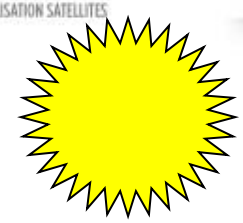
Ocean Color

Workshop IPEE/CLS - 3-FEB-2010

Satellite characteristics

Satellite		Instrument	
AQUA	- American satellite (NASA) - Operational mission - Orbit = 705 km - 14/15 rotations/day - almost polar - heliosynchroneous	Modis	- radiometer - passive measurement - sensible in visible band and infrared - spatial resolution: 1 x 1 km. - gaps due to clouds
Envisat	- European satellite (ESA) - Operational mission - Orbit = 800 km - ~12 rotations/day - polar - heliosynchroneous	Meris	

Radiometer measurements



Descending light from sun

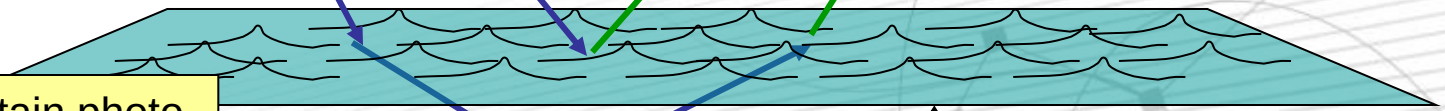
Diffusion, reflextion and absoprtion by air particles and aerosols

sensor

Ascending light

Absorption

Reflection at sea surface



Absorption, diffusion et reflection by phytoplancton and other particles

Reflection of the light in the first few meters below the sea surface

Chlorophyll-A contain photo synthetics pigments . They reflect a wave length that is measured by MODIS/MERIS sensors

Radiometer measurements

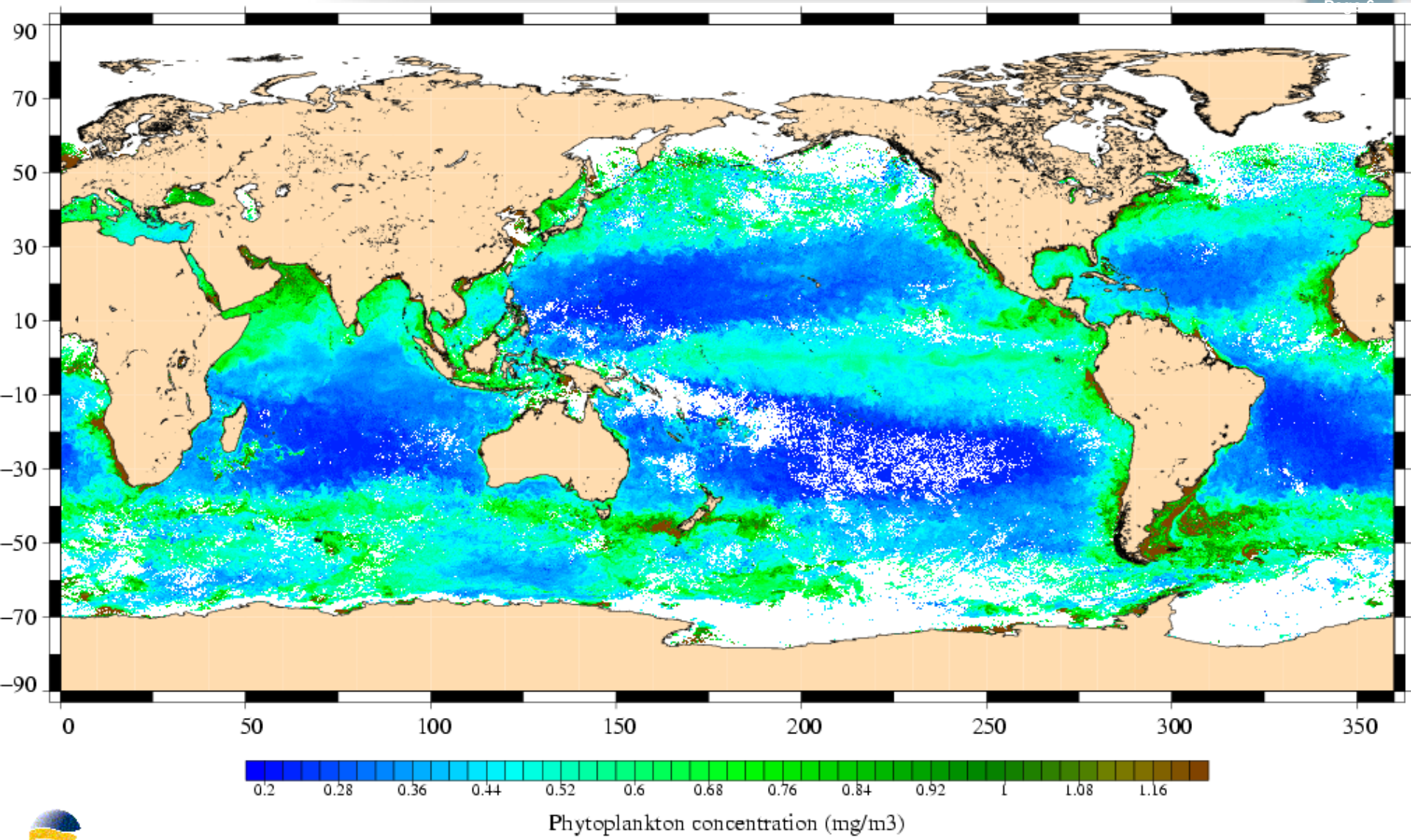
- Sensor = instrument that measure radiation emitted by the sea surface but also the first few meters below the surface
- Satellite transmits data when it flies over a reception antenna
- Data are sent to CLS to be processed
- Maps are generated by in built algortihm in CLS

