

National Environmental Satellite,
Data, and Information Service

March 31, 2025

What to consider when choosing a dataset

NOAA Coastwatch Satellite Course

Viewing and Analyzing Ocean/Coastal Events and Water Quality Using Satellites

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Balance the Needs of Your Project



Temporal coverage

Was the satellite flying during the dates of my study?

Geographical coverage

Does the dataset have data in my area of interest?

Spatial resolution

How big can the pixels be?

Temporal resolution

How often does the satellite fly over my area of interest?

Latency / Quality

How fast do I need the data after its been collected and at what quality?

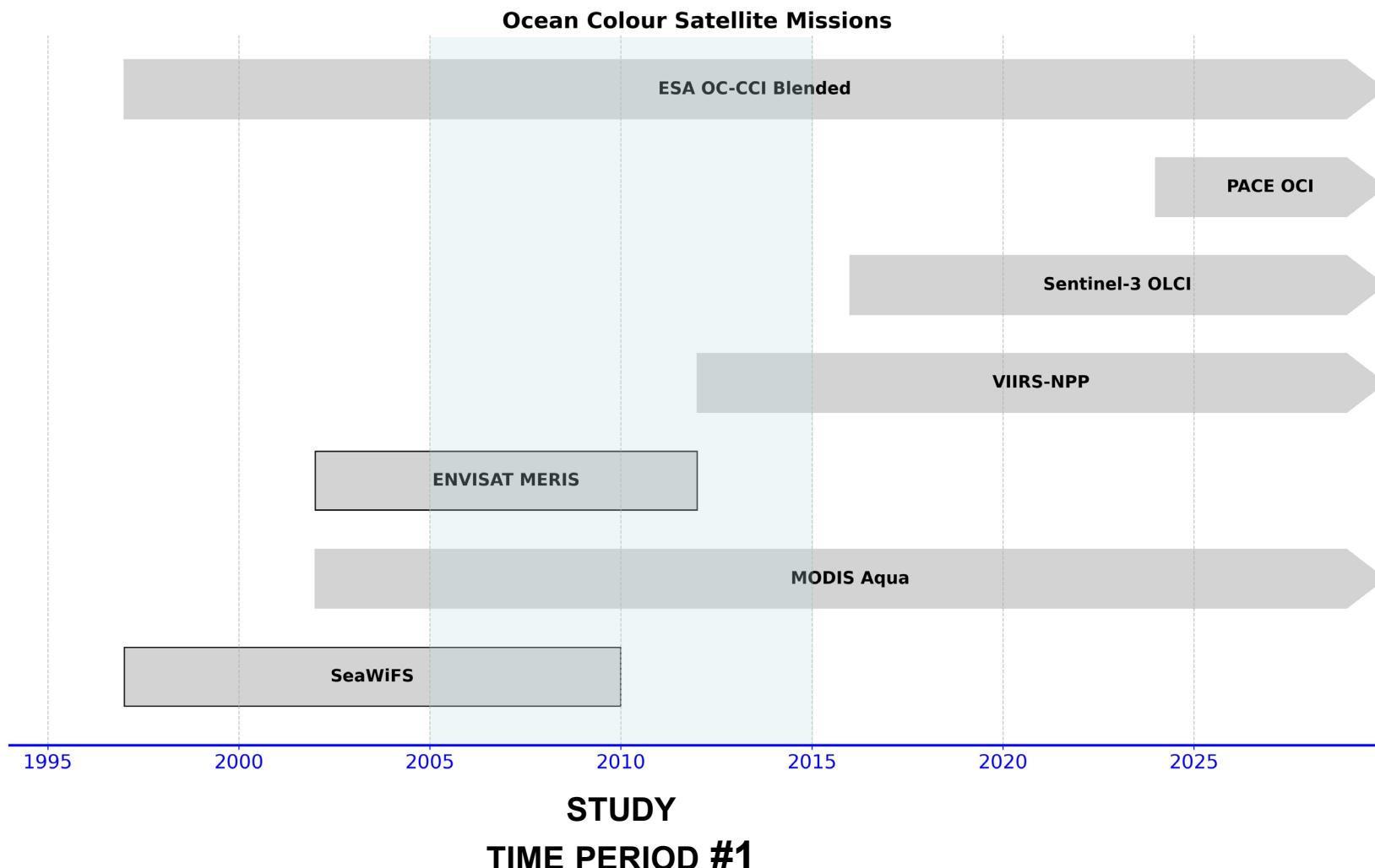
Missing data

How much missing data can I tolerate?



Does the dataset cover the time of your study?

SENSORS HAVE A LIMITED LIFESPAN



TEMPORAL COVERAGE



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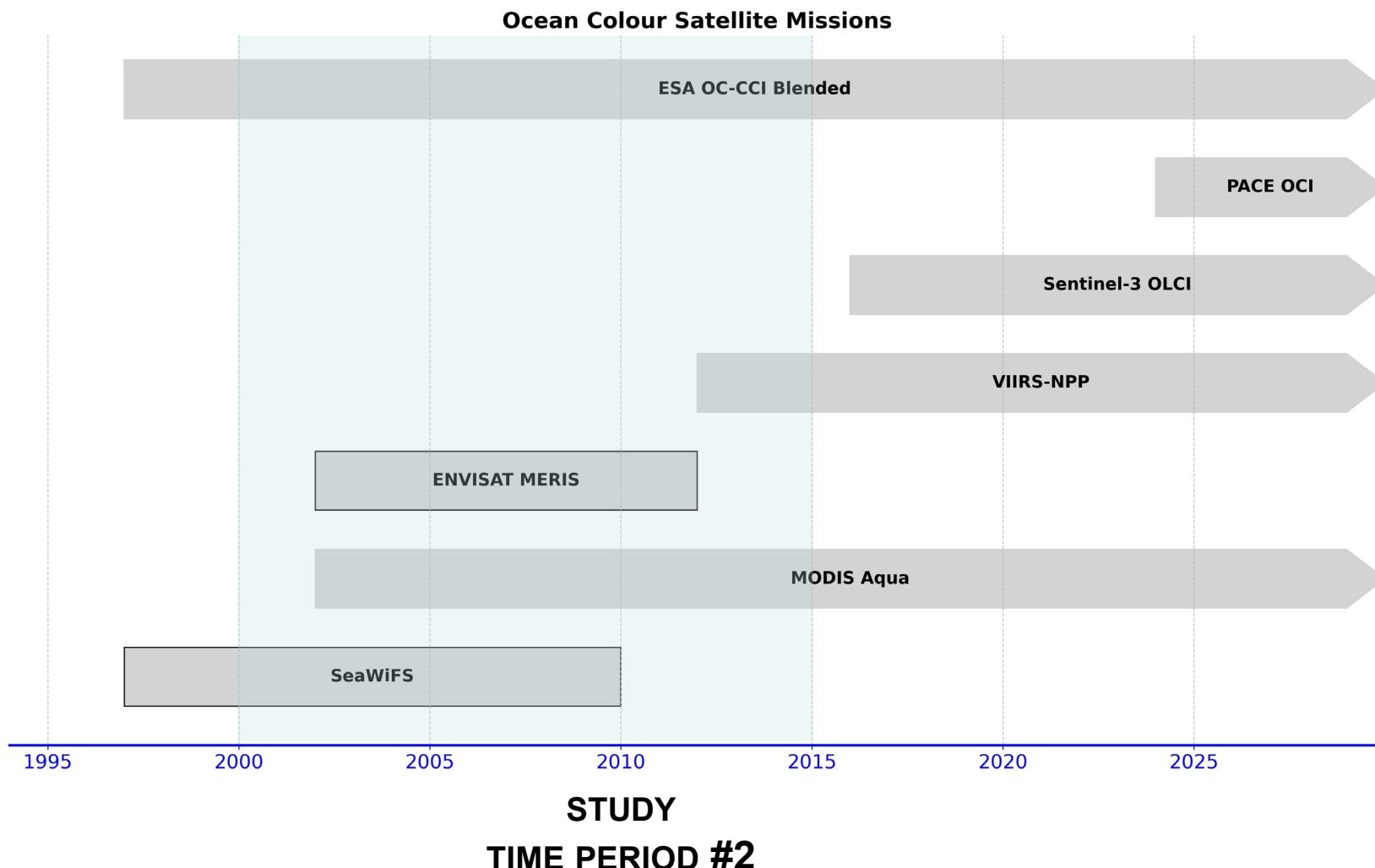
NOAA CoastWatch Satellite Course

<http://coastwatch.noaa.gov>



Does the dataset cover the time of your study?

