

# What to consider when choosing a dataset

## NOAA Coastwatch Satellite Course

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

National Environmental Satellite,  
Data, and Information Service

March 31, 2025

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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?

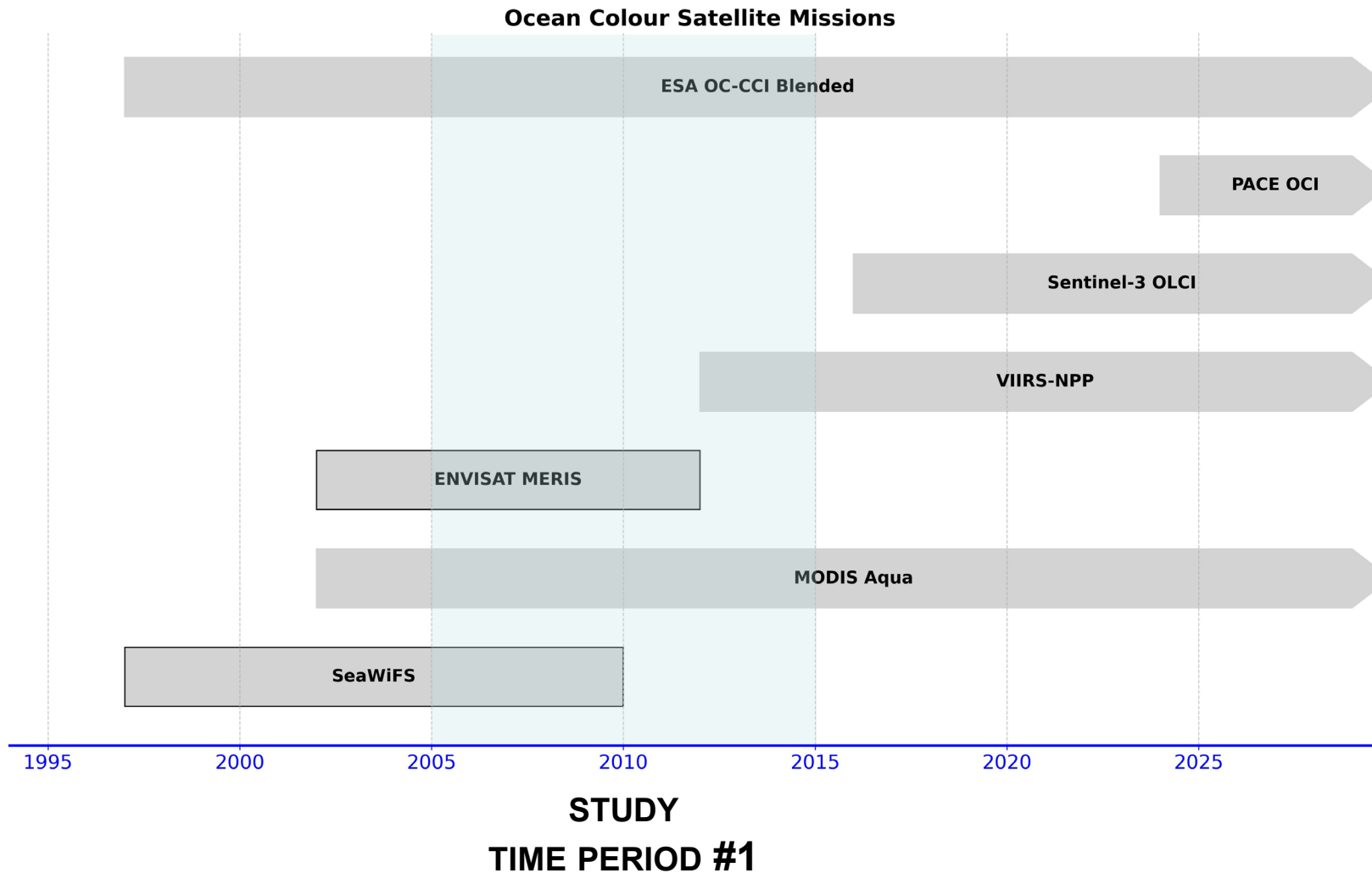
## **Missing data**

How much missing data can I tolerate?



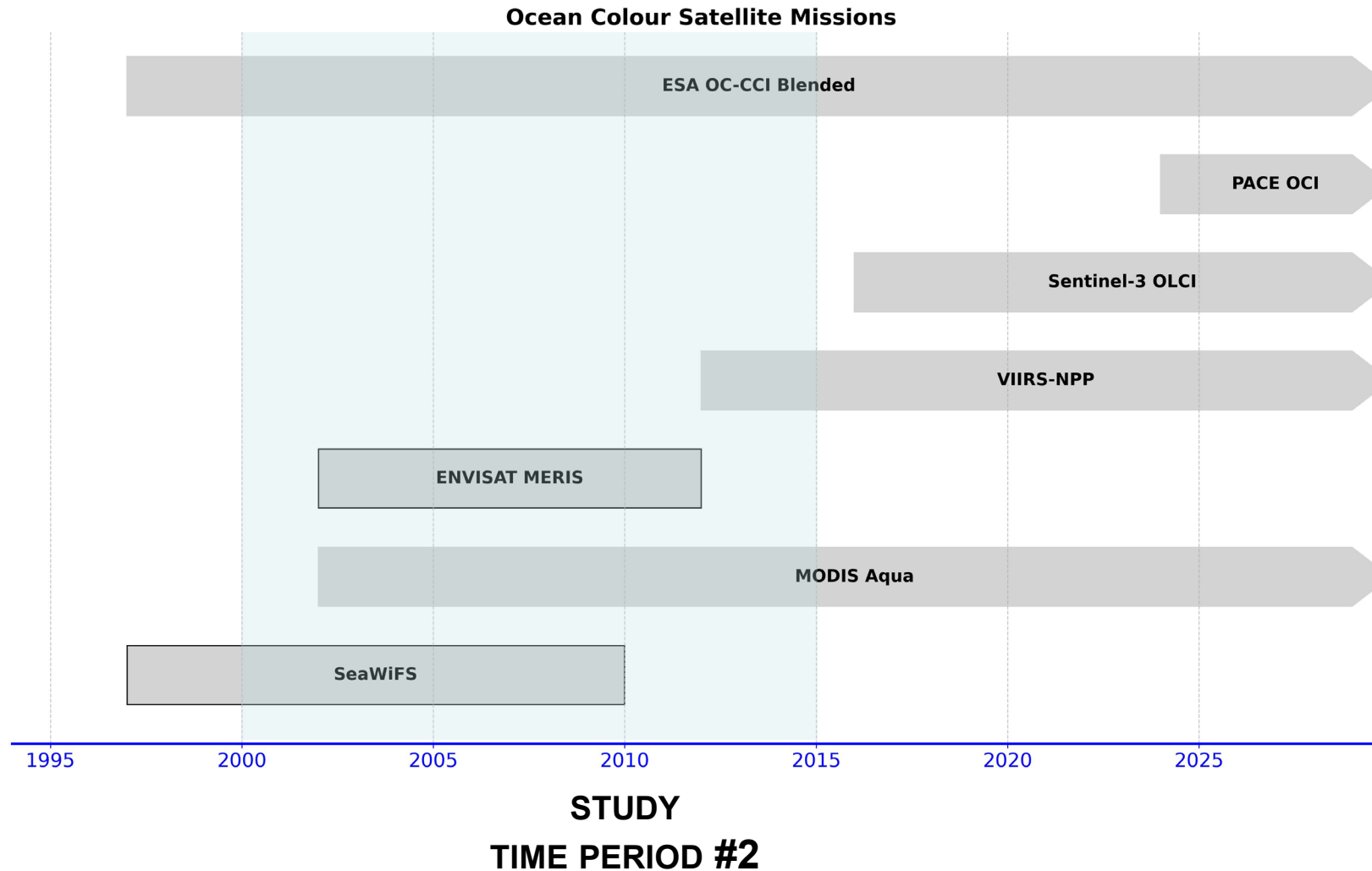
# Does the dataset cover the time of your study?

