

CoastColour Products over La Plata River site

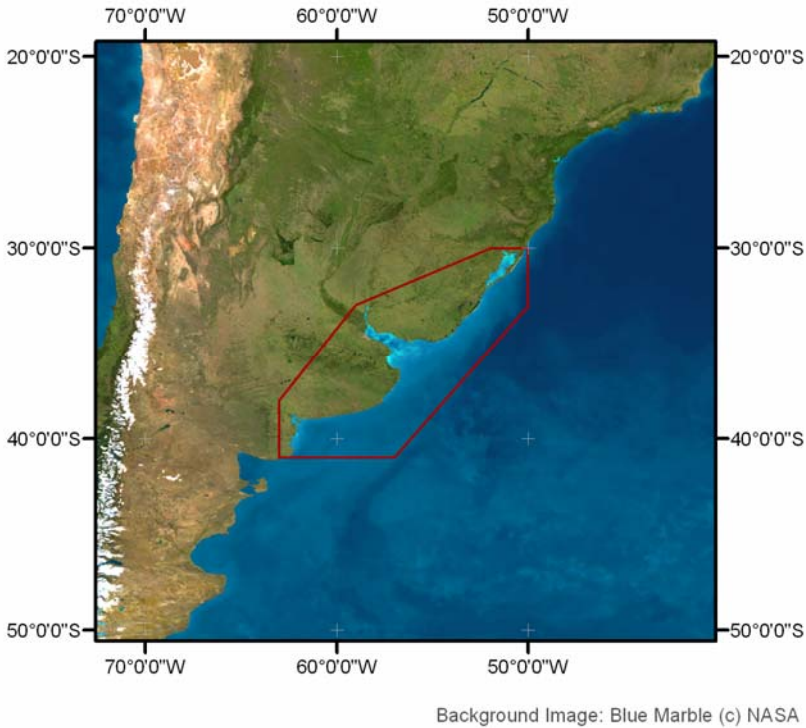
Ana I. Dogliotti
Kevin Ruddick



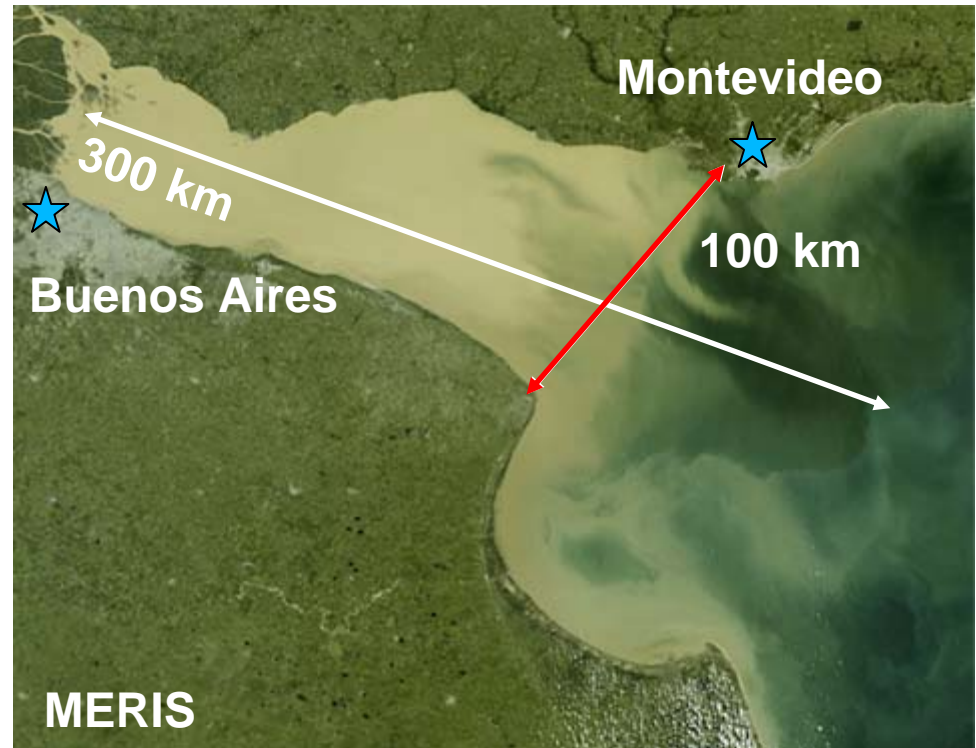
Management Unit of the North Sea Mathematical Models
MUMM | BMM | UGMM

Department VI of the Royal Belgian Institute of Natural Sciences

La Plata River (Test Site #27)



- Large scale and shallow (<20m) estuary;
- Drains 2nd largest basin SA (22,000 m³/s)
- High TSM (100-400 g m⁻³)
- Turbidity front (topography)



