Undergraduate student internship: Software update and study of the South-East Pacific characteristics to prepare OUTPACE campaign
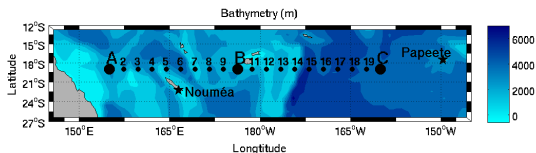
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MIO (Mediterranean Institute of Oceanography)

October 3, 2014

Objectives

→ Knowledges about the campaign zone and its behaviour

→ Update software based on satellite data to choose the best spot to sample

→ Developp a script to calculate the time to implement an MVP sampling strategy at long duration station
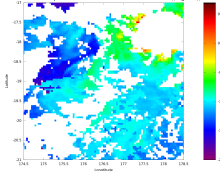
Climatology

$\rightarrow$ Station A : ++ Chl-a South-East zone between Feb-Mar / 1-2 eddies
$\rightarrow$ Station B: Highest Chl-a concentration zone around Fidji / lots of eddies
$\rightarrow$ Station C: Most oligotrophic area
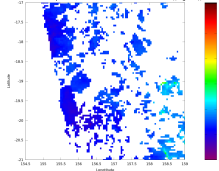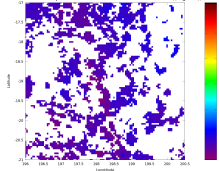
SPASSO software

Software Package for an Adaptive Satellite-based Sampling for Ocean campaigns
$\rightarrow$ Get near-real time online data
$\rightarrow$ Process data and plot in the campaign zone
$\Rightarrow$ crontab every day at 16h pm (French hour)
$\rightarrow$ Figures posted on OUTPACE website (soon)
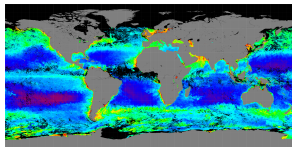
SPASSO software
Data

$\rightarrow$ AVISO products
-Sea Surface Height (m)
-u and v velocity components (m/s)
Resolution: $\frac{1}{4} \times \frac{1}{4}$ °
http://www.aviso.oceanobs.com/duacs/

$\rightarrow$ OceanColor data
-Chlorophylle -a (mg m^{-3})
-Sea Surface Temperature (°C)
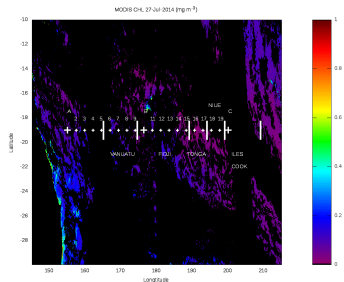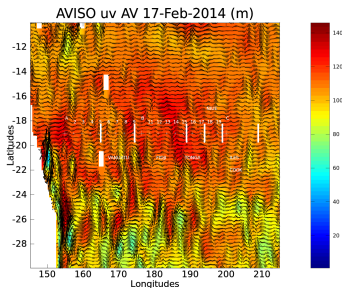Resolution: 4km
http://oceancolor.gsfc.nasa.gov/

SPASSO software
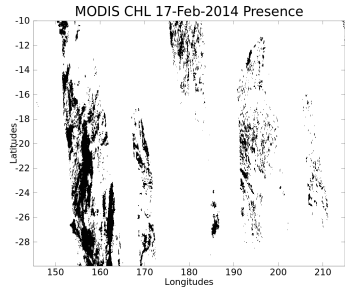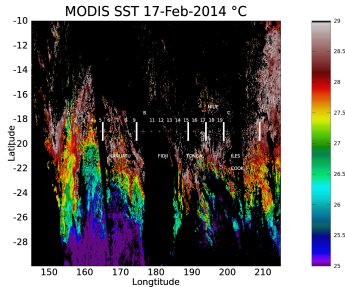MODIS and AVISO processing

Each day:
→ Extract files from AVISO and MODIS websites
→ Plot SSH and u,v components on same figures
→ Plot Chl-a and SST on different figures

SPASSO software
MODIS and AVISO processing

$\rightarrow$ Make a figure of Chl-a presence/absence (presence ≥ 0.1 mg m^{-3})
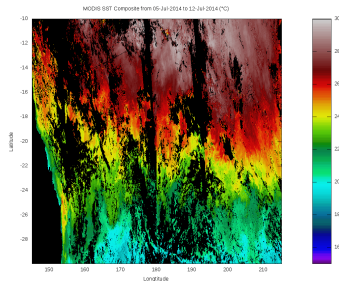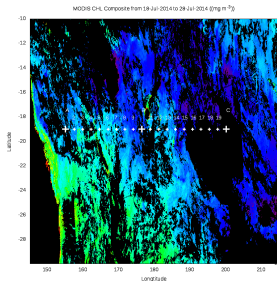$\rightarrow$ Make zoom on the 3 long duration station for every parameters