SENSORS HAVE A LIMITED LIFESPAN



TEMPORAL COVERAGE



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NOAA CoastWatch Satellite Course

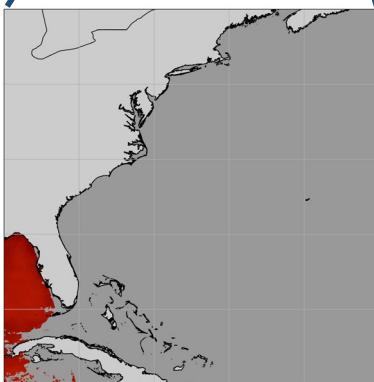
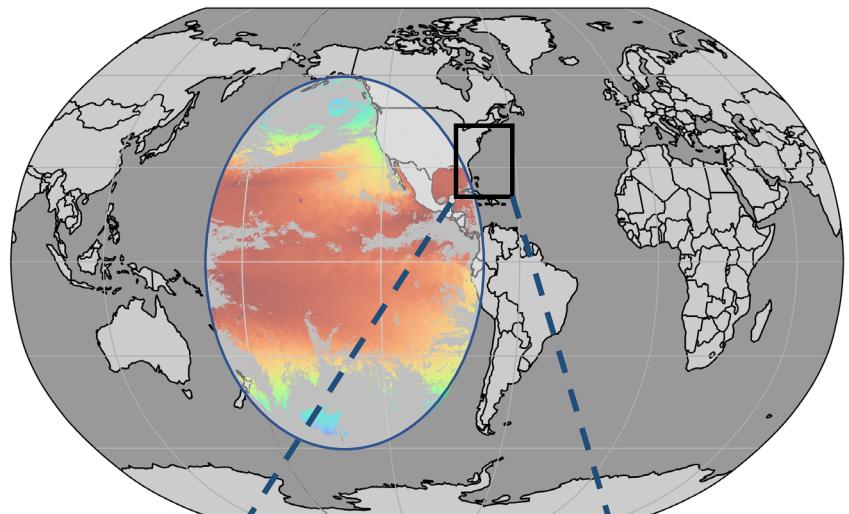
<http://coastwatch.noaa.gov>



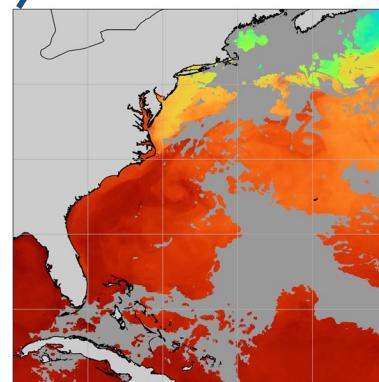
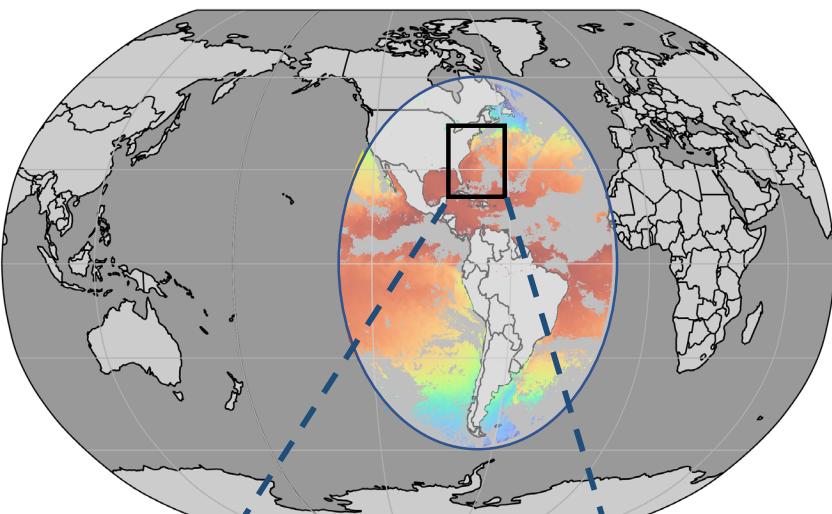
Does the dataset cover your area of interest?

SOME DATASETS HAVE GLOBAL COVERAGE, OTHERS ARE REGIONAL

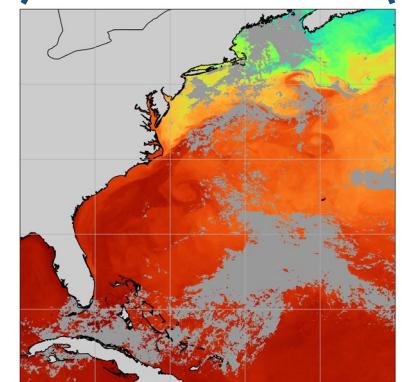
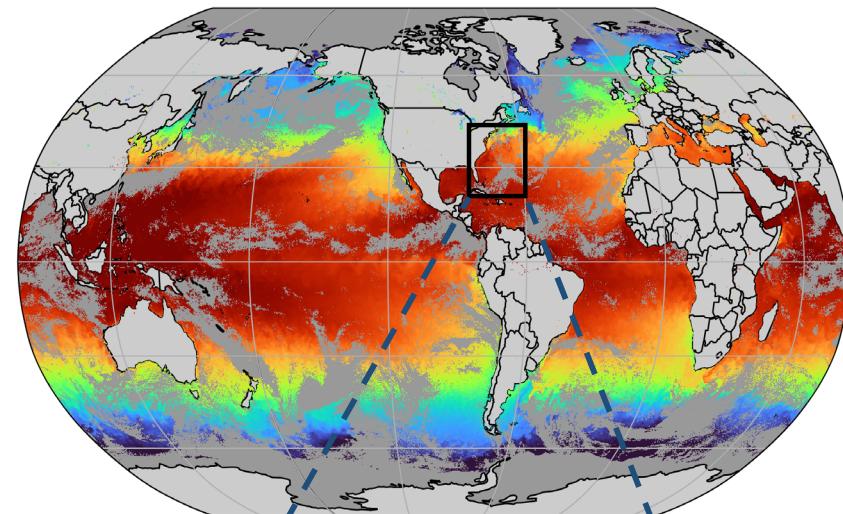
NOAA GOES West SST
(geostationary satellite)



NOAA GOES East SST
(geostationary satellite)



NOAA L3S-LEO SST
(Low Earth Orbit Satellites)