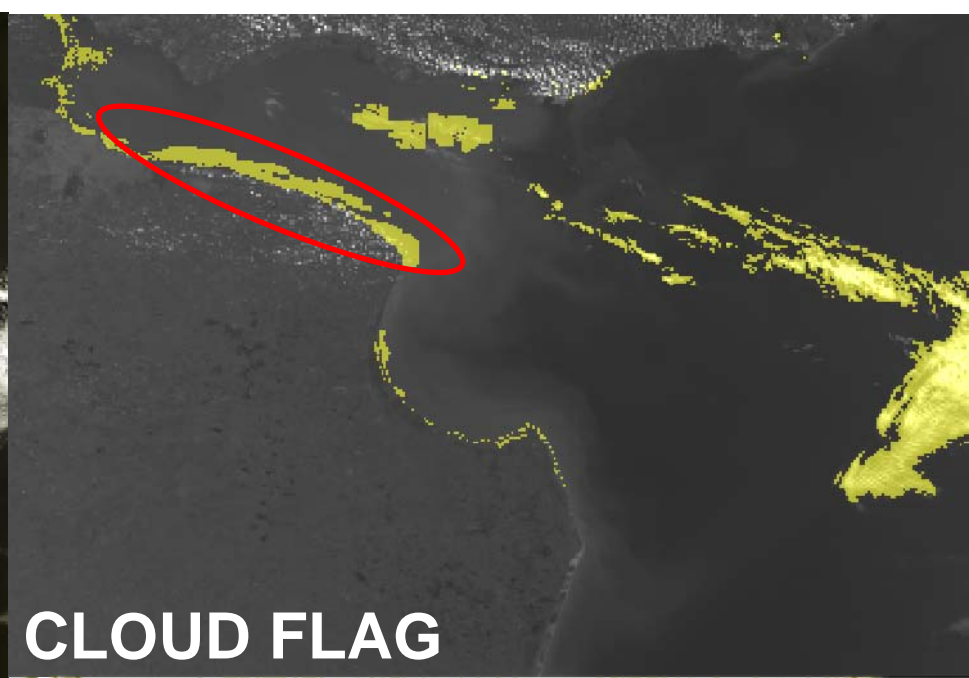
Objective

- Assess the quality of CoastColour (CC) data

Outline

- 1) Analysis of Quality flags at different levels:
 - L1P: Pre-processing flags (cloud mask, land/water classif.)
 - L2r: Atm. correction quality
 - L2w: Water Product quality
- 2) AC assessment by analyzing of separation of TOA into water, atm comp.
- 3) Water leaving radiance reflectance spectrum analysis and comparison with ESA std processing and MODIS (NIR-SWIR)
- 4) Validation of TSM/T products using *in situ* measurements in Samborombón Bay

1) Quality Flags (I): L1P



**SPATIAL CLOUD
FLAG**



1) Quality Flags (II): L2R (AC)

$L_{TOA}(865)$

RLw (865)

+ Invalid FLAG

(L1p_Cloud, Land,
Snow/ice, L1_invalid)

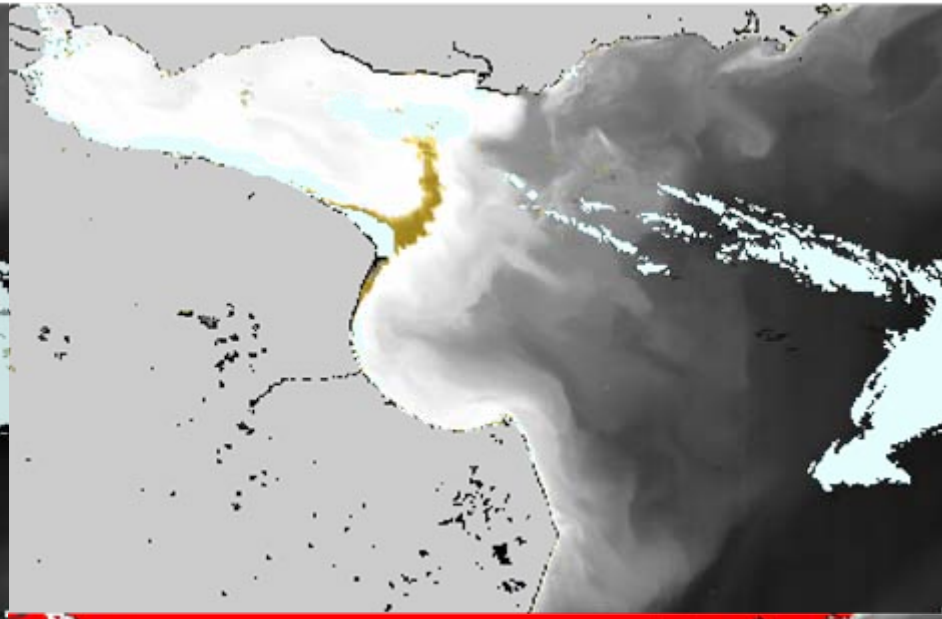
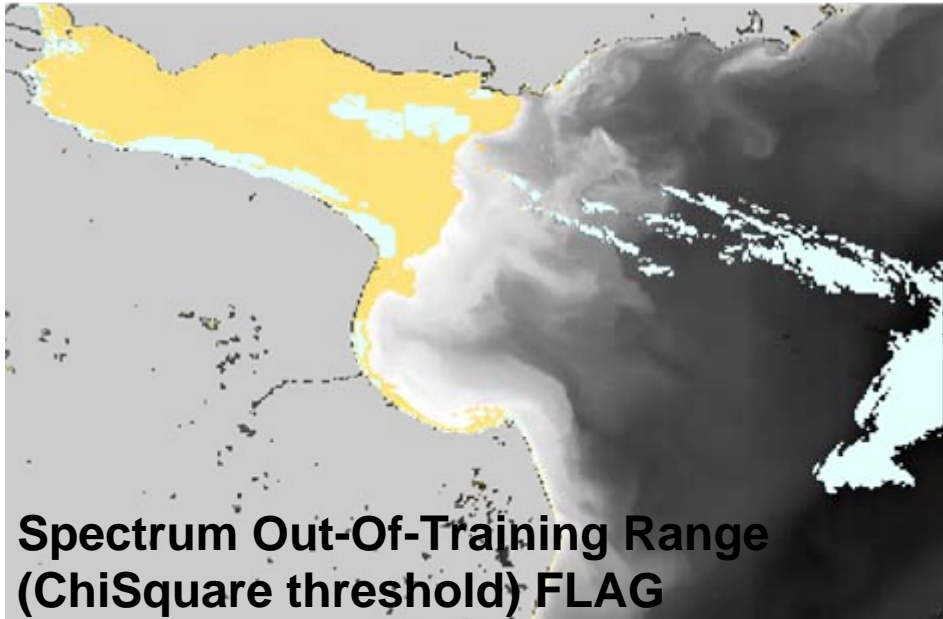
TOA Reflectance
Out-Of-Range FLAG