SENSORS HAVE A LIMITED LIFESPAN



# Does the dataset cover the time of your study?

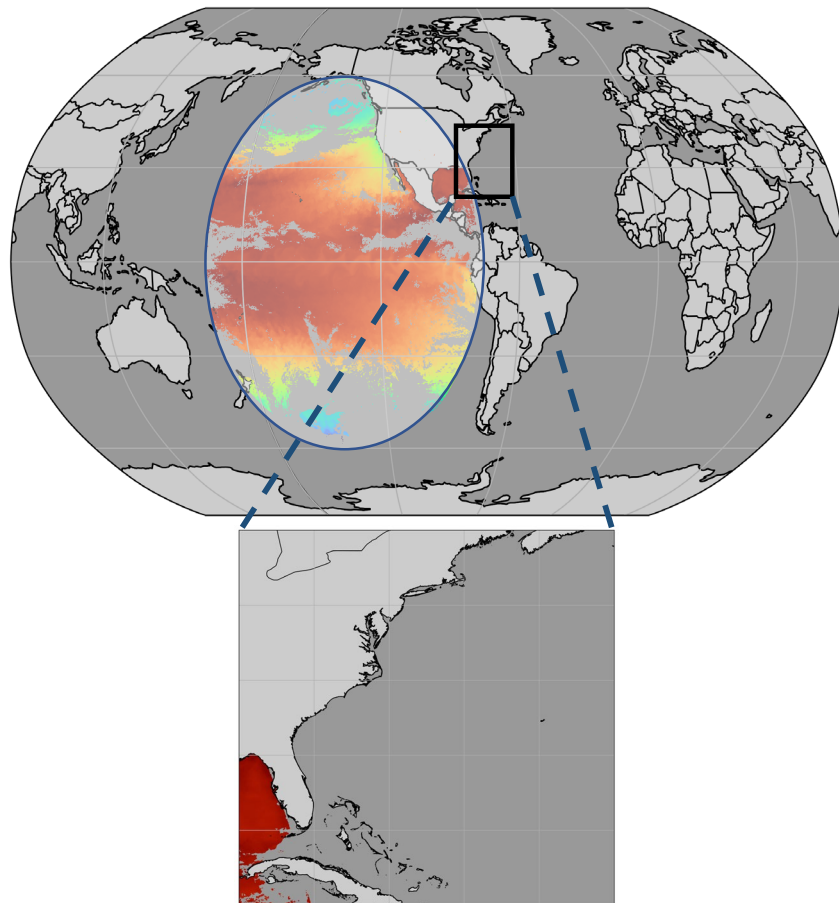
SENSORS HAVE A LIMITED LIFESPAN



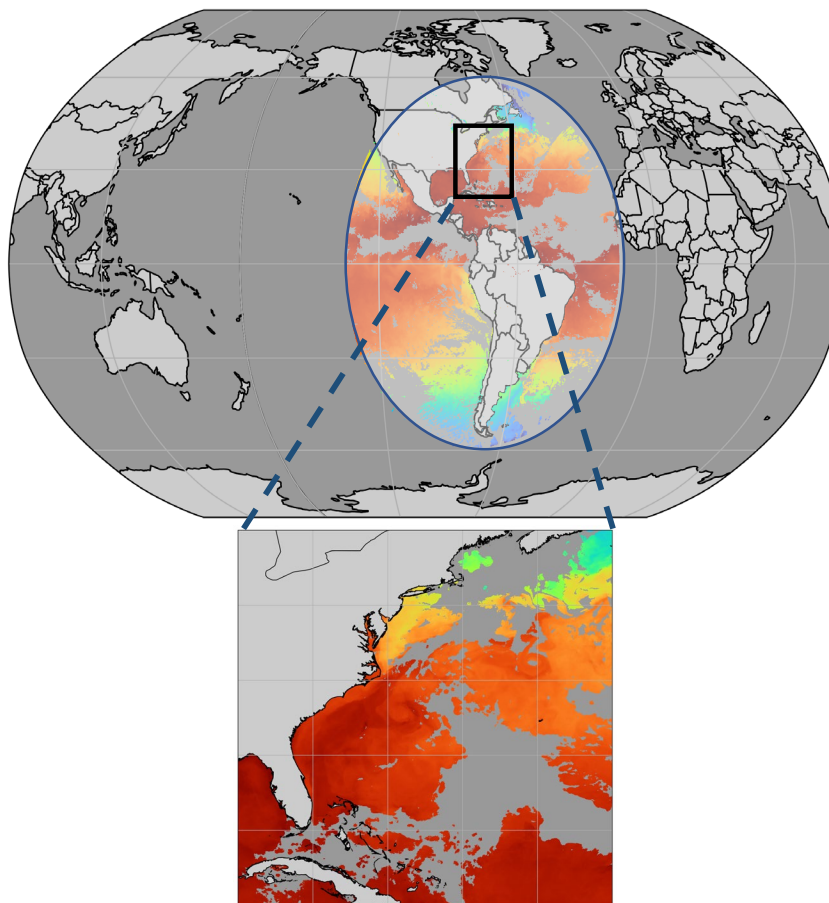
# Does the dataset cover your area of interest?

SOME DATASETS HAVE GLOBAL COVERAGE, OTHERS ARE REGIONAL

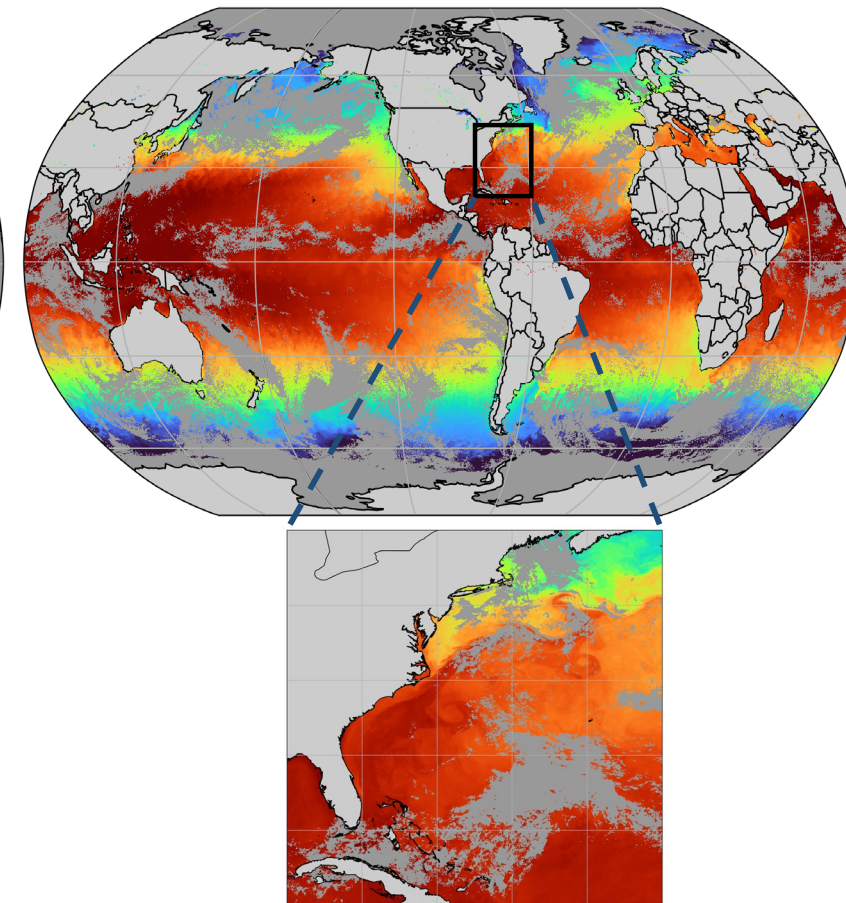
NOAA GOES West SST  
(geostationary satellite)