SPATIAL COVERAGE



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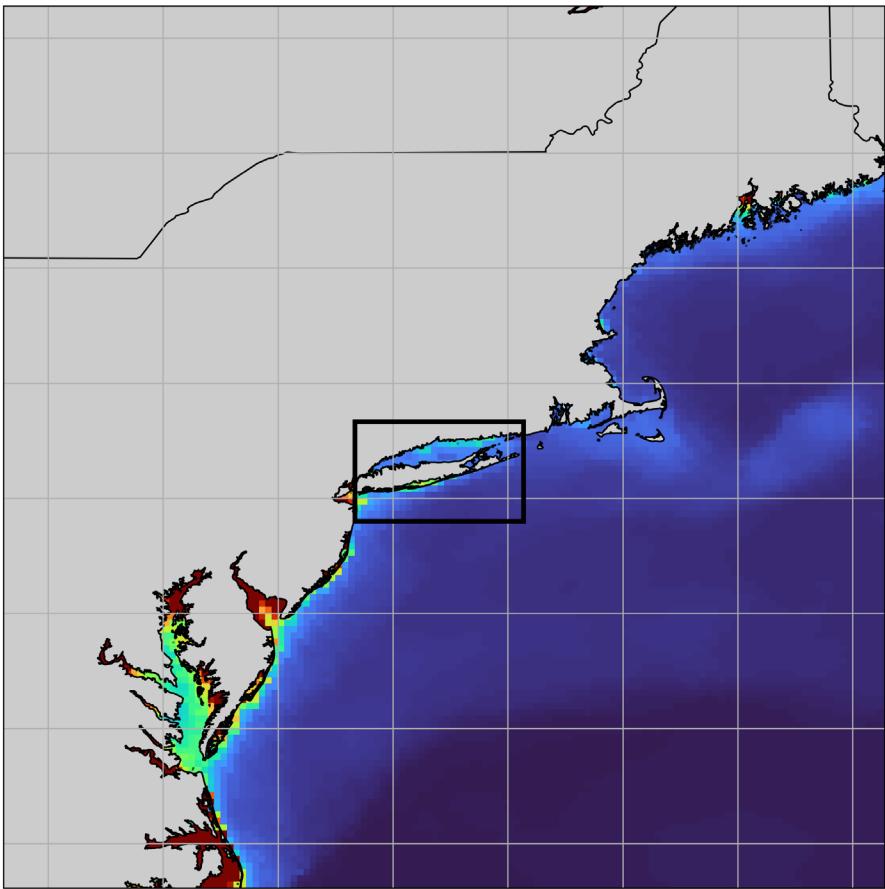
<http://coastwatch.noaa.gov>



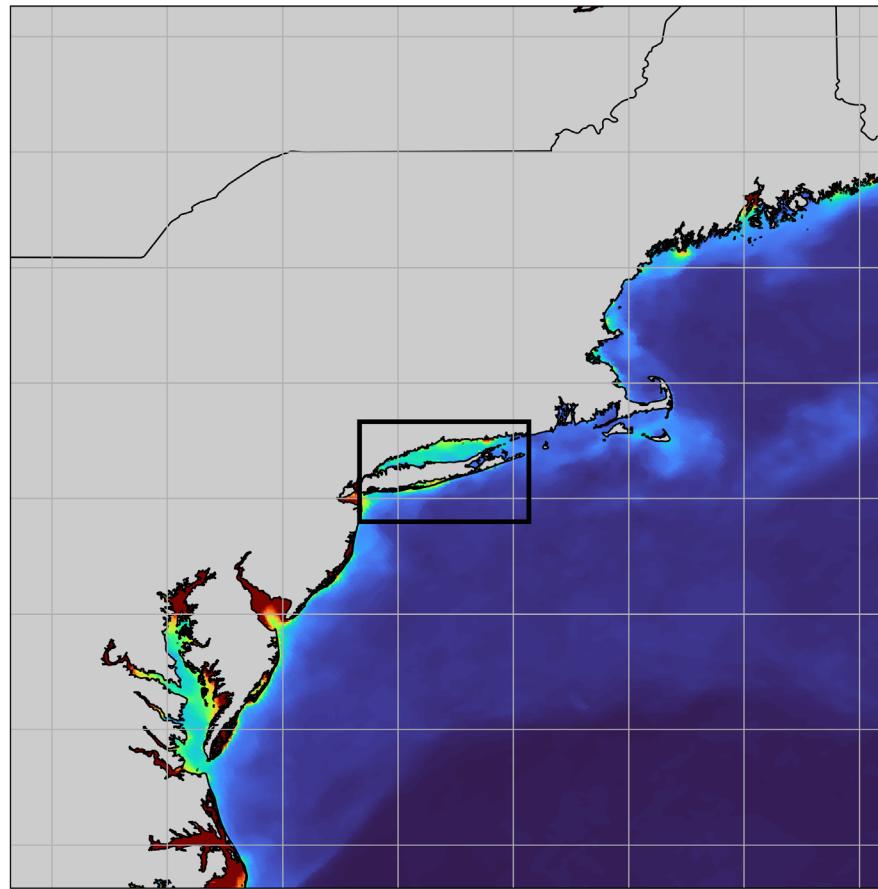
How big are the pixels?