AC Out-Of-Range
FLAG

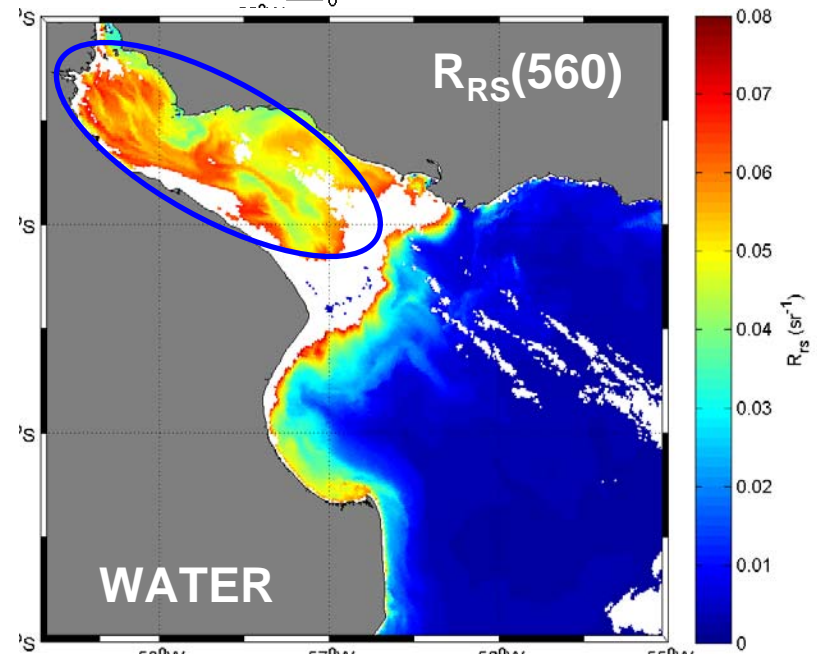
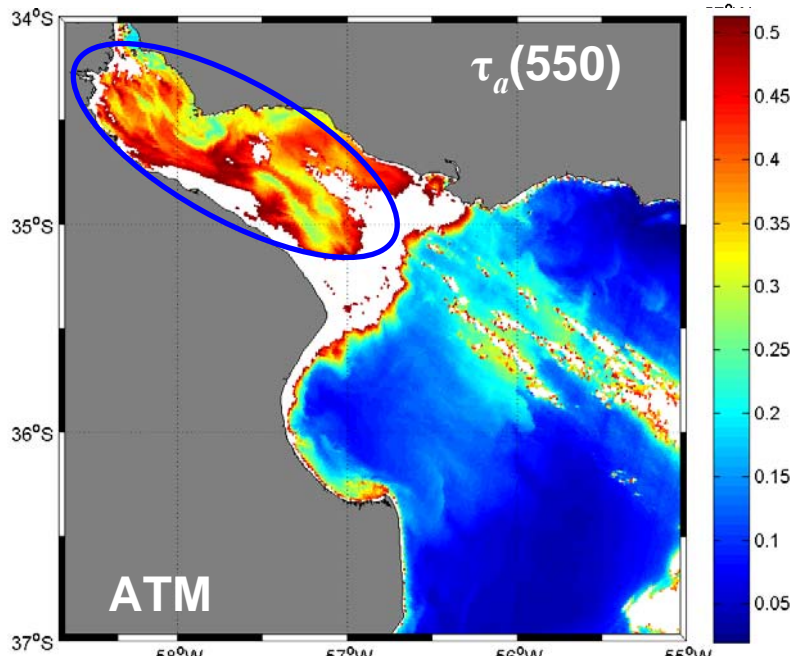
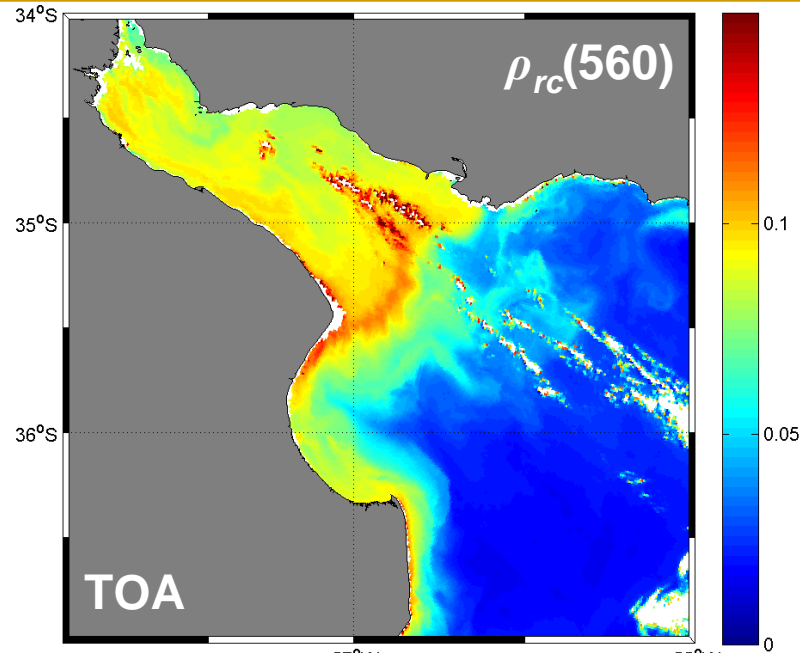
1) Quality Flags (III): L2W