NOAA GOES East SST  
(geostationary satellite)



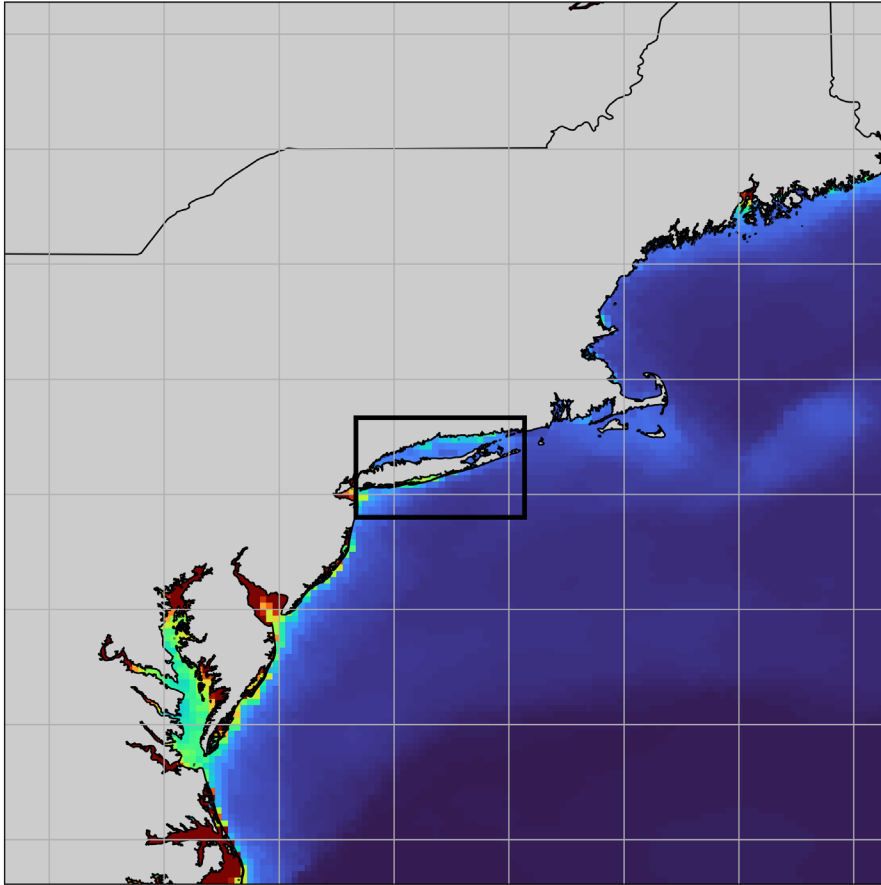
NOAA L3S-LEO SST  
(Low Earth Orbit Satellites)



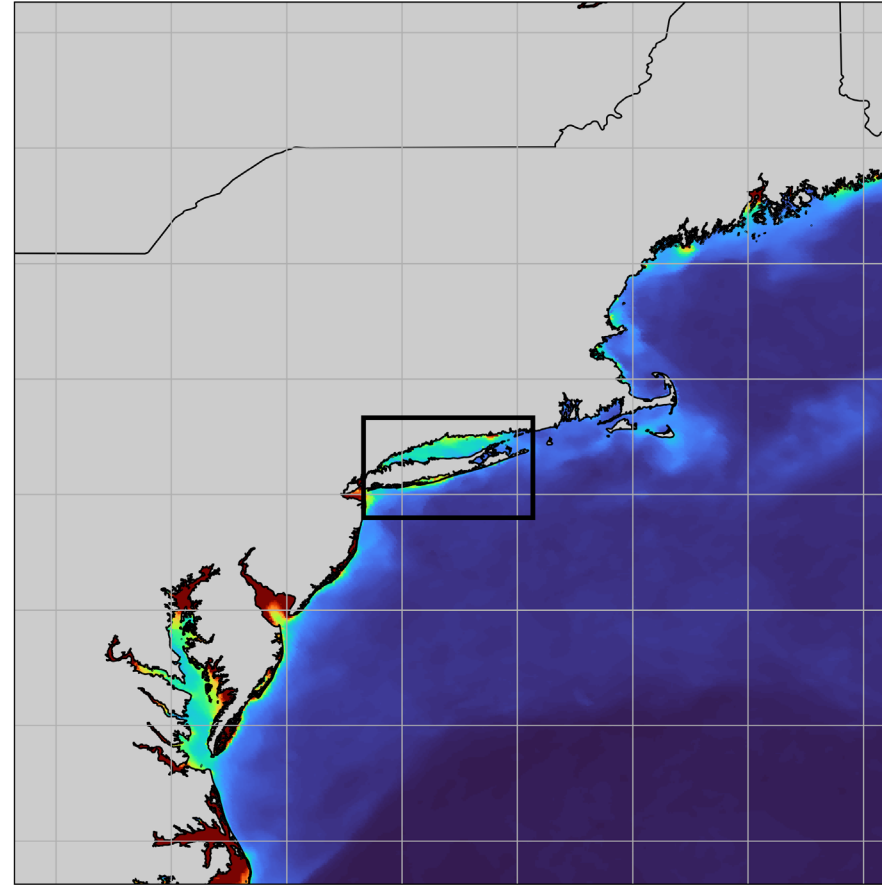
# How big are the pixels?