LARGE PIXELS ARE BEST FOR LARGER REGIONS AND WHEN NOT TRACING FINE SCALE FEATURES

VIIRS & OLCI SPM
9 km x 9 km pixel



VIIRS & OLCI SPM
2 km x 2 km pixel



SPM =
Suspended
Particulate Matter

SPATIAL RESOLUTION

U.S. Northeastern Atlantic Region

National Environmental Satellite, Data, and Information Service

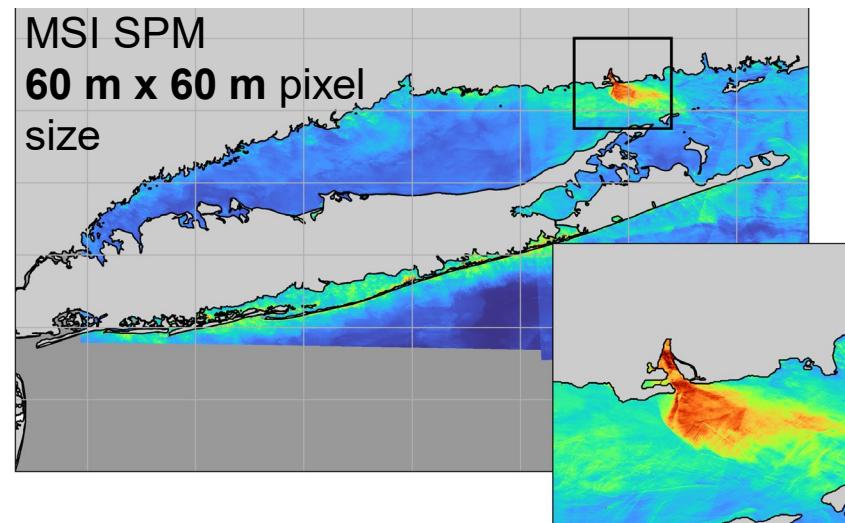
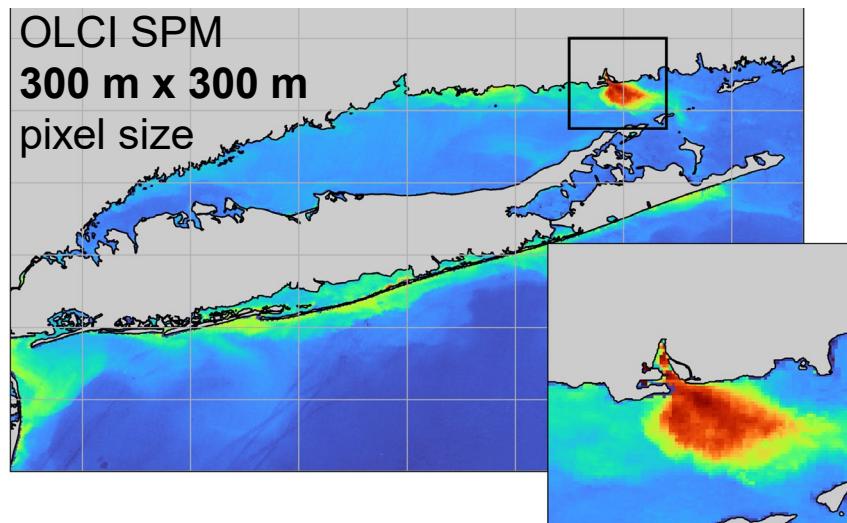
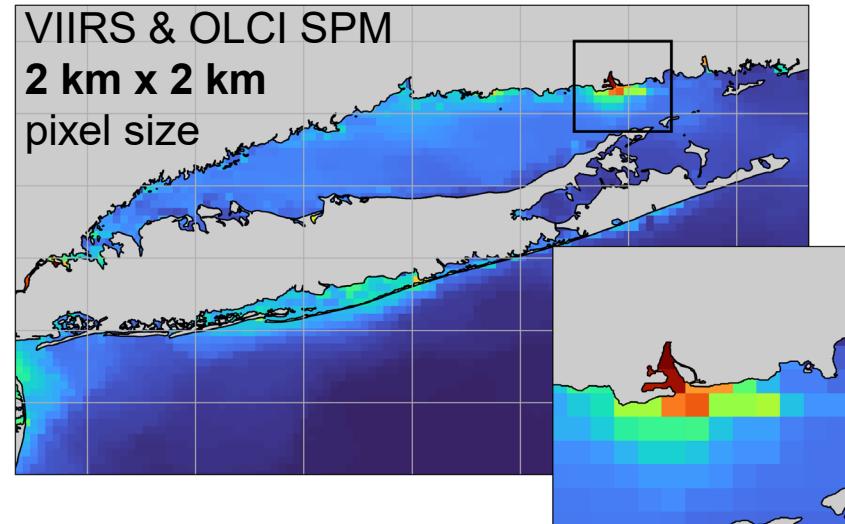
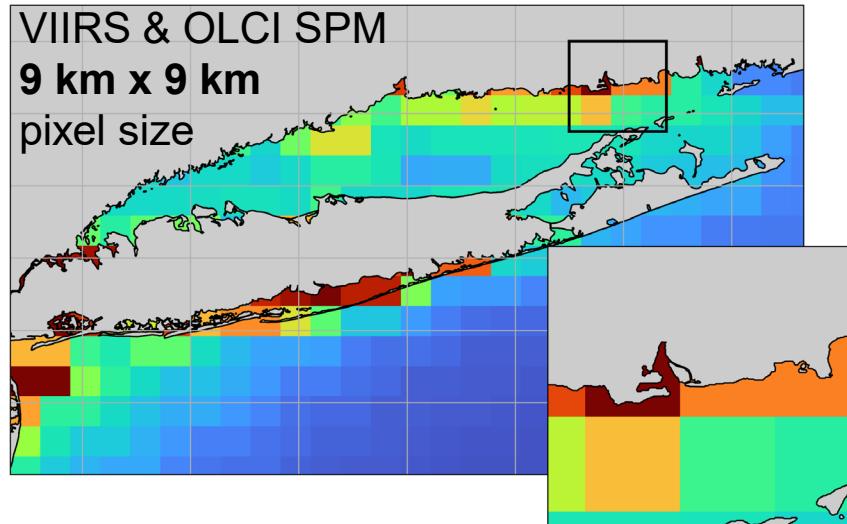
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<http://coastwatch.noaa.gov>



How big can the pixels be?

SMALLER PIXELS BEST FOR SMALLER REGIONS AND WHEN TRACING SCALE FINE FEATURES



SPATIAL RESOLUTION

Long Island Sound



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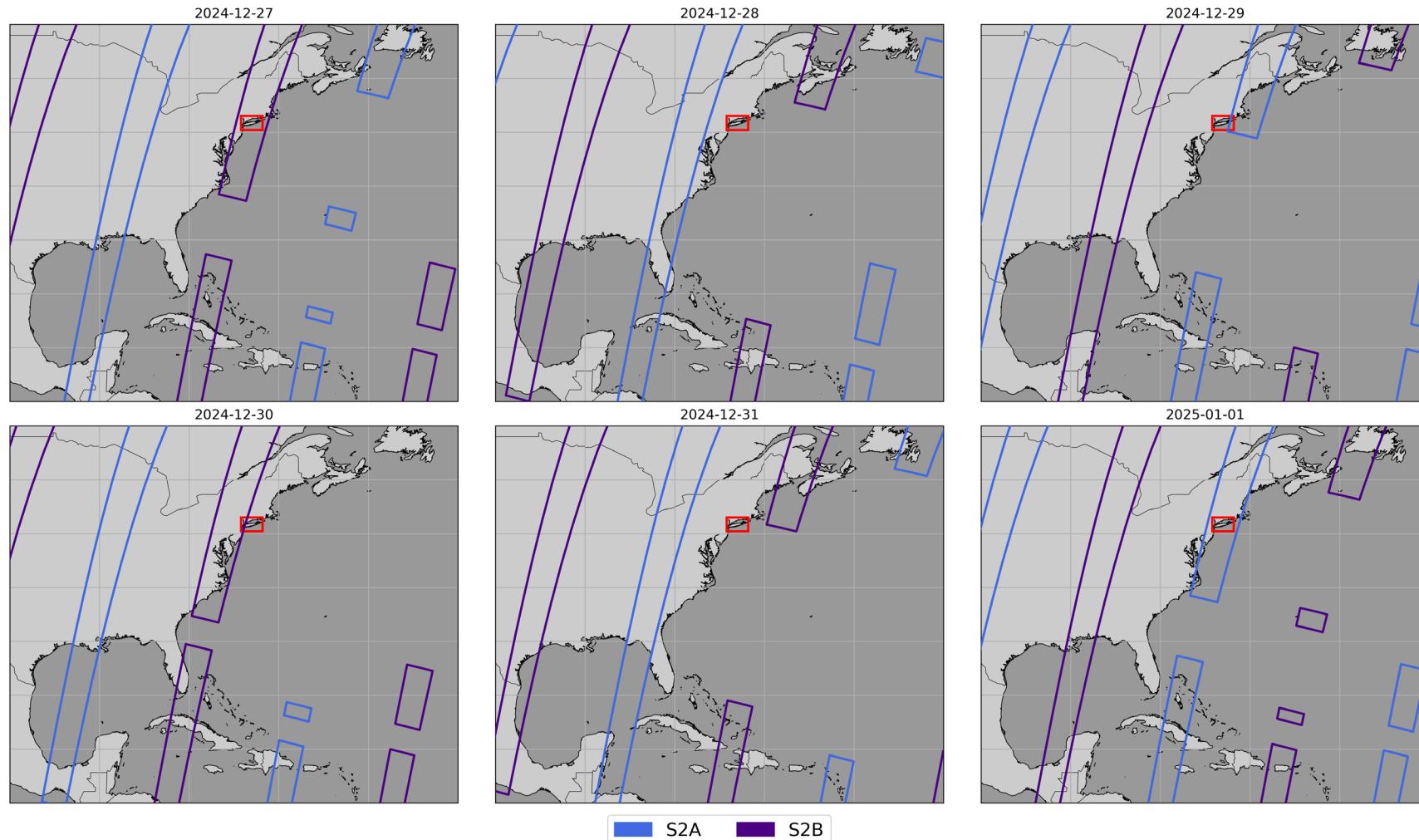
<http://coastwatch.noaa.gov>



How often do you need a measurement?