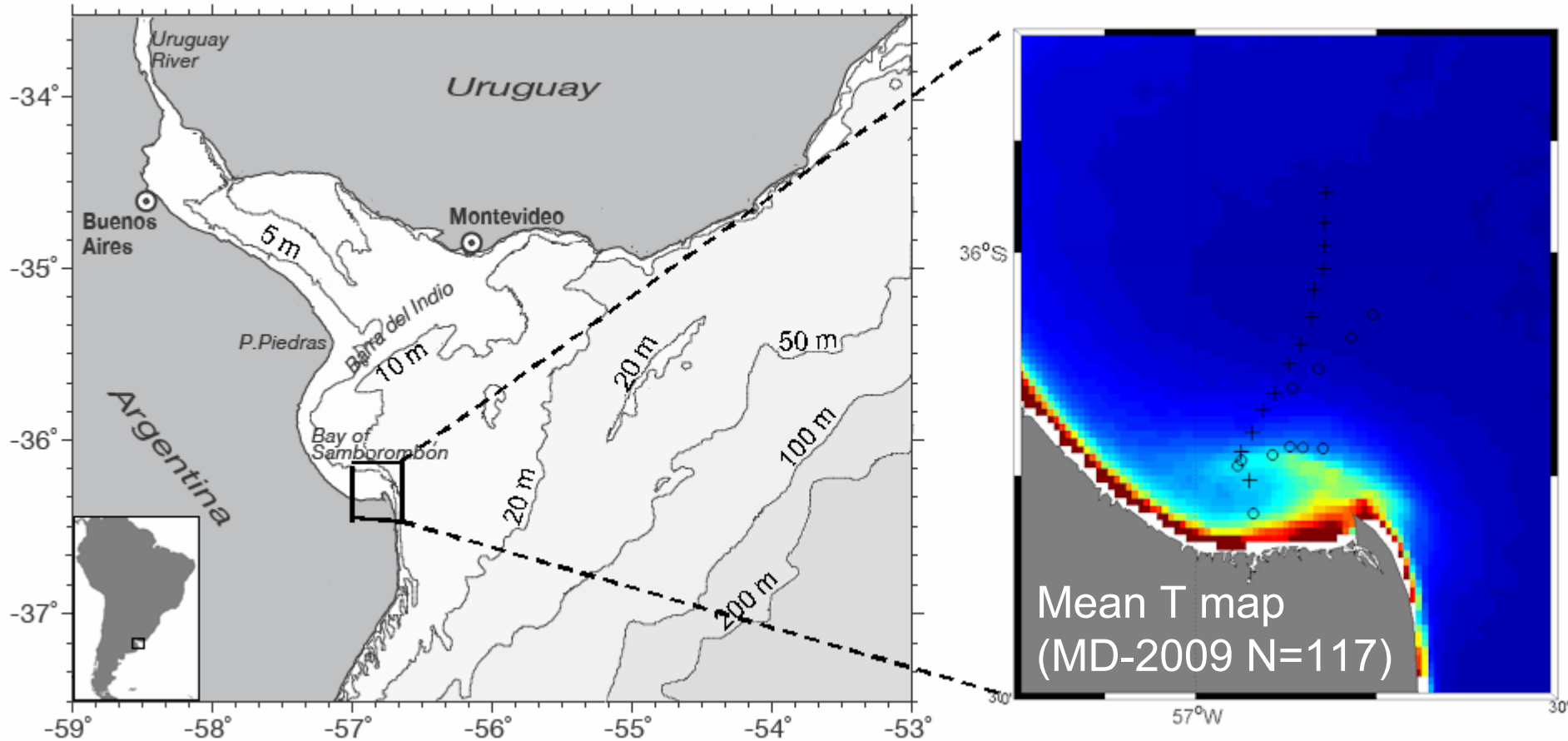
Std-TSM

Hi-TSM



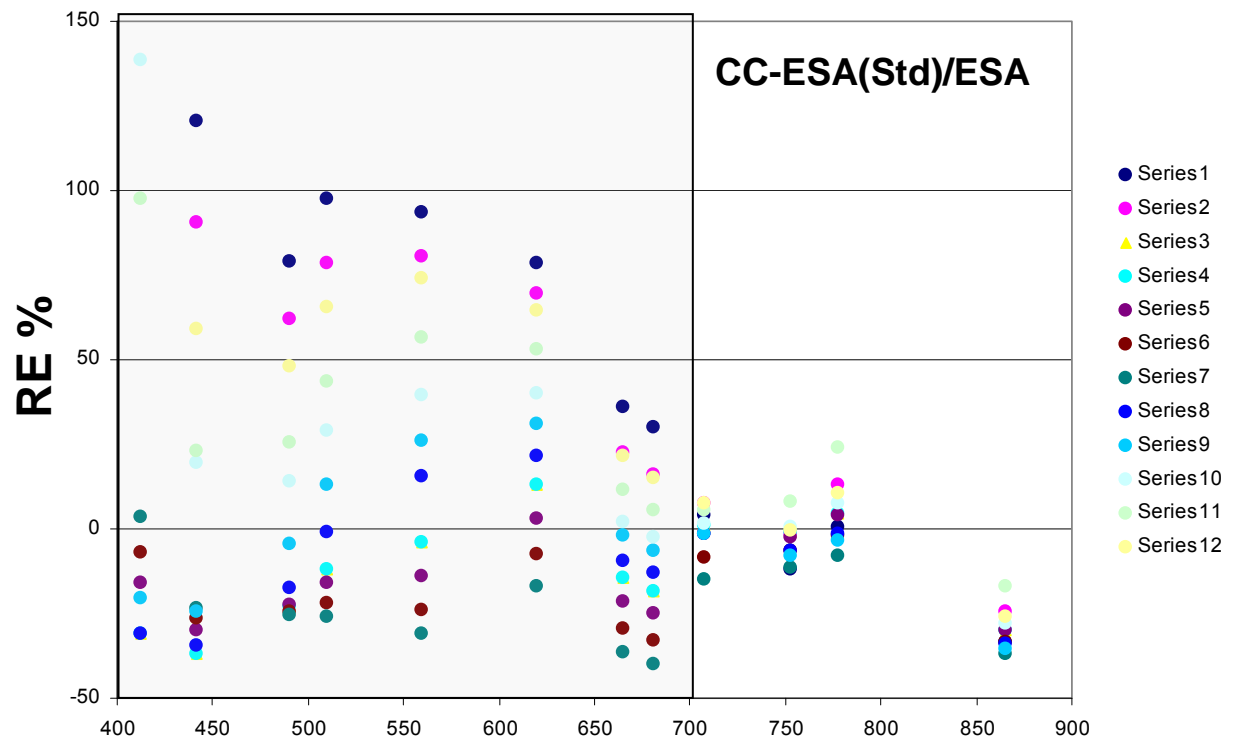
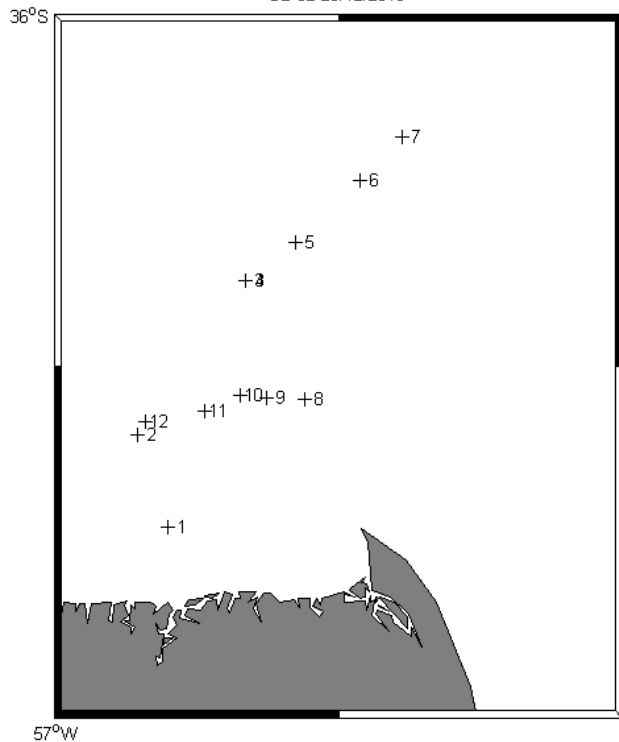