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

VIIRS & OLCI SPM  
9 km x 9 km pixel



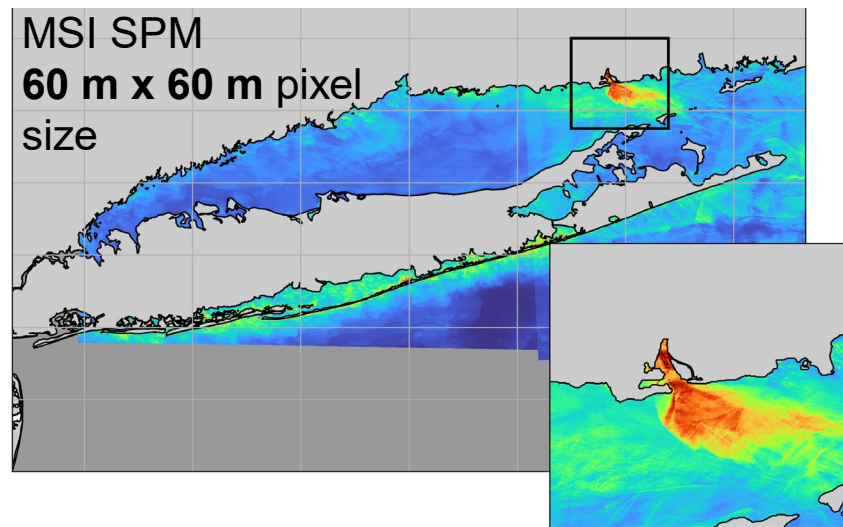
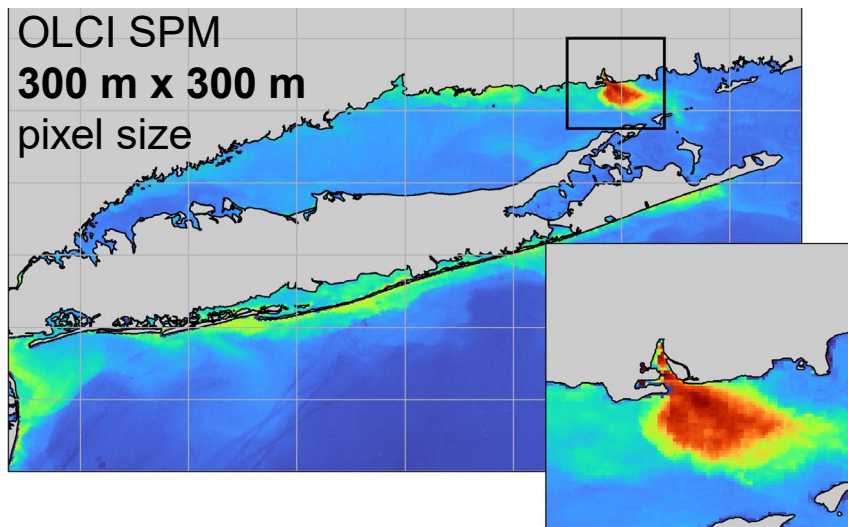
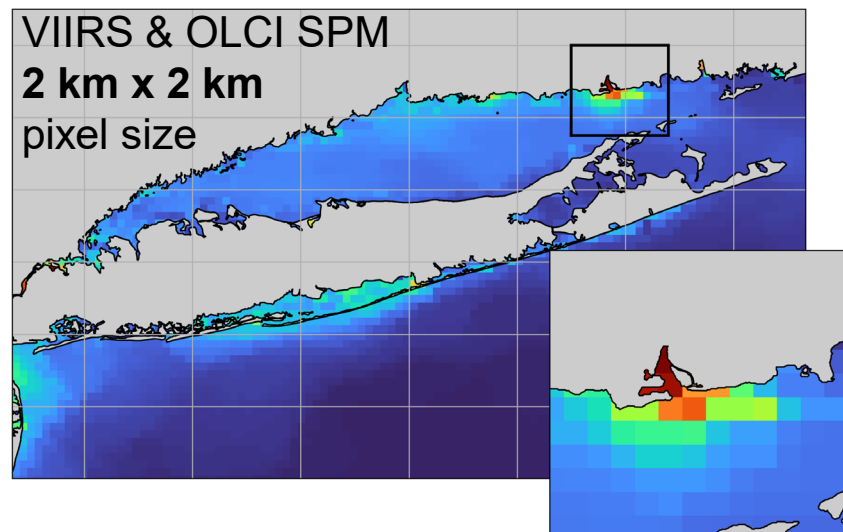
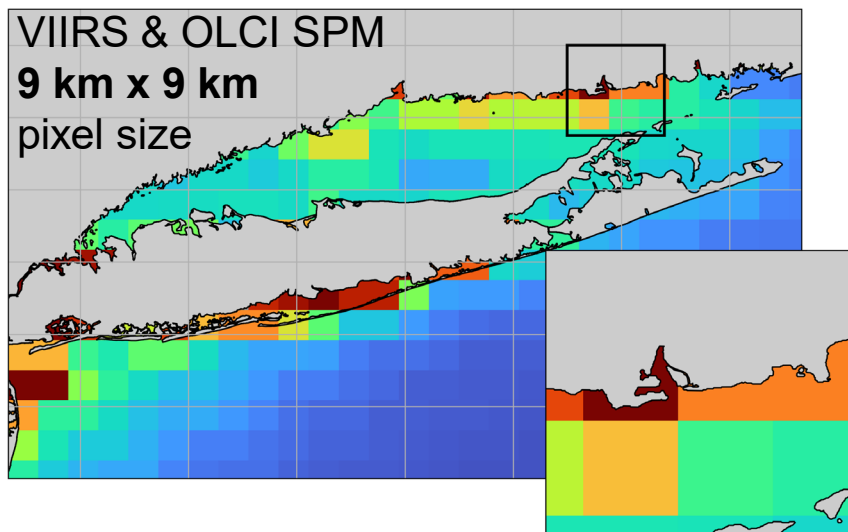
VIIRS & OLCI SPM  
2 km x 2 km pixel