- ➔ Final map: resolution (pixel) = 0.04 X 0.04° (4 km)
- Maximum time delivery between acquisition and CLS end processing = 4-5 hours

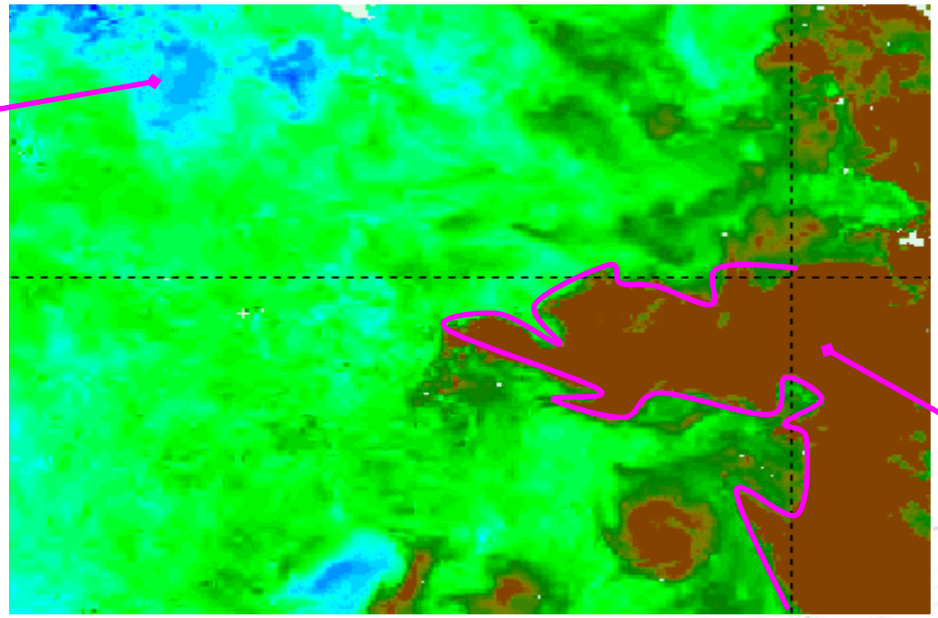
OC characteristics

- OC maps are synoptic views of the ocean surface:
  - That depict the chlorophyll concentration
  - Directed linked to
    - The phytoplankton distribution
    - The zooplankton concentration
    - The feeding of fishes
- OC maps provide information on:
  - Oceanic circulation
  - Dynamic characteristics of the ocean (oceanic fronts, upwelling, cold eddies…)
  - Favorable areas of primary production