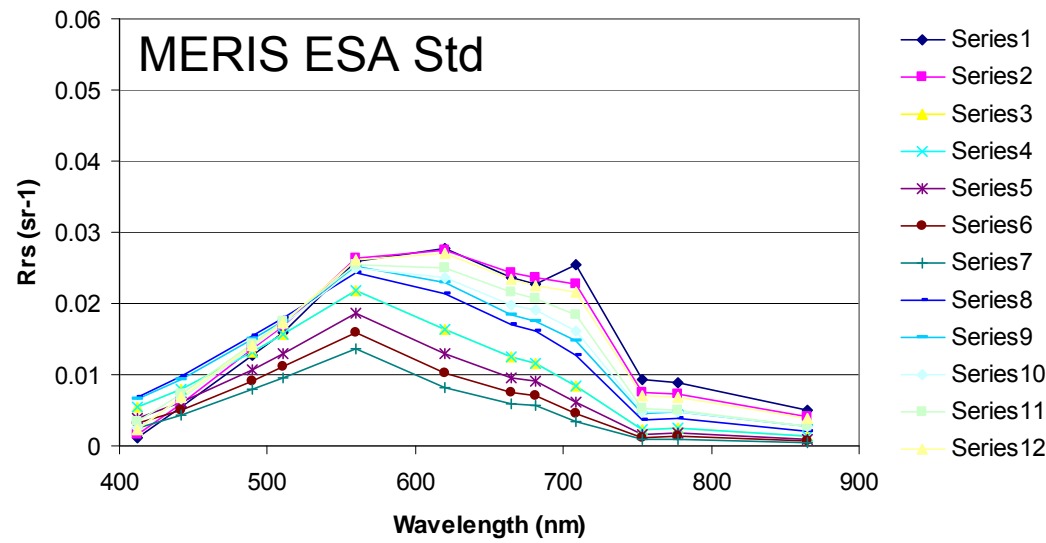
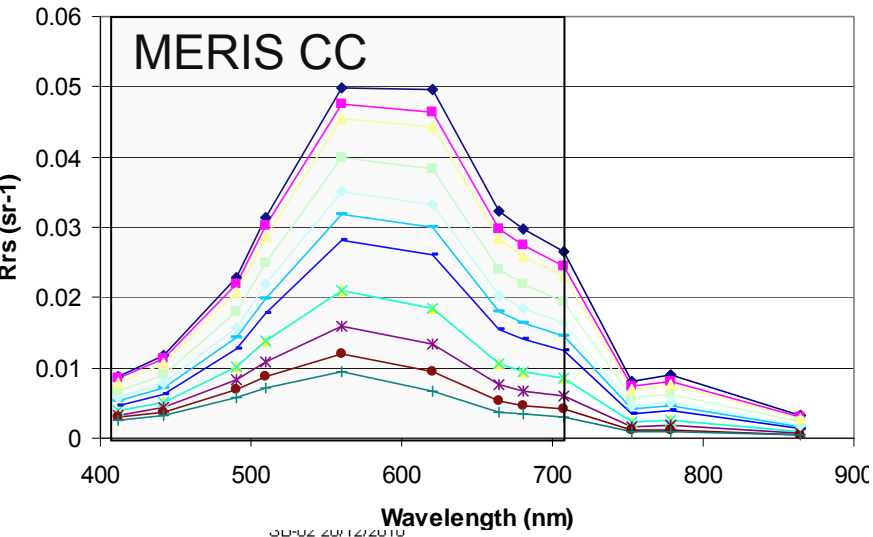
2) AC assessment