SPM =  
Suspended  
Particulate Matter

# How big can the pixels be?

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



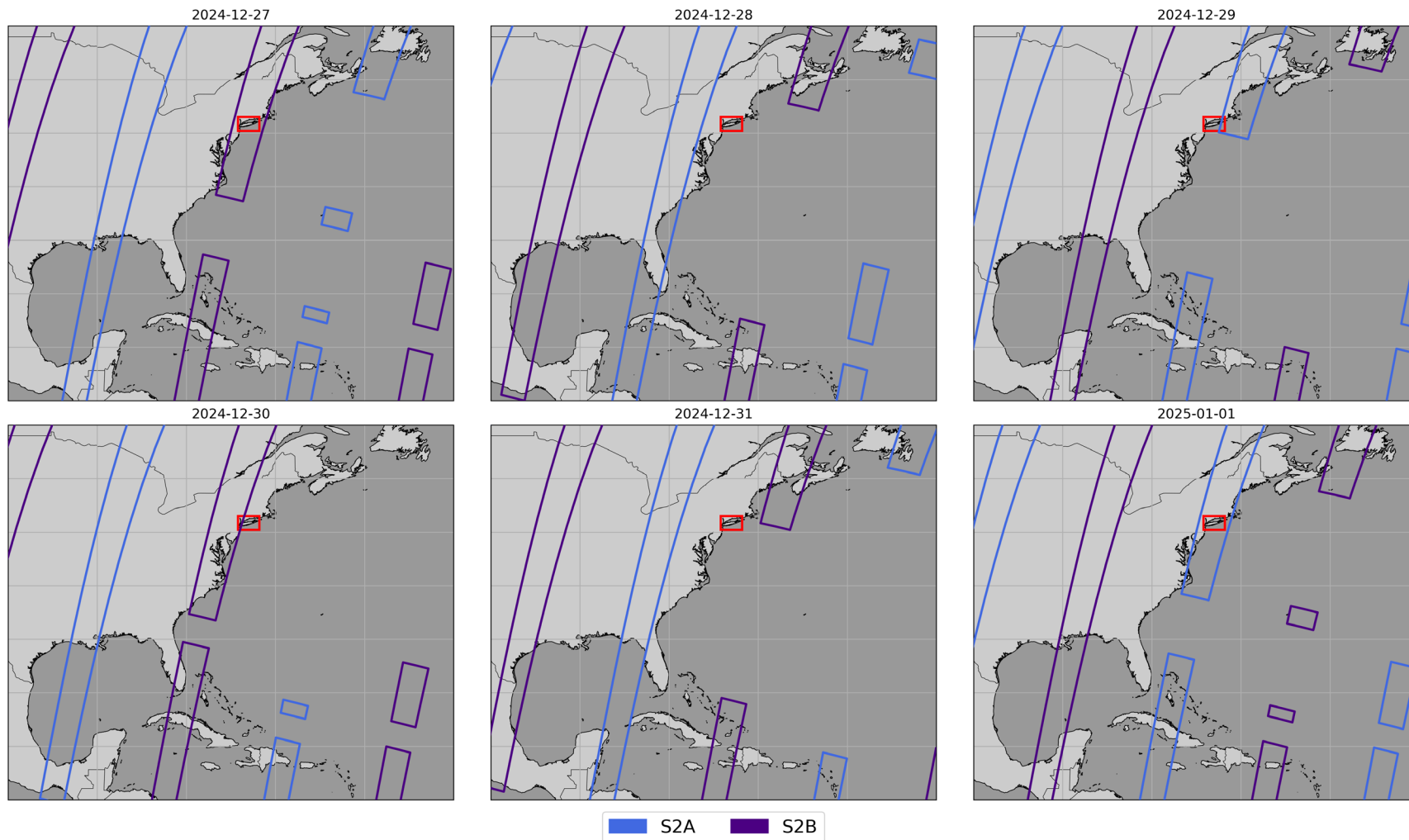
Long Island Sound

**SPATIAL RESOLUTION**

# How often do you need a measurement?

...OR HOW MANY DAYS TO GET GLOBAL COVERAGE

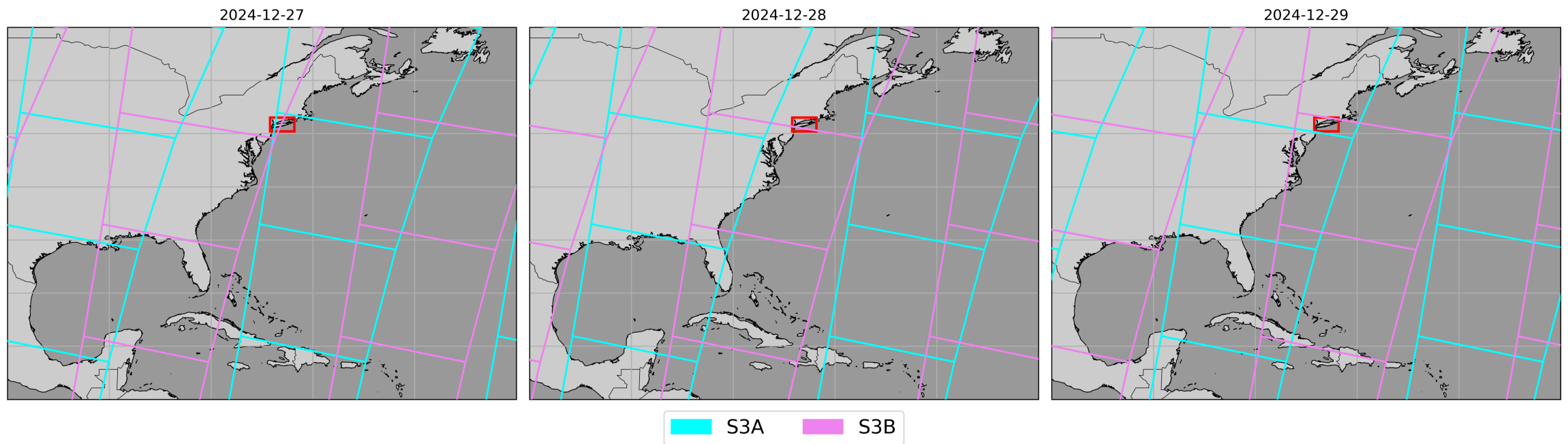
MSI  
60 m x 60 m  
~5 Day revisit time



# How often do you need a measurement?

...OR HOW MANY DAYS TO GET GLOBAL COVERAGE

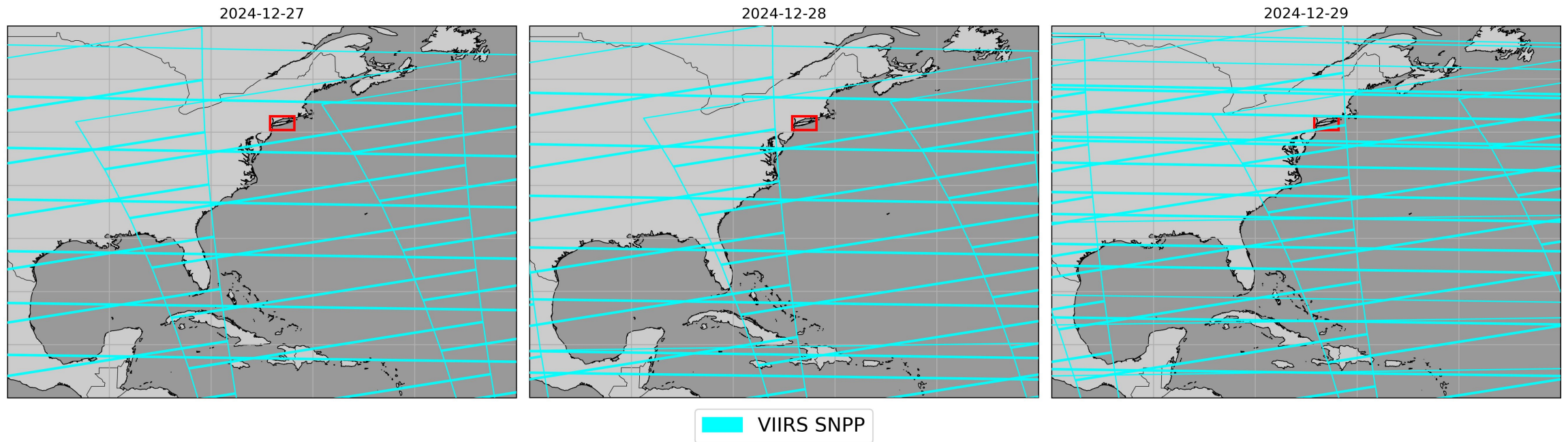
OLCI  
60 m x 60 m  
<2 Day revisit time



# How often do you need a measurement?

...OR HOW MANY DAYS TO GET GLOBAL COVERAGE

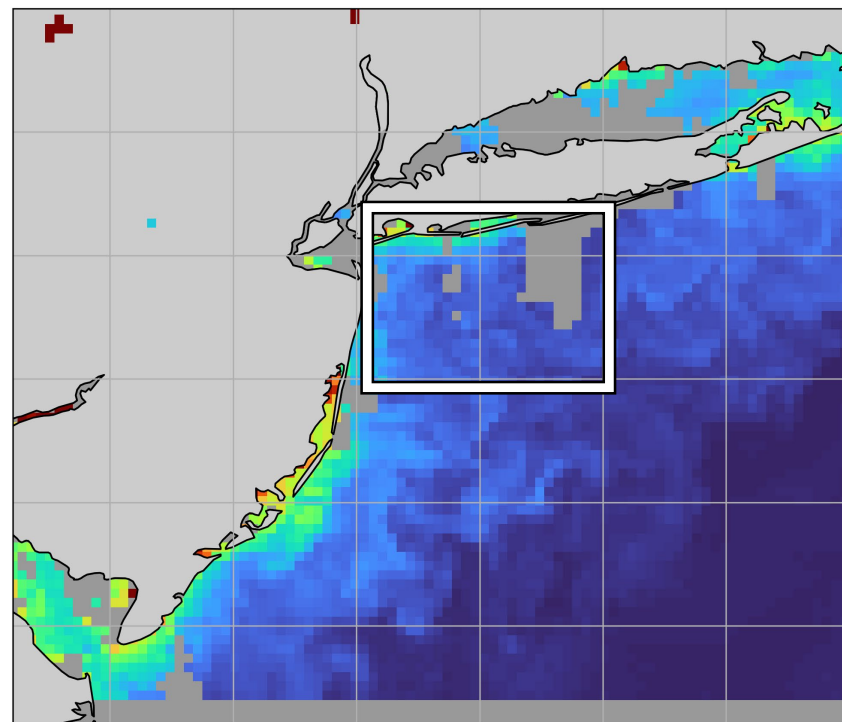
**VIIRS SNPP**  
**60 m x 60 m**  
**Daily revisit time**