Global coverage



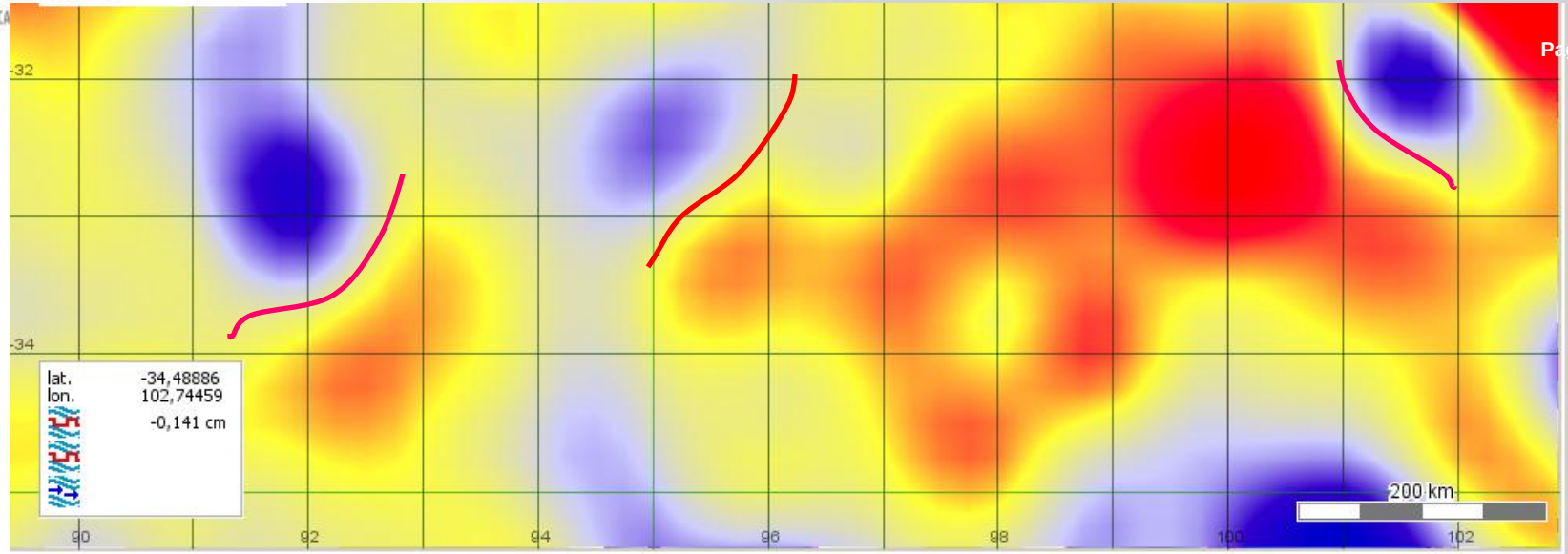
Ocean color maps and animals

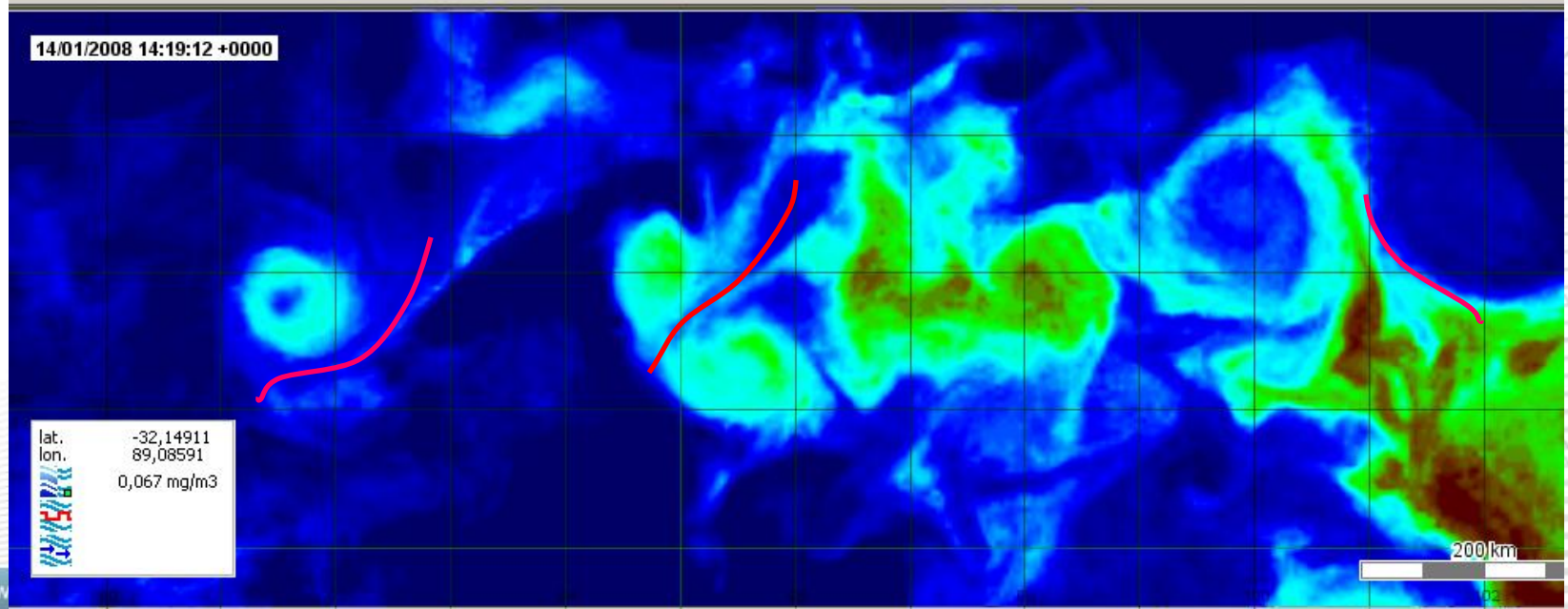


Phytoplakton concentration is high in brown