SPASSO software
MODIS composite

In order to avoid blanks on NRT map due to clouds or satellites trajectories:
-use previous 10 days to fill in "NaN values" in Chl-a and SST matrix assuming that there are no significant changes during this period
-every day $\rightarrow$ composite map using 10 days before the actual day

SPASSO software
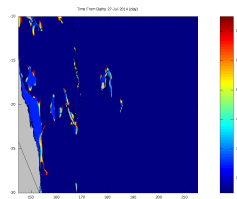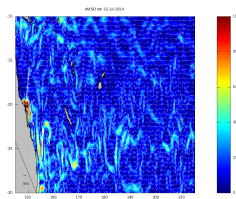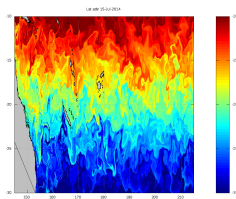## Lagrangian analysis

$\rightarrow$ A lagrangian analysis is processed by calculating:

-Okubo-Weiss parameter

-Lyapunov exponent

$\rightarrow$ Representation on maps using 10 previous days
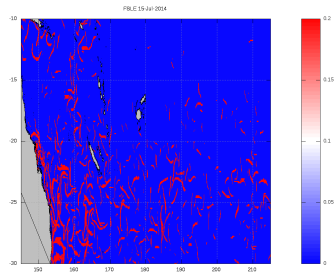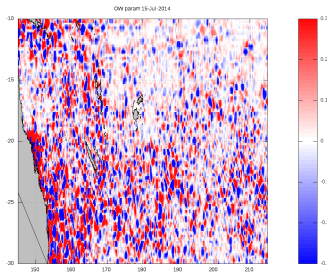
SPASSO software
Lagrangian analysis
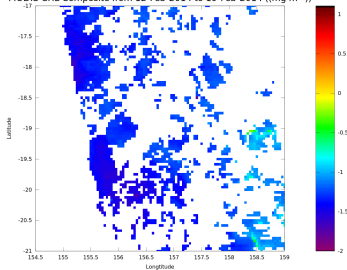
-Lon/Lat advection
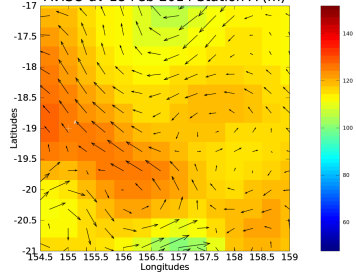-Velocities
-Time from bathymetry

SPASSO software
Sampling area choice

Choice of the station center using "zoom" on every long duration station zone
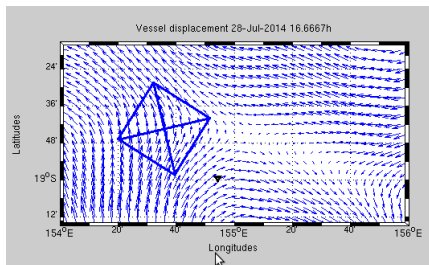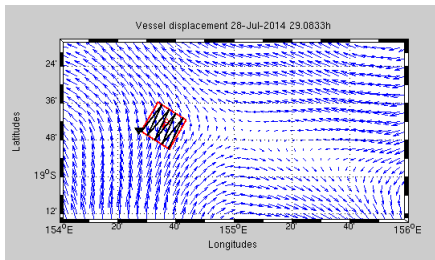
Navigation tool

- Enter position of the boat
- Chose center of the station by mouse clicking
- Draw a 40km square around the center (angle of rotation for the square)
- Simulate boat route on diagonals

Navigation tool

- Draw a 20km square around the center
- Simulate boat route following a "zigzag" trajectory (chosen resolution)

Vessel displacement 28-Jul-2014 29.0833h

Navigation tool
Output

$\rightarrow$ Lon/Lat targeted

$\rightarrow$ Cape

$\rightarrow$ Time since navigation started

$\rightarrow$ Distance since navigation started

Special thanks

Andrea M. Doglioli, Francesco Nencioli, Francesco D'Ovidio, T. Moutin
and all MIO lab for their great help and welcome !