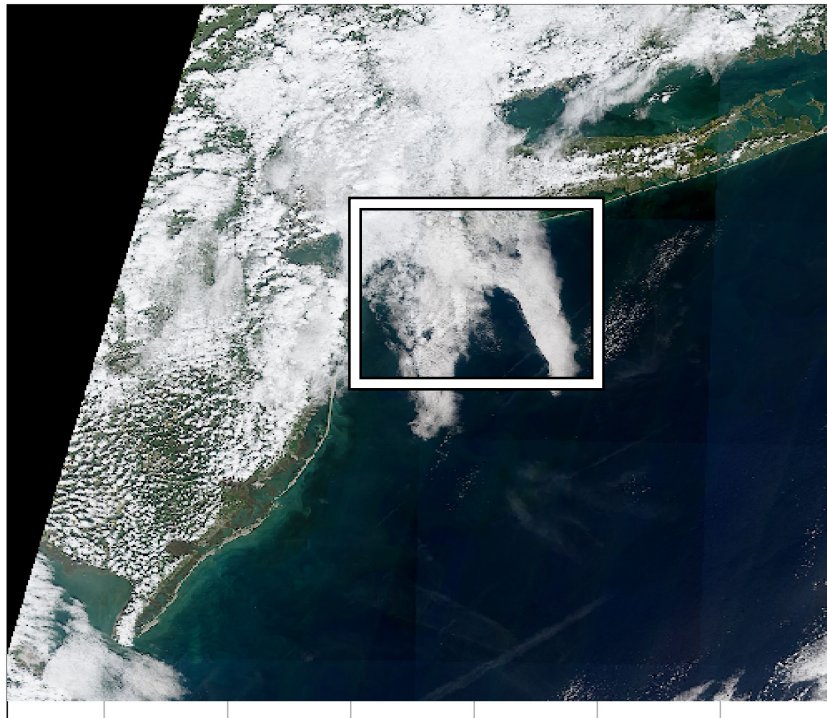
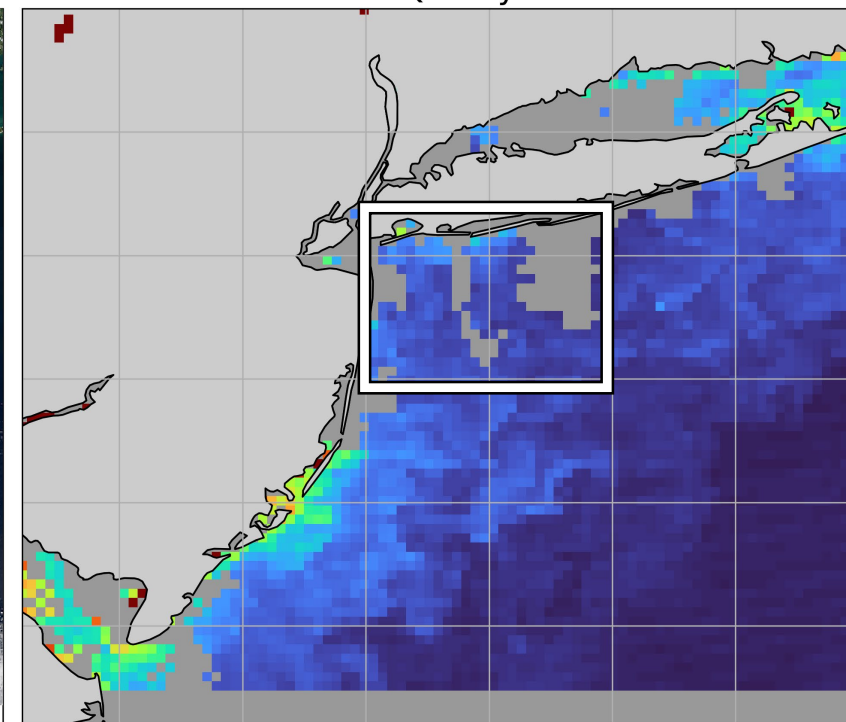
# How fast do you need the data and at what quality?

THERE IS A TRADEOFF BETWEEN LATENCY AND QUALITY

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



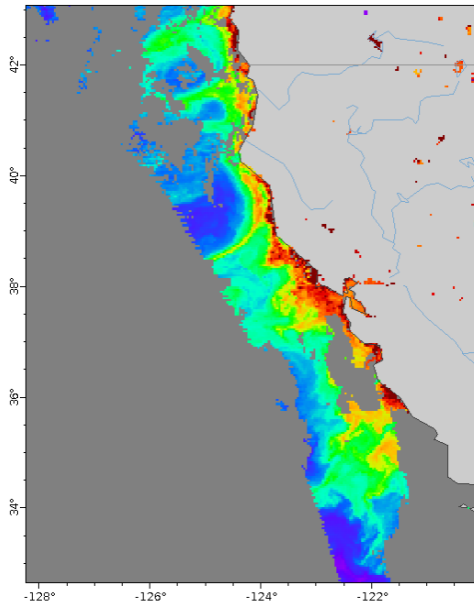
VIIRS Chlorophyll **Science Quality**  
(2 week lag)