Fish and marine mammals are migrating toward these areas to feed

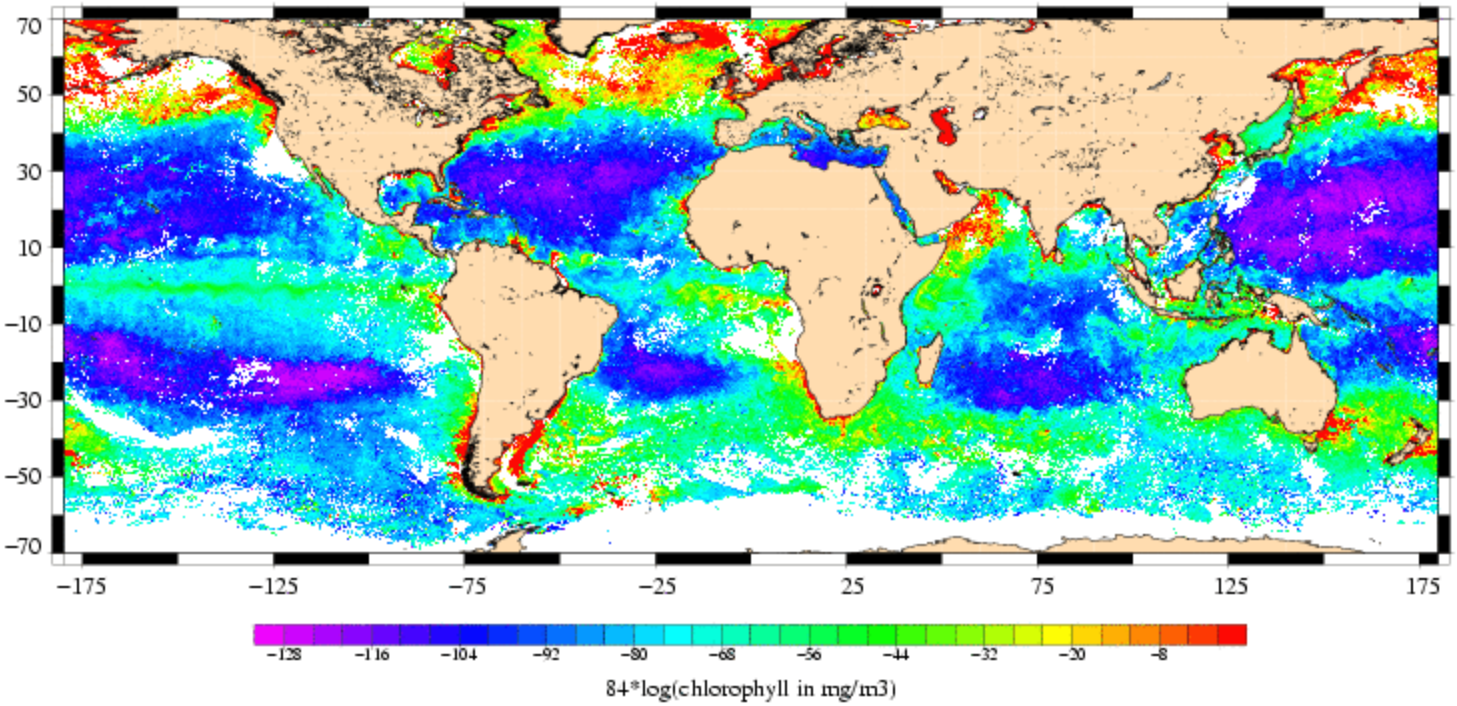
Correlation SLA/OC





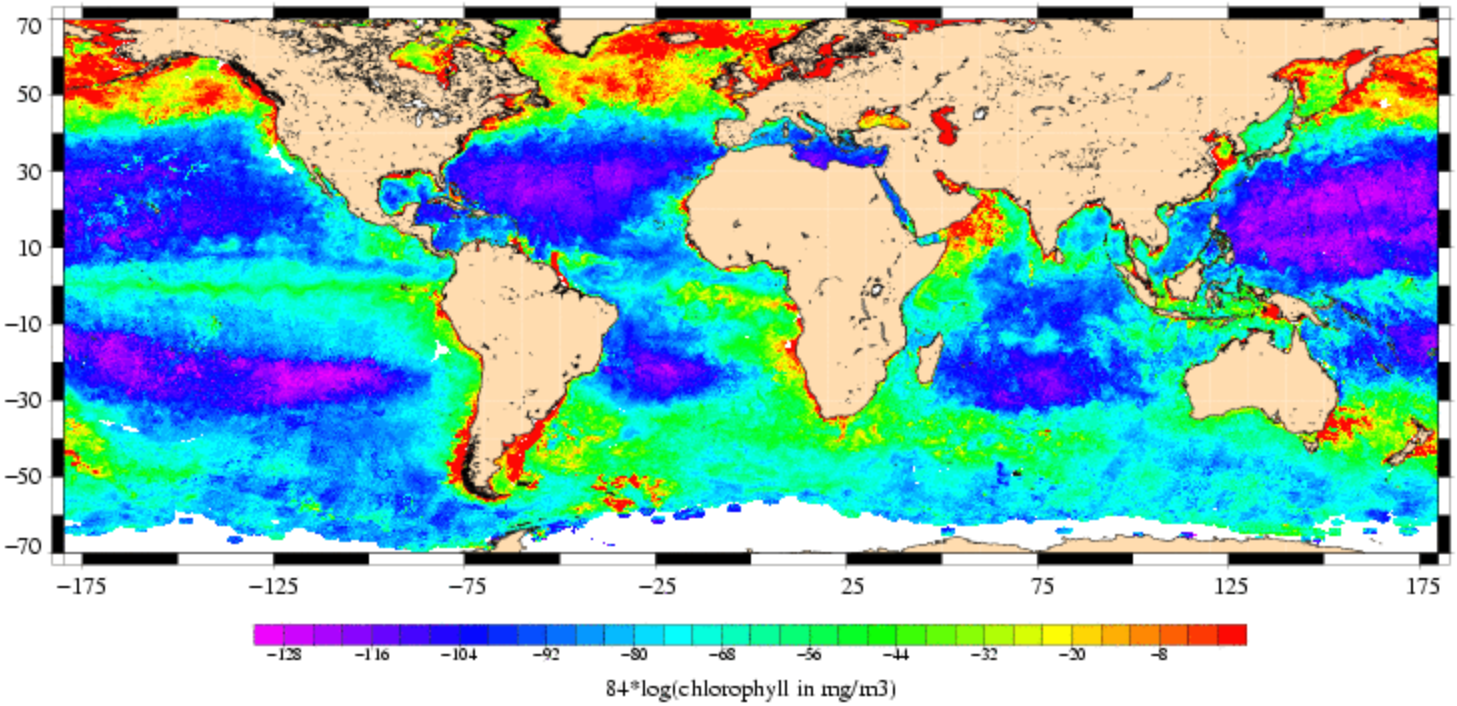
CLS data processing