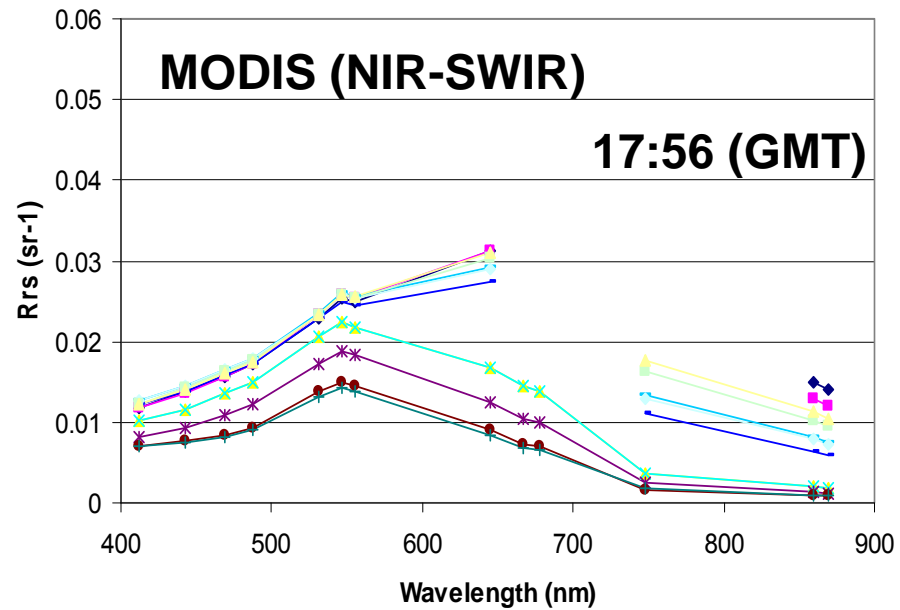
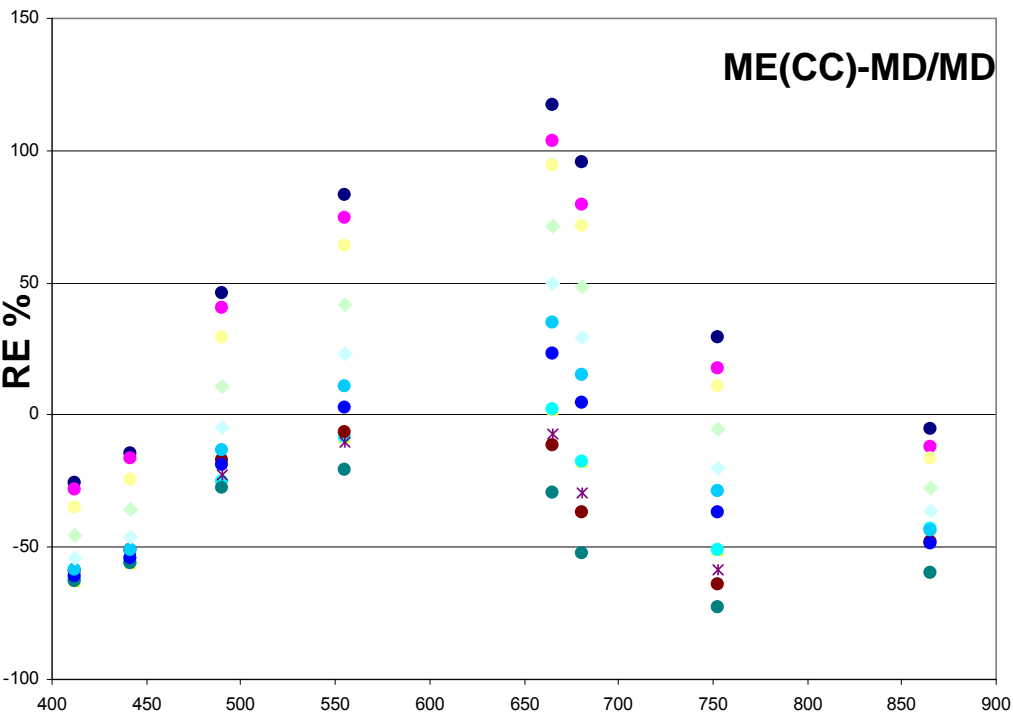
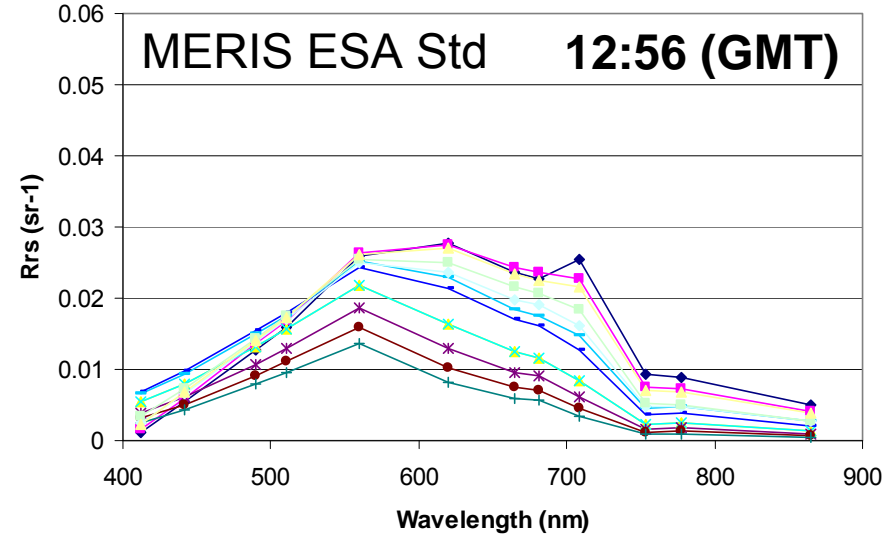
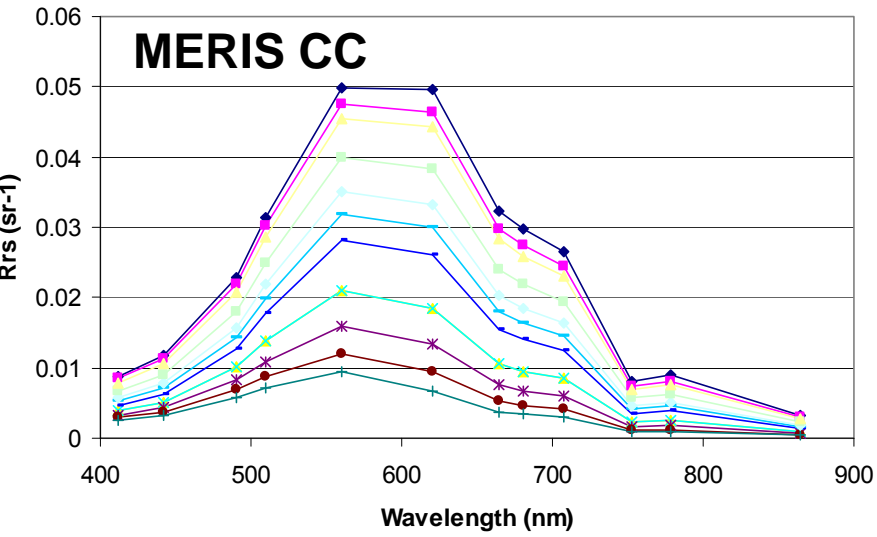


- o 20 December, 2010 (Turbidity – HORIBA Turbidimeter)
- + 27 April, 2011 (TSM - gravimetric)