# Some applications require science quality data

## EXAMPLE: DEVELOPING HABITAT MODELS

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

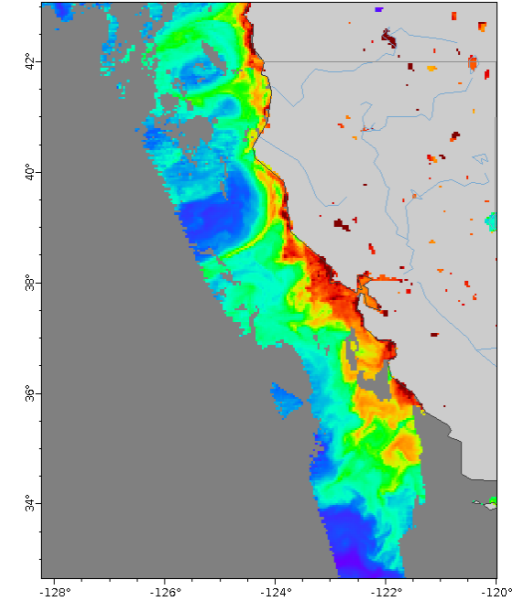


**MODEL  
DEVELOPMENT**

Harmful Algal Bloom

**Habitat Model**

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



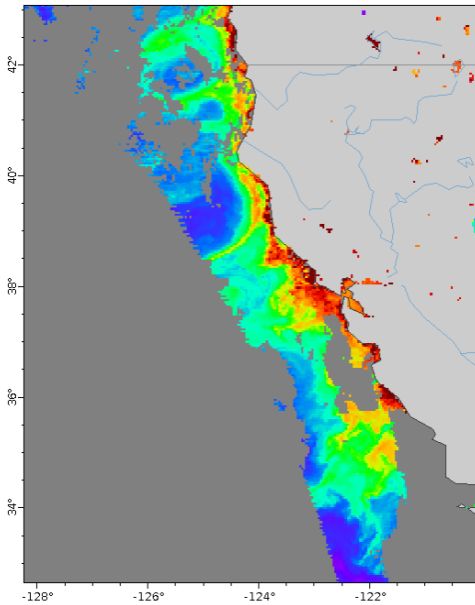
**LATENCY / QUALITY**



# Other applications require near real-time data

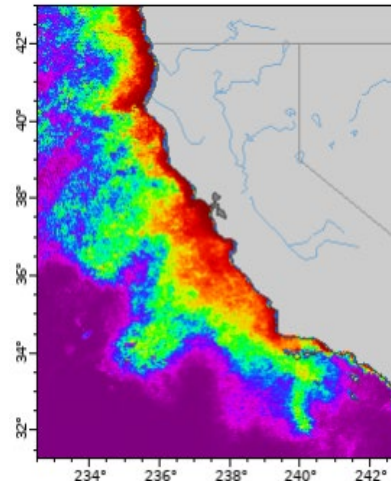
## EXAMPLE: GENERATING FORECASTS AND NOWCASTS FROM THE MODEL

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



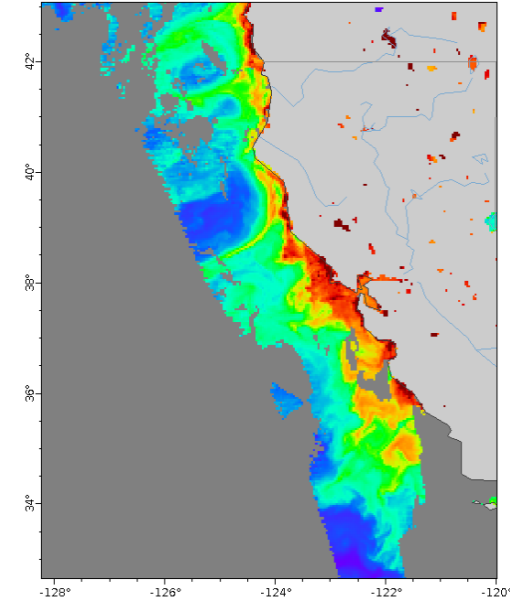
Harmful Algal Bloom

Habitat Model



Harmful Algal Bloom Forecast

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

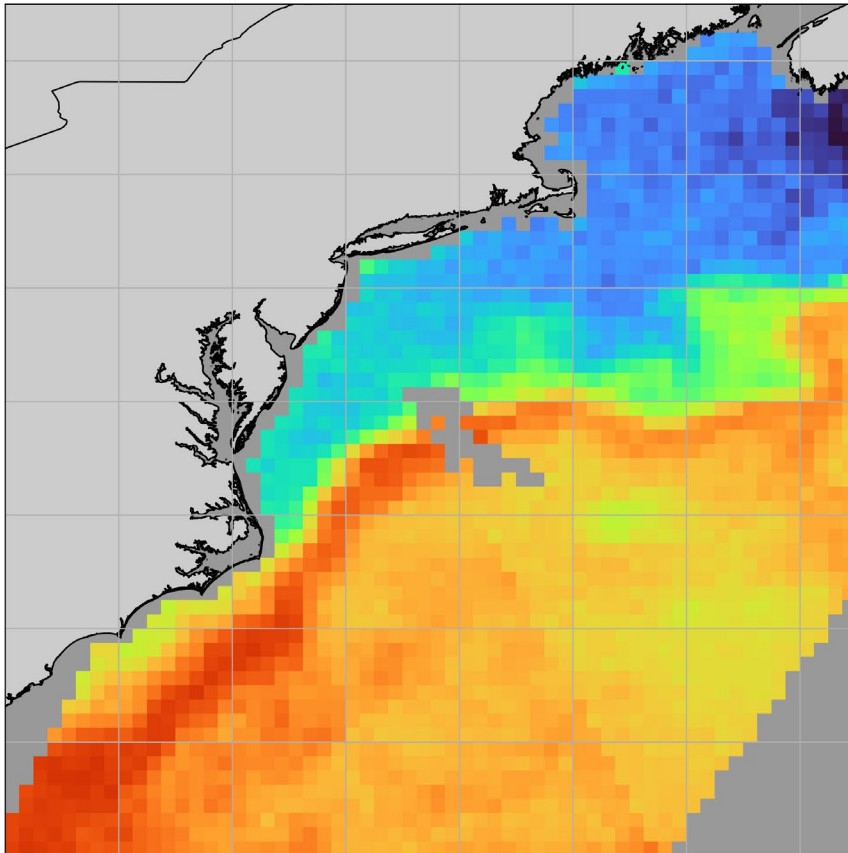


FORECAST

# How much missing data can your project tolerate?

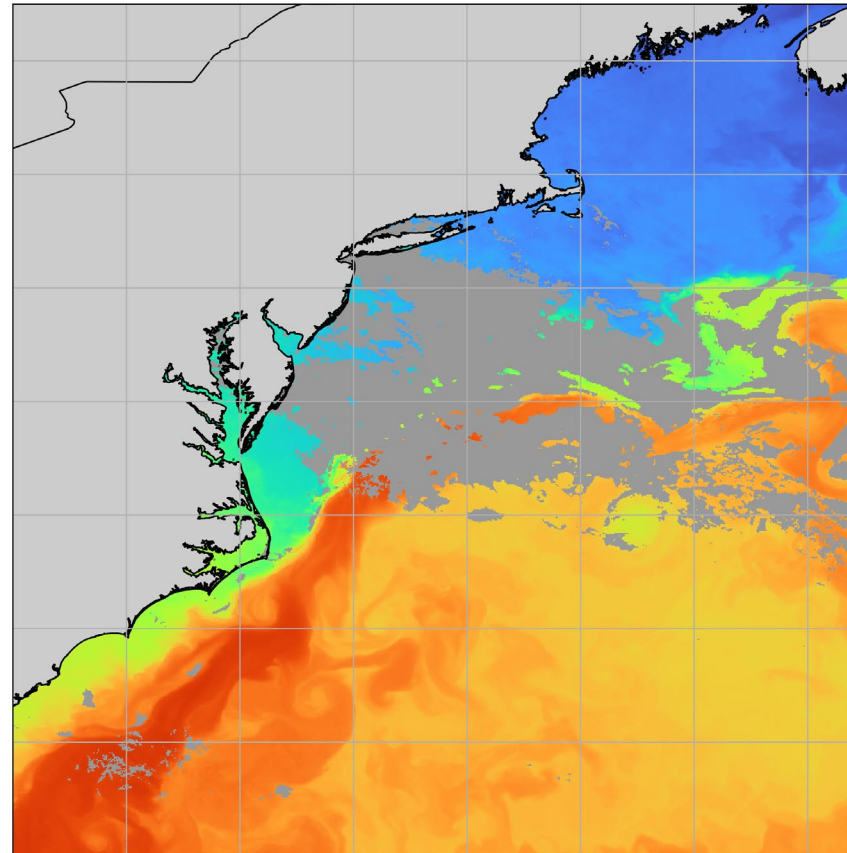
CLOUDS AND PROXIMITY TO LAND CAN CAUSE MISSING DATA

**Microwave SST**



**CAN SEE THROUGH CLOUDS  
CANNOT MEASURE CLOSE TO LAND**

**Infrared SST**



**CANNOT SEE THROUGH CLOUDS  
CAN MEASURE CLOSER TO LAND**

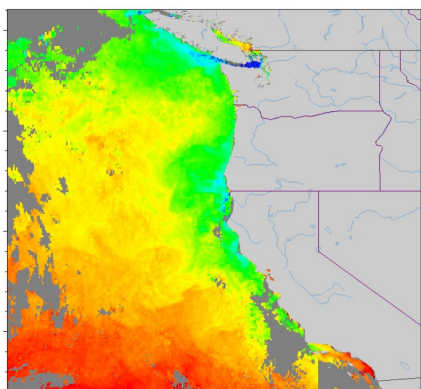
**MISSING DATA**



# Case study: managing missing SST data from clouds

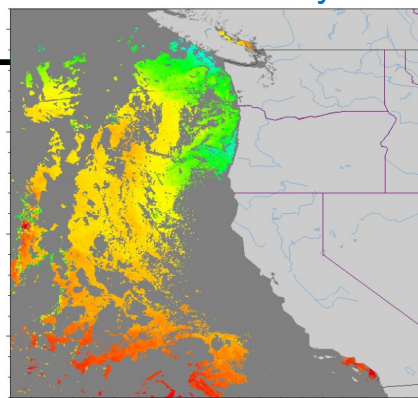
Use Geostationary sensor

Infrared geostationary 1-day



- + Less missing data
- Bigger pixels

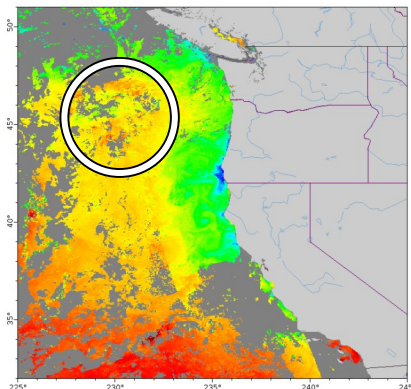
Infrared 1-day



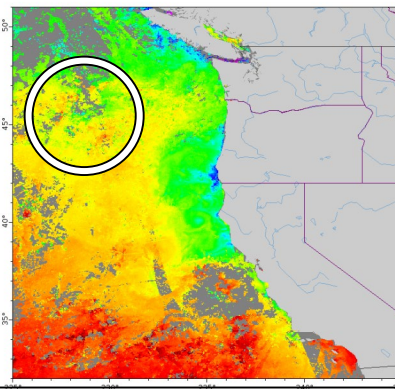
Polar Orbit Composite



Infrared 3-day

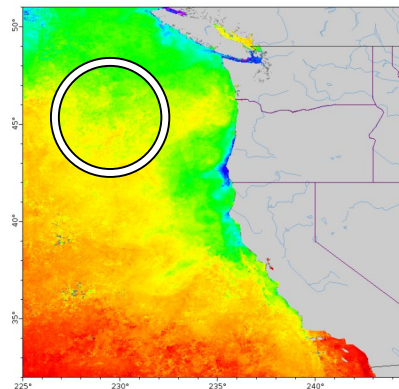


Infrared week



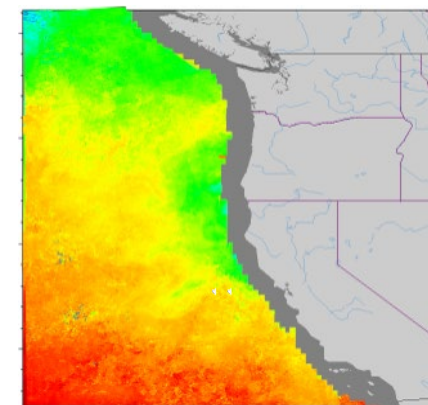
- + Less missing data