MODIS+MERIS Polymer 5–day composite

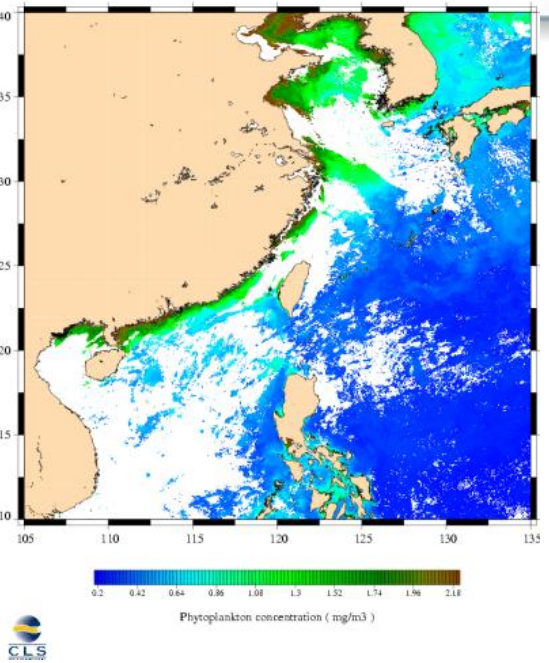


CLS data processing

MODIS + MERIS POLYMER Chlorophyll Objective Analysis

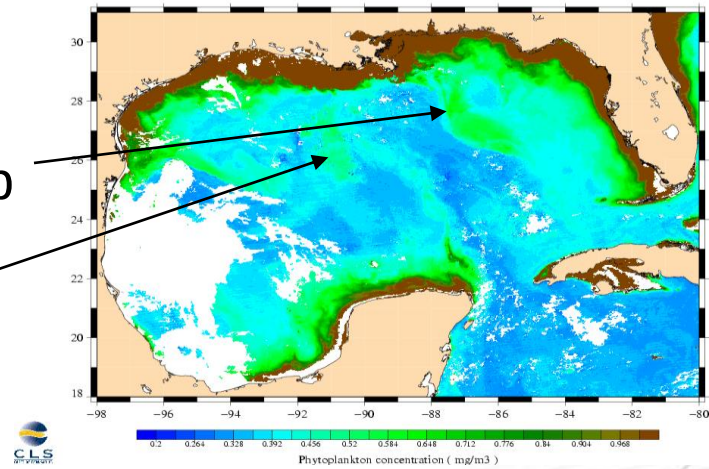