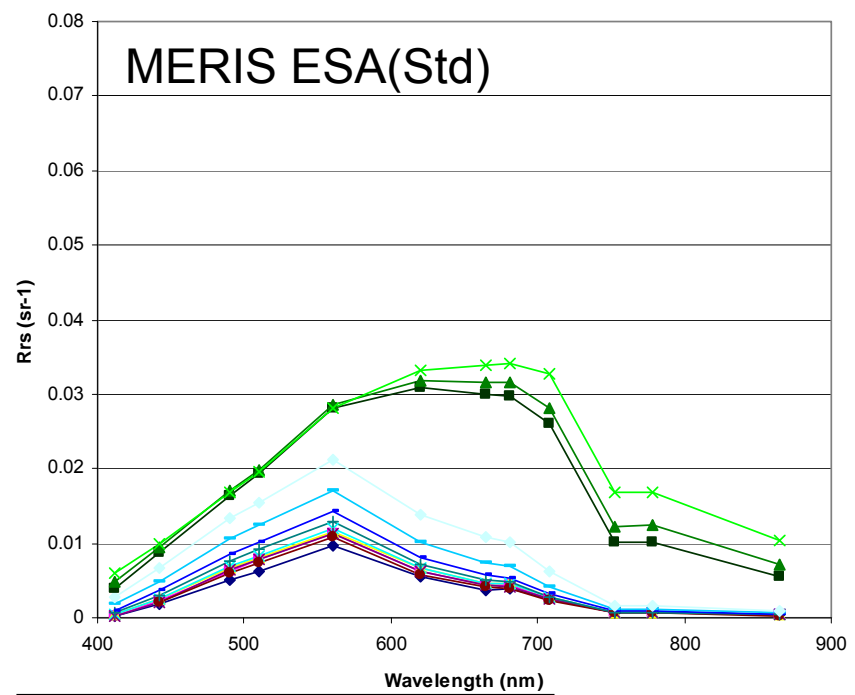
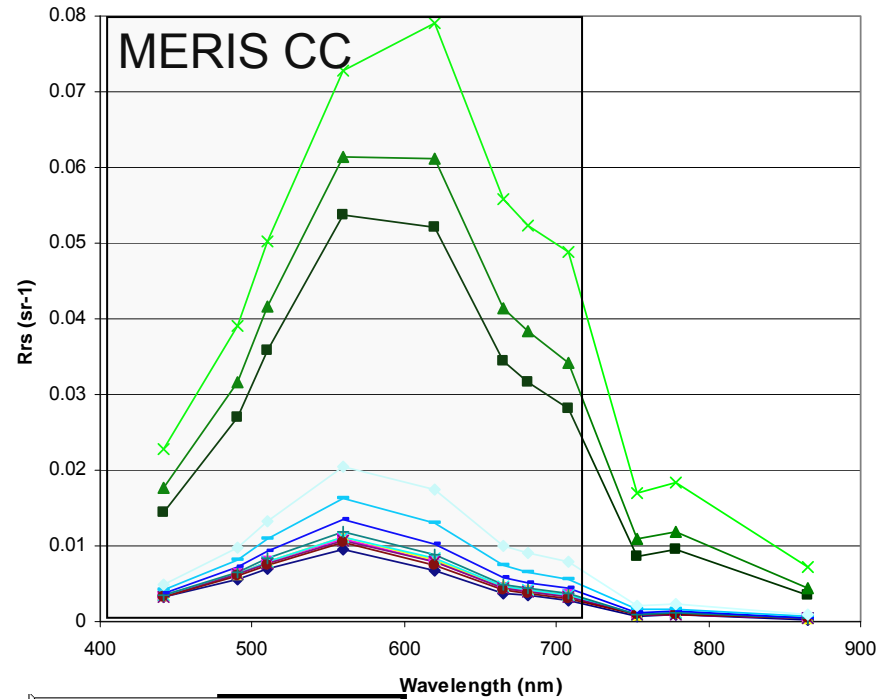
Reflectance Spectrum (20Dec2010)



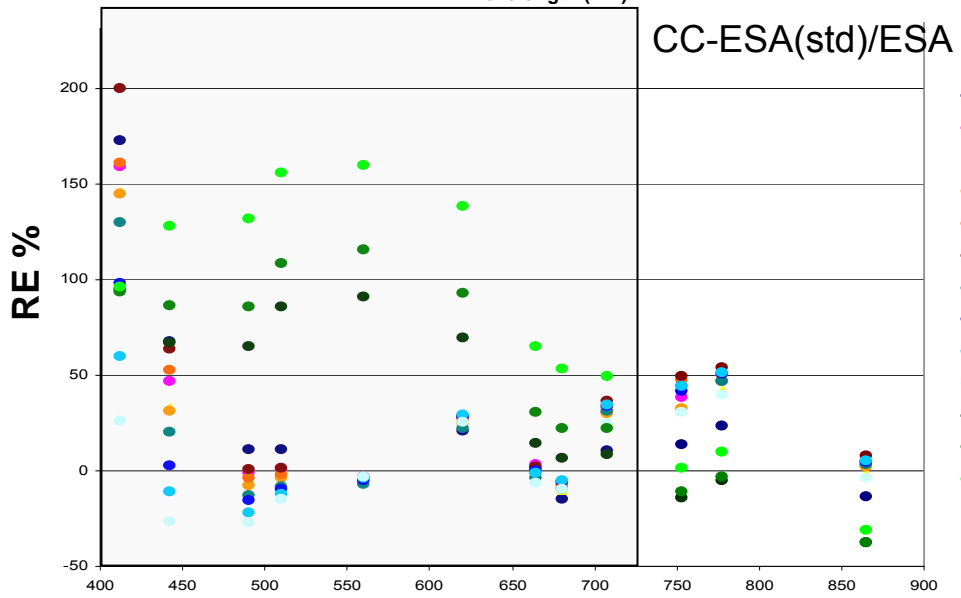
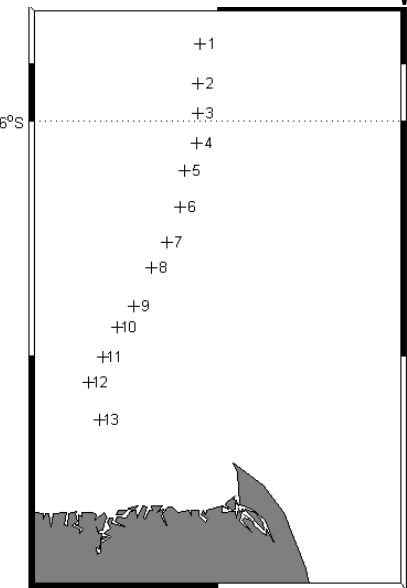
Reflectance Spectrum (20Dec2010)