- Smoothed data

Infrared month



Use microwave sensor

Microwave 1-day

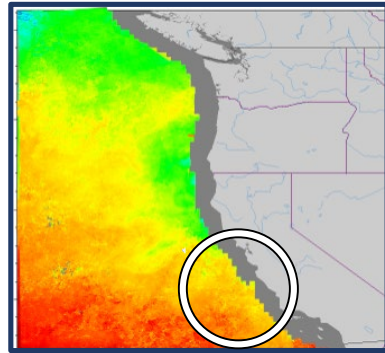


- + Less missing data
- Wide coastal mask
- Bigger pixels

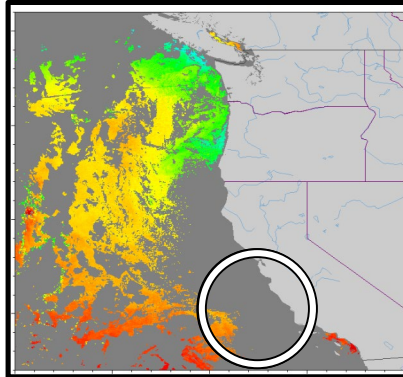


# Blended SST products – best of all worlds?

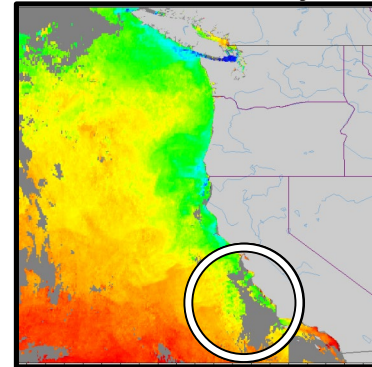
Microwave  
Polar Orbiting



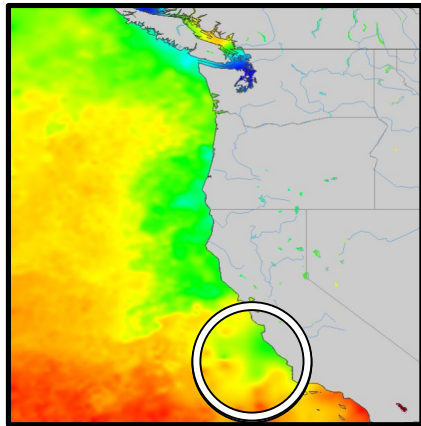
Infrared SST  
Polar Orbiting



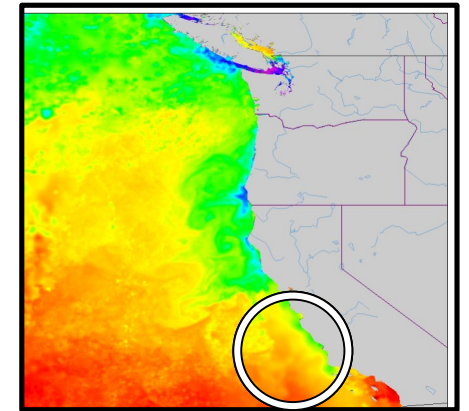
IR SST  
Geostationary



GHRSSST MUR SST  
(Multi-scale Ultra-high Resolution)



NOAA GeoPolar  
Blended SST



Blending Caution

If interpolated, some values are not measurements.  
How good is the interpolation method?

# 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](http://coastwatch.noaa.gov)

**NOAA** COASTWATCH  
WEST COAST REGIONAL NODE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
[coastwatch.pteg.noaa.gov/data.html](http://coastwatch.pteg.noaa.gov/data.html)

**NOAA CoastWatch**  
Caribbean and Gulf of Mexico Regional Node  
[cwcaribbean.aoml.noaa.gov](http://cwcaribbean.aoml.noaa.gov)

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

**NOAA CoastWatch**  
EAST COAST NODE  
[eastcoast.coastwatch.noaa.gov](http://eastcoast.coastwatch.noaa.gov)

**NOAA** POLARWATCH  
COASTWATCH REGIONAL NODE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
[polarwatch.noaa.gov](http://polarwatch.noaa.gov)

**NOAA CoastWatch**  
Great Lakes  
[coastwatch.glerl.noaa.gov](http://coastwatch.glerl.noaa.gov)

Preview sample images

Find out the geographical coverage

Find out the temporal range coverage

Review metadata for details about datasets