Satellite observations



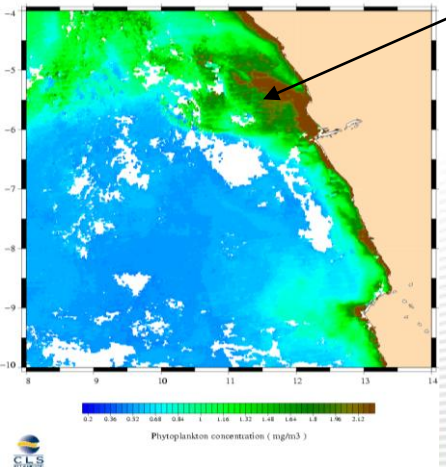
Gulf of Mexico:

- To delineate the Loop current
- To localize and monitor eddies



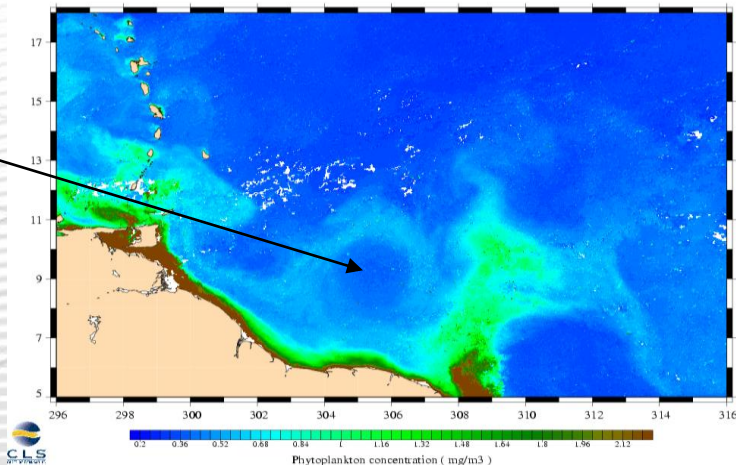
Angola:

