Angle ZA
- Satellite Zenith Angle ZS
- Cloud Masks CM

**GOES**
- Visible channel (Ch.1)
- Infrared channel (Ch.2)
- Water vapor
- SST Imagery

**MODIS**
- MODIS True Color 250 m Resolution

**NPP VIIRS**
- Sea Surface Temperature (SST) 1.3 km and 750 m
CoastWatch Great Lakes Products

CoastWatch Great Lakes Regional Products

- GLSEA (with Ice Cover during winter months), .dat, .png, .asc, .kmz
  - Night Time Only GLSEA, .asc (1996 – present)
  - 1024x1024 (1995 – present – netCDF)
- AVHRR Ch1 – Ch2 Subtraction (Blooms and Plumes)
- AVHRR Ch1 Histogram Equalized (Ice Cover)
- NOAAPORT (hourly Buoy, CMAN, USCG Stations, Ship, Other Marine)
  - GLCFS Nowcast/Forecast Analyzed Wind Field
  - Long Term Average SST Compared to Current Year
- Great Lakes Average Surface Water Temperature (Data and Graph)
- Great Lakes Hydro-optical Model
- RADARSAT (Government only)
- MODIS True Color 250 m Resolution
- Java GIS
  - AVHRR SST, CH1
  - GLSEA (1024x1024)
  - ICE (NIC)
  - BATHYMETRY
  - MODIS
NOAA (A VHRR 15, 18, 19, MetOp-A, MetOp-B) SST in png format.

geotif format

Water Surface Temperature
2013_275_1556_M02_GR_D4.png
10/02/2013 15:56 GMT

Satellite: METOP-2
Sensor: AVHRR
Projection type: Mercator
Map projection: 1.8 km/pixel
Latitude: 30 N -> 52 N
Longitude: 93 W -> 75 W
Great Lakes Surface Environmental Analysis (GLSEA)

Analysis Date: JD 104 04/14/2014
Percent Pixels with Data within +/-10 Days: 88.1%
Date of last ice analysis: 4/14/2014

NOAA CoastWatch
Great Lakes GOES – 13 Satellite Imagery

NOAA CoastWatch
GOES – 13  Res: 6 km
Sea Surface Temperature
3–hour composite
DN: 248  (9/5/2013)
Time: 21:00  – 00:00 GMT
MODIS (Aqua and Terra) Near Real-time Imagery
Click on Lake for Available Images
AVHRR Ch1 - Ch2 Subtraction (Blooms and Plumes)
AVHRR Ch1 Histogram Equalized (Ice Cover)
Great Lakes Statistics

Average GLSEA Surface Water Temperature Data (°C)

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Great Lakes Average Ice Concentration (%)

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GLSEA Long Term Average Surface Water Temperature Compared to Current Year

Lake Superior Average Great Lakes Surface Environmental Analysis (GLSEA)
Lake Michigan Average Great Lakes Surface Environmental Analysis (GLSEA)
Lake Huron Average Great Lakes Surface Environmental Analysis (GLSEA)
Lake Erie Average Great Lakes Surface Environmental Analysis (GLSEA)
Lake Ontario Average Great Lakes Surface Environmental Analysis (GLSEA)

Surface Water Temperature Compared to Current Year

(http://coastwatch.glerl.noaa.gov)

- Average 1992 – 2013
- 2014

Wed Apr 30 06:40:14 2014
Great Lakes CoastWatch Java GIS
CoastWatch Great Lakes Products

Future Products / Directions

- NPP VIIRS
- SAR Ice Type Classification
- SAR Wind Fields (Google)
- MODIS Chl, DOC, SM
- Primary Productivity
- Scatterometer Measured Winds/Ice
- Decision Support (GIS)
- Thredds /LAS or ERDAP Server
NPP VIIRS – 1.3 Km Resolution
NPP VIIRS – 750 Meter Resolution
Google SAR Winds
MTRI Developmental Harmful and Nuisance Algal Bloom Map

September 14, 2013
Lake Erie

Algal and Sediment Extent Map

Water Quality & Public Health Concern Map

MODIS True Color

Area
- Surface Algal Mat Area: 432 Sq Km.
- High Algal Concentration Area: 2845 Sq Km.
- Heavy Sediment Plume Area: 0 Sq Km.

Possible HAB Related Public Health Concern:
(microcystin assumed > 20 µg/L, based on surface scum analysis and historical observations, Water Temp > 18°C)
- Higher Concern
- Lower Concern
- Detected Area: 432 Sq Km.

Possible HAB Related Water Quality Concern:
(Chlorophyll > 20 µg/L, Water Temp > 18°C)
- Higher Concern
- Lower Concern
- Detected Area: 2845 Sq Km.
Future Products

Prototype Primary Productivity
Prototype of Great Lakes wind-field product derived from QuikScat/SeaWinds Data
Future Products
Prototype of Great Lakes Ice-cover product derived from QuikScat/SeaWinds Data

green-red = ice, blue = water, and violet = unclassified areas
Decision Support System
Data Inputs

Bathymetry
Slope
Temperature
Substrate
Circulation

- Glaciolacustrine clay
- Sand
- Muds
- Muds > 50%
- Muds < 50%
- Till or bedrock
- Bedrock
- Glacial till
- Mud
- Sand/gravel
- Sand/mud
CoastWatch Great Lakes Decision Support Tool

Welcome to the NOAA CoastWatch Great Lakes Node

What's New
About

AVHRR Imagery
GESEA
Contour Maps
GOES Imagery
RADARSAT
MODIS Imagery
Ocean Color
Image Products
In Situ Data
GLCFS
Statistics

JAVA GIS
Imagery Archive
Software
Documentation

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George A. Leshkevich,
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Google Earth®
Great Lakes CoastWatch New Server

Dell PE-R710
Intel x5370