...OR HOW MANY DAYS TO GET GLOBAL COVERAGE

MSI
60 m x 60 m
~5 Day revisit time



TEMPORAL RESOLUTION



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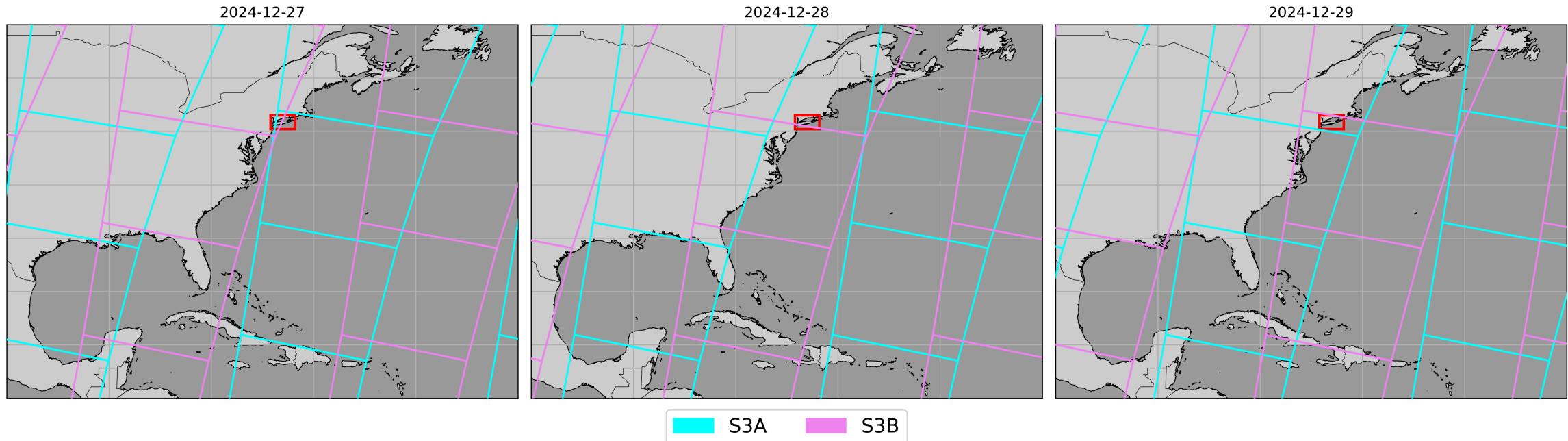
How often do you need a measurement?

...OR HOW MANY DAYS TO GET GLOBAL COVERAGE

OLCI

60 m x 60 m

<2 Day revisit time



TEMPORAL RESOLUTION



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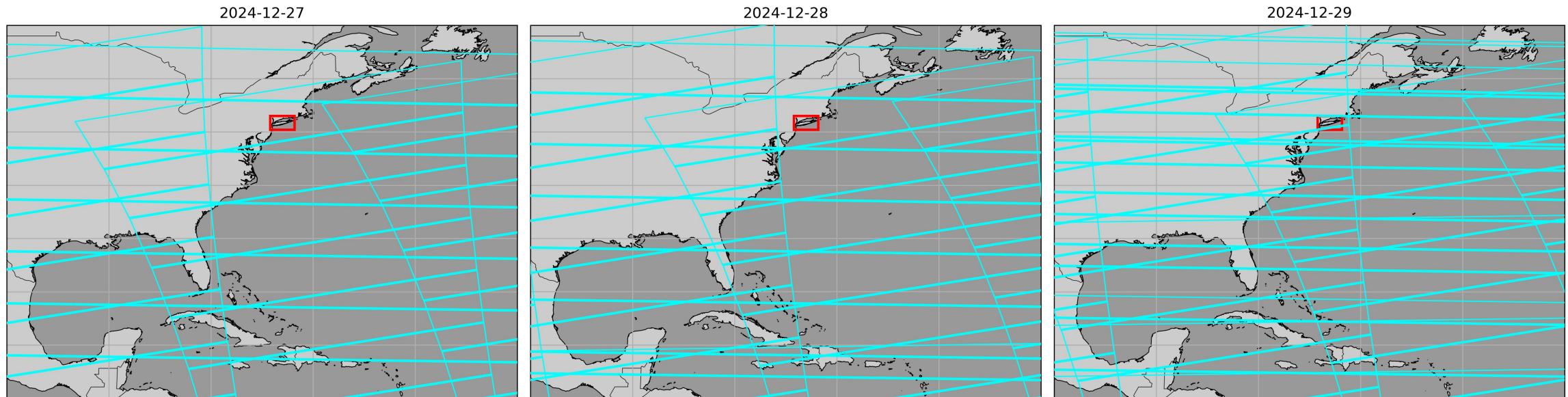
<http://coastwatch.noaa.gov>



How often do you need a measurement?

...OR HOW MANY DAYS TO GET GLOBAL COVERAGE

VIIRS SNPP
60 m x 60 m
Daily revisit time



TEMPORAL RESOLUTION



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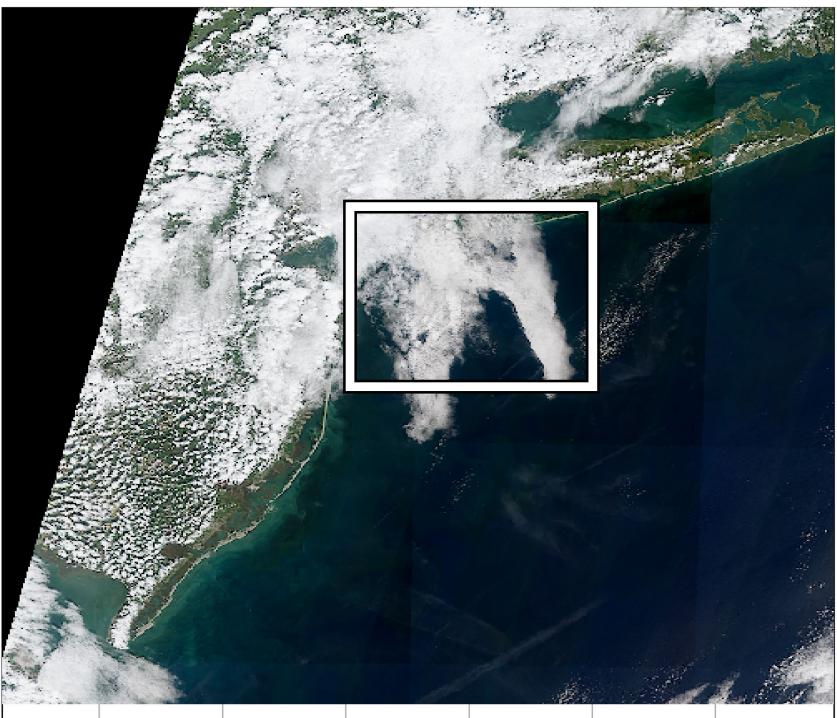
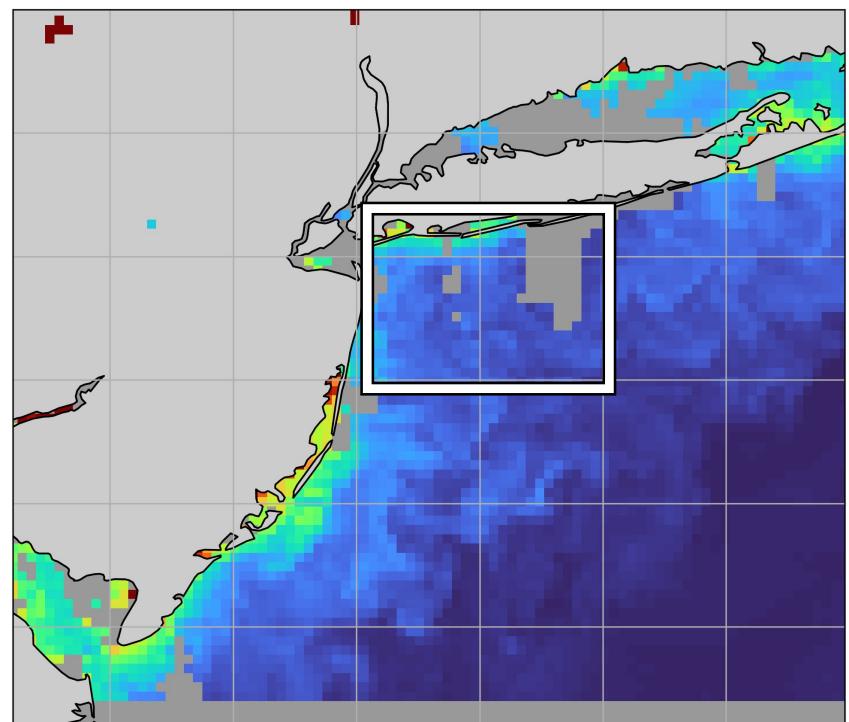
<http://coastwatch.noaa.gov>