- To detect and monitor plume river



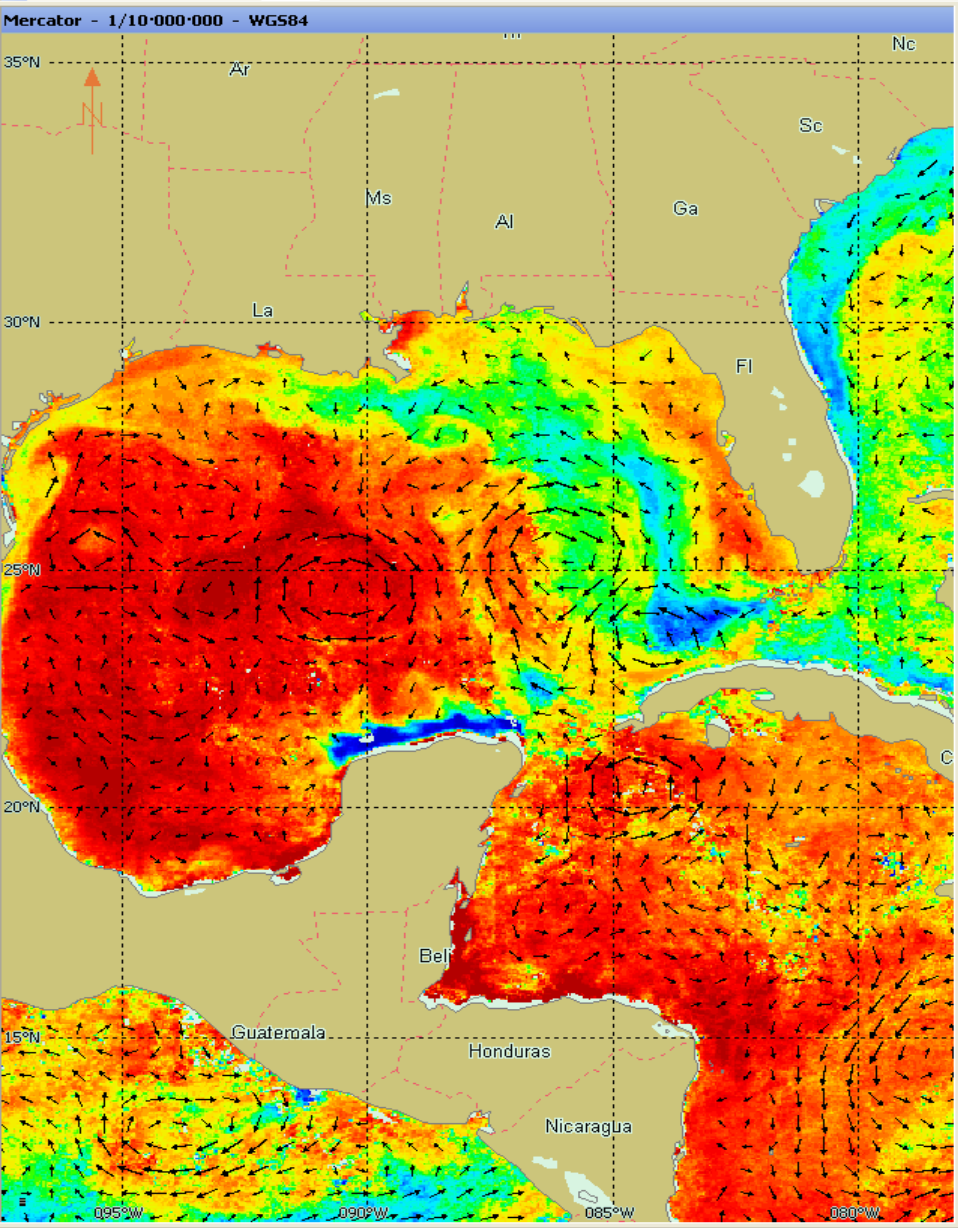
Trinidad:

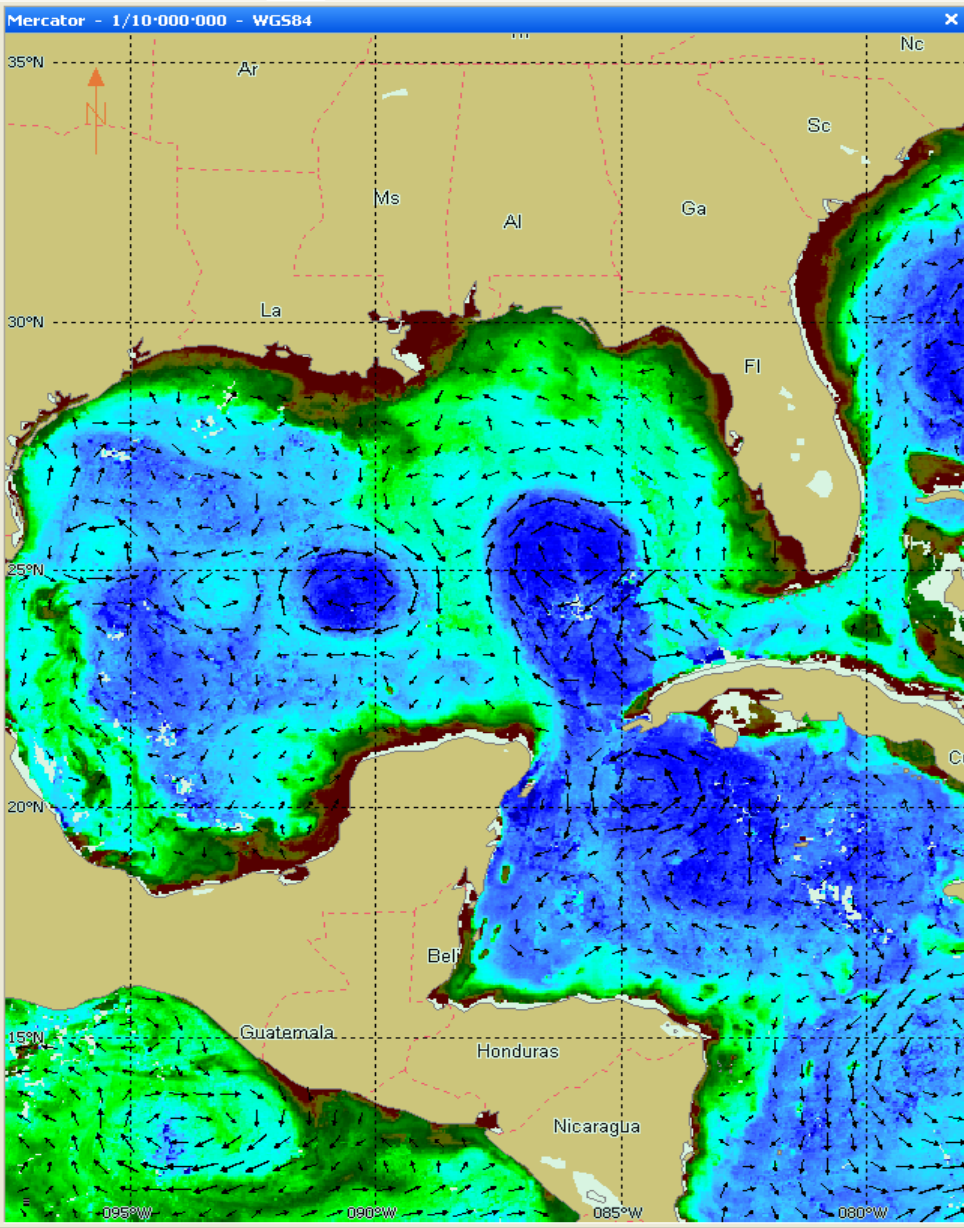
- To track eddies



Ocean colour data make it possible to trace and predict the motions of water masses from space.

The context of SST and OC use at CLS





14:37:49B · 23°47'897 N - 087°44'695 W