Reflectance spectrum (27Apr2011)

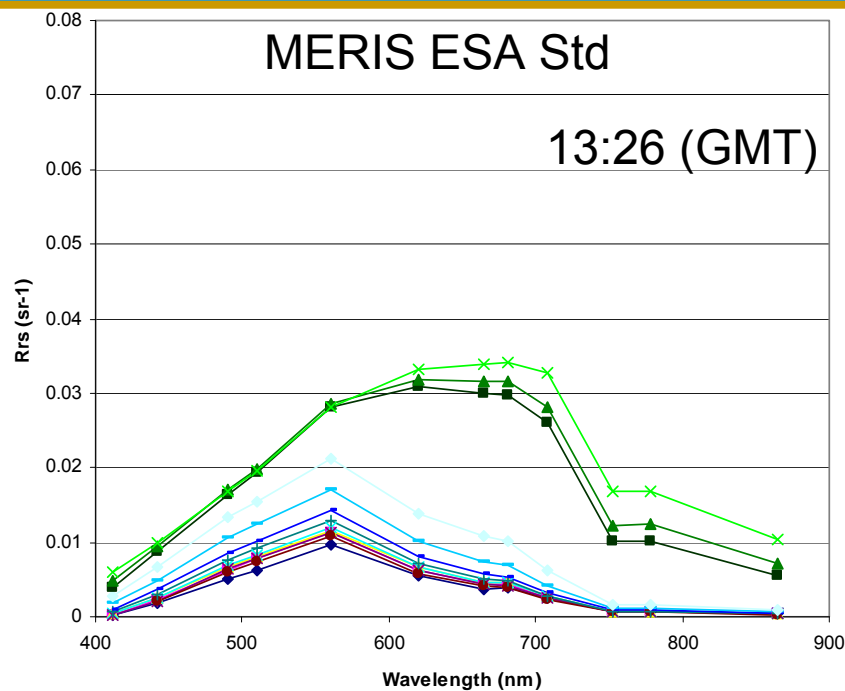
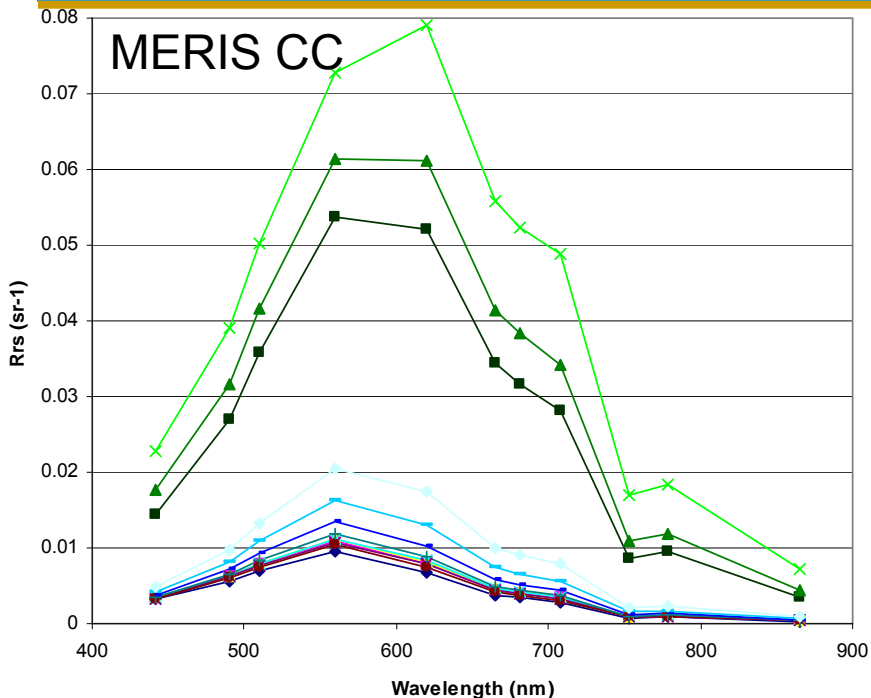


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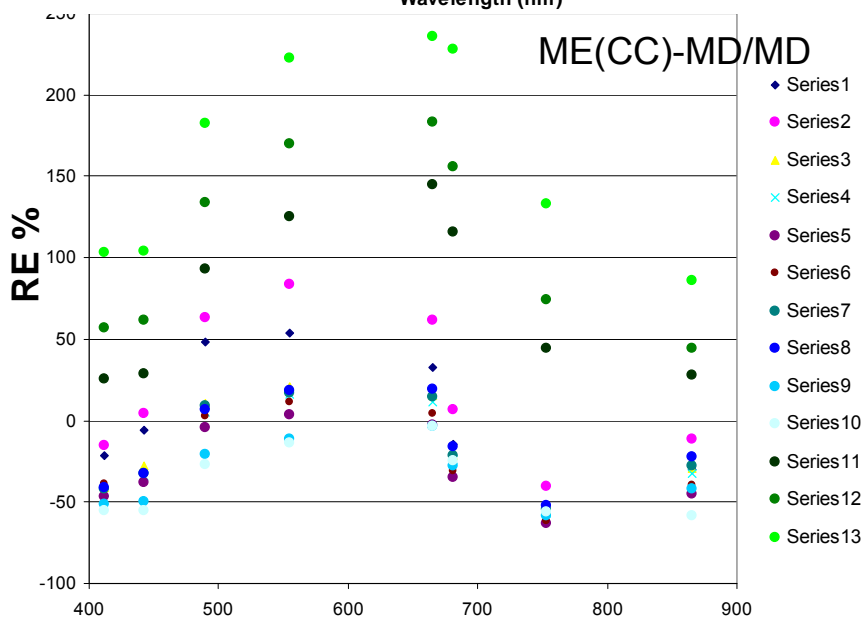


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