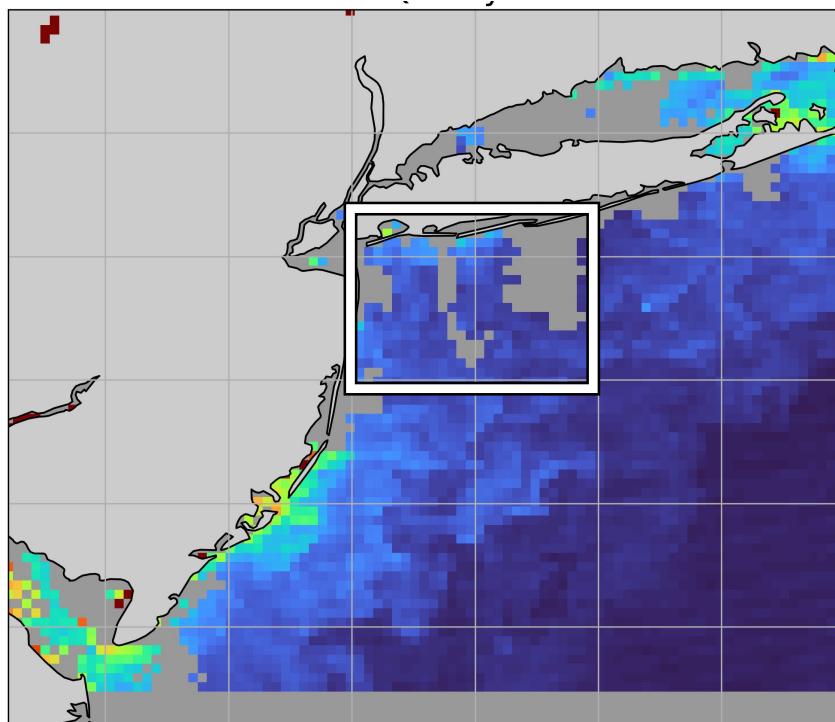
How fast do you need the data and at what quality?

THERE IS A TRADEOFF BETWEEN LATENCY AND QUALITY

VIIRS Chlorophyll, Near Real-Time
(~3 hours from overpass)



VIIRS Chlorophyll Science Quality
(2 week lag)



LATENCY / QUALITY



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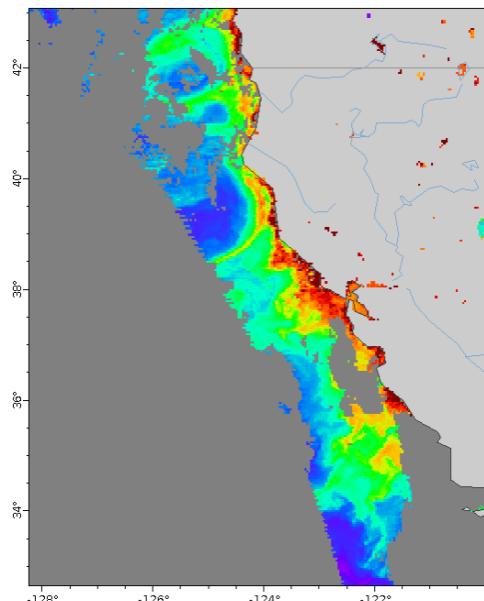


Some applications require science quality data

EXAMPLE: DEVELOPING HABITAT MODELS

VIIRS Chlorophyll **Delayed-Release**

Science Quality (2 week lag)

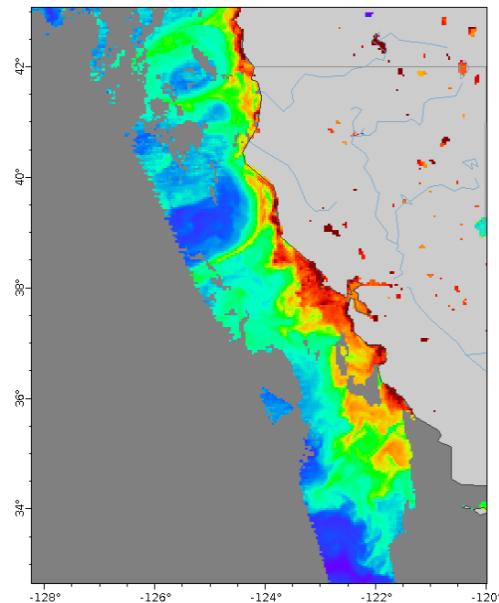


MODEL
DEVELOPMENT

Harmful Algal Bloom

Habitat Model

VIIRS Chlorophyll, **Near Real-Time** Lower Quality Control



LATENCY / QUALITY



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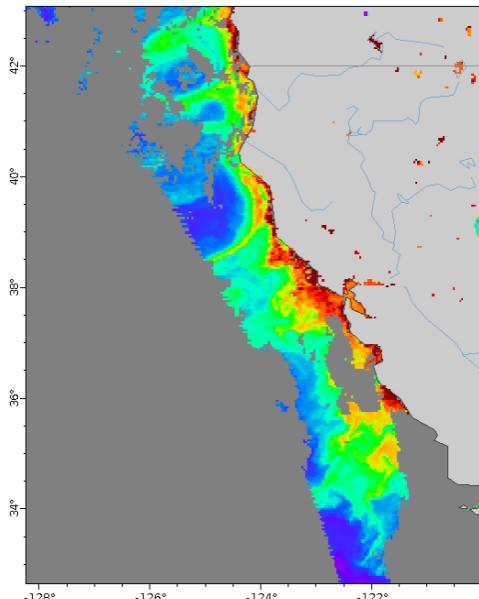
<http://coastwatch.noaa.gov>



Other applications require near real-time data

EXAMPLE: GENERATING FORECASTS AND NOWCASTS FROM THE MODEL

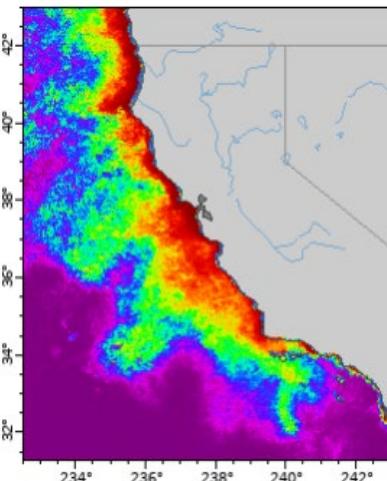
VIIRS Chlorophyll **Delayed-Release** Science Quality (2 week lag)



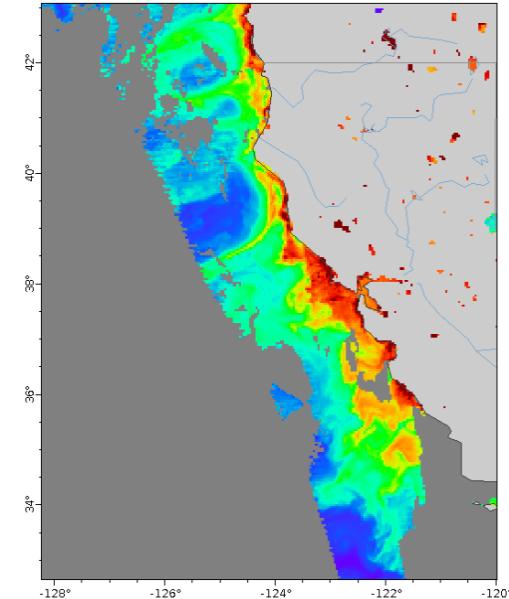
Harmful Algal Bloom

Habitat Model

FORECAST



VIIRS Chlorophyll, **Near Real-Time** Lower Quality Control



Harmful Algal Bloom Forecast

LATENCY / QUALITY



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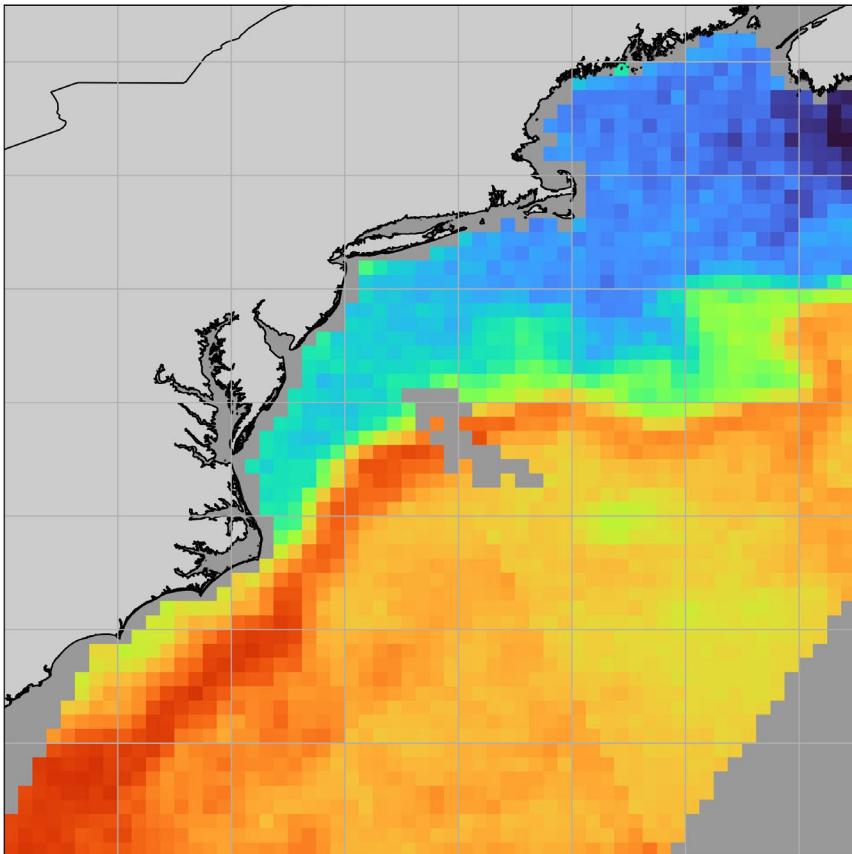
<http://coastwatch.noaa.gov>



How much missing data can your project tolerate?

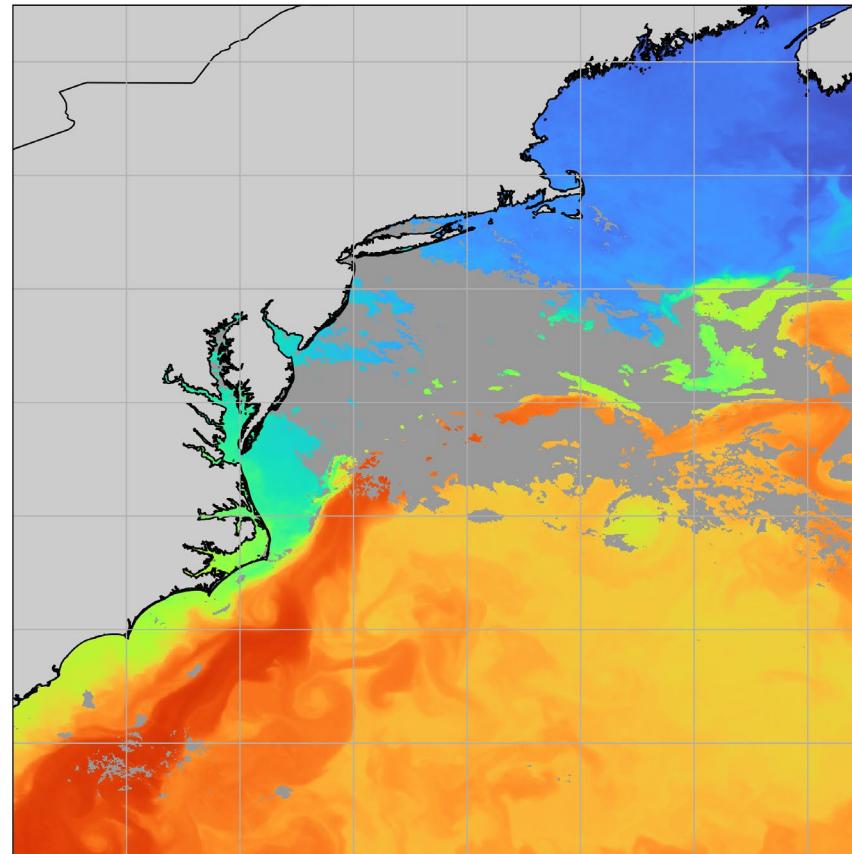
CLOUDS AND PROXIMITY TO LAND CAN CAUSE MISSING DATA

Microwave SST



CAN SEE THROUGH CLOUDS
CANNOT MEASURE CLOSE TO LAND

Infrared SST



CANNOT SEE THROUGH CLOUDS
CAN MEASURE CLOSER TO LAND

MISSING DATA



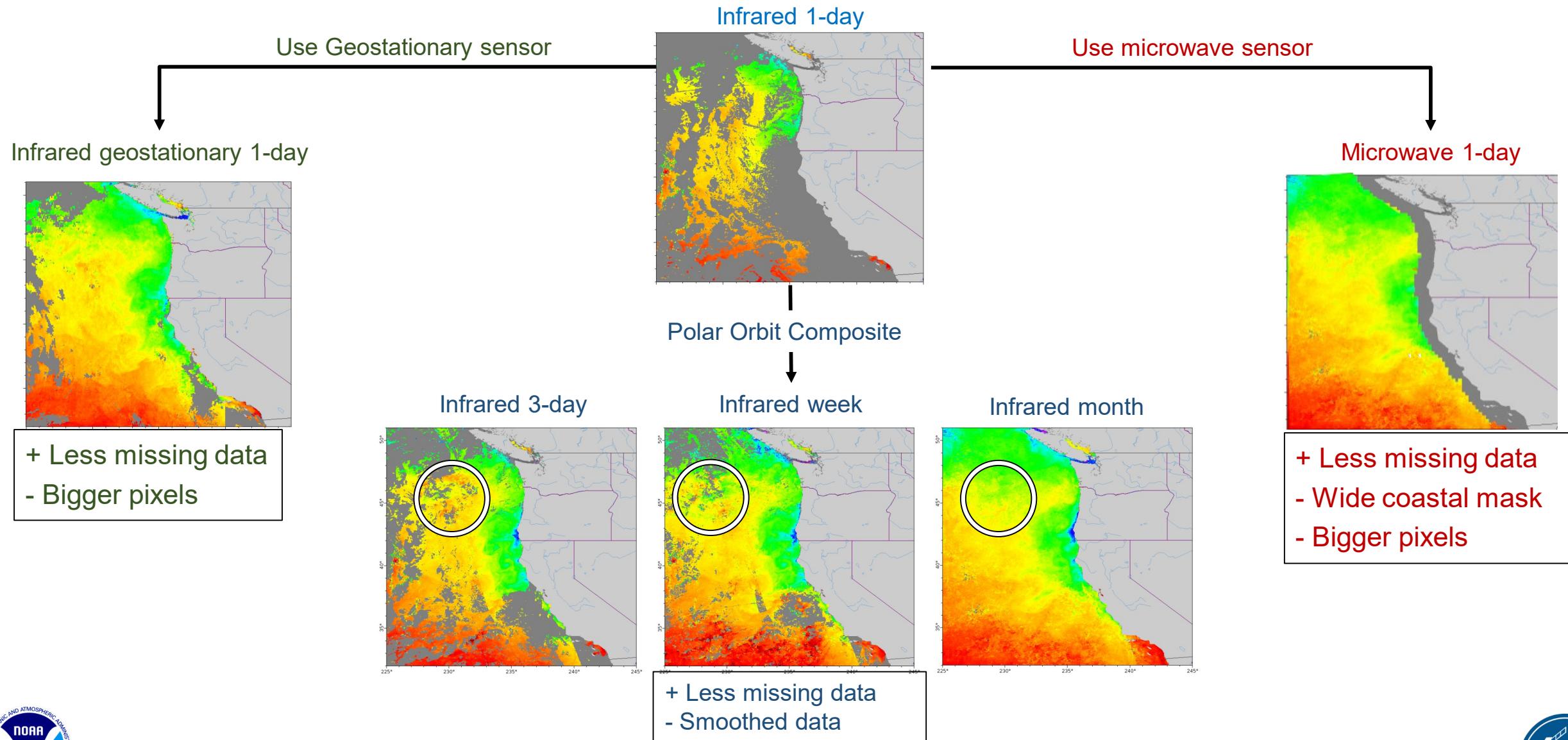
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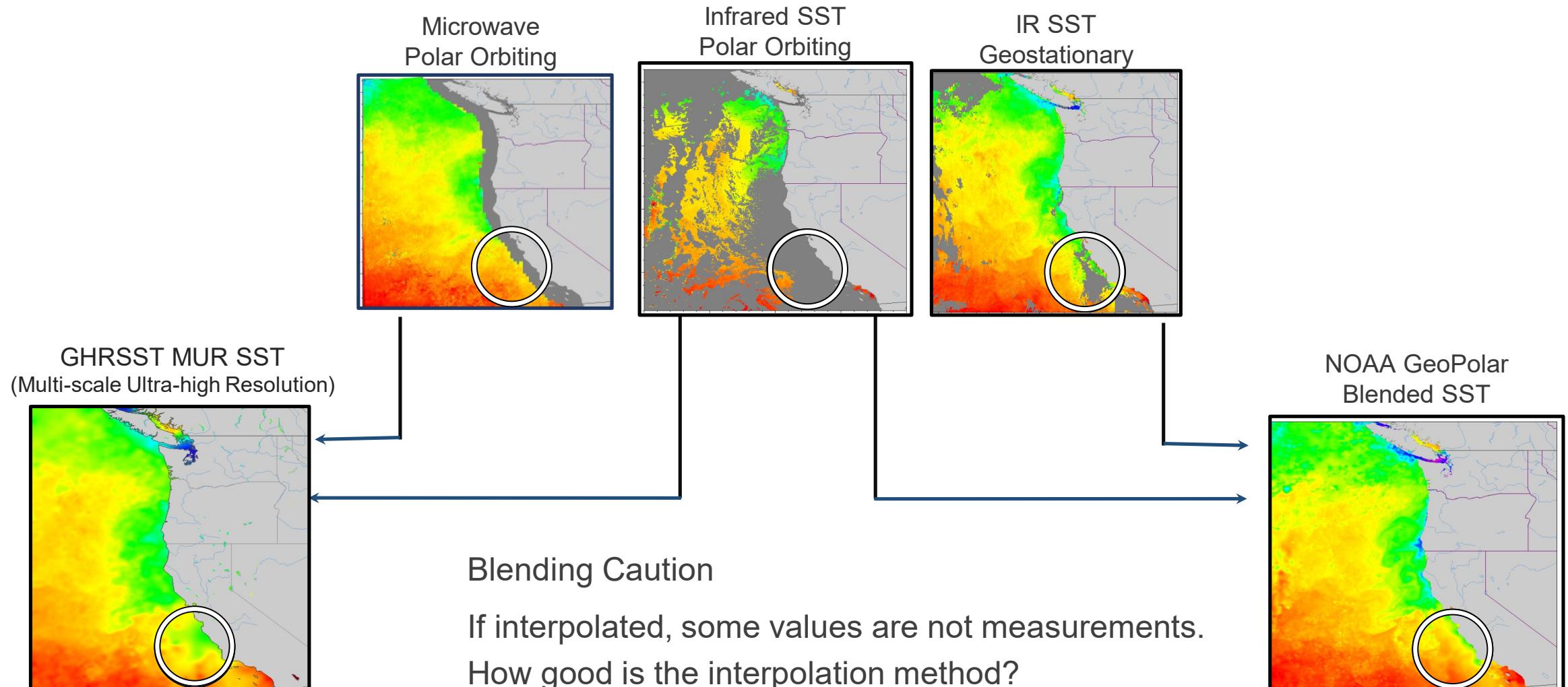
<http://coastwatch.noaa.gov>



Case study: managing missing SST data from clouds



Blended SST products – best of all worlds?



Visit the NOAA CoastWatch data catalog pages

EACH OF THESE CATALOGS PROVIDE INFORMATION ABOUT DATASETS TO HELP YOU DECIDE WHICH TO USE



NOAA CoastWatch • OceanWatch

Central Office coastwatch.noaa.gov

NOAA COASTWATCH
WEST COAST REGIONAL NODE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
coastwatch.pteg.noaa.gov/data.html

NOAA OCEANWATCH
CENTRAL PACIFIC NODE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
<https://oceanwatch.pifsc.noaa.gov/doc.html>

NOAA POLARWATCH
COASTWATCH REGIONAL NODE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
polarwatch.noaa.gov

NOAA CoastWatch

Caribbean and Gulf of Mexico Regional Node
cwcaribbean.aoml.noaa.gov

NOAA CoastWatch
EAST COAST NODE
eastcoast.coastwatch.noaa.gov

NOAA CoastWatch
Great Lakes
coastwatch.glerl.noaa.gov

Preview sample images

Find out the geographical coverage

Find out the temporal range coverage

Review metadata for details about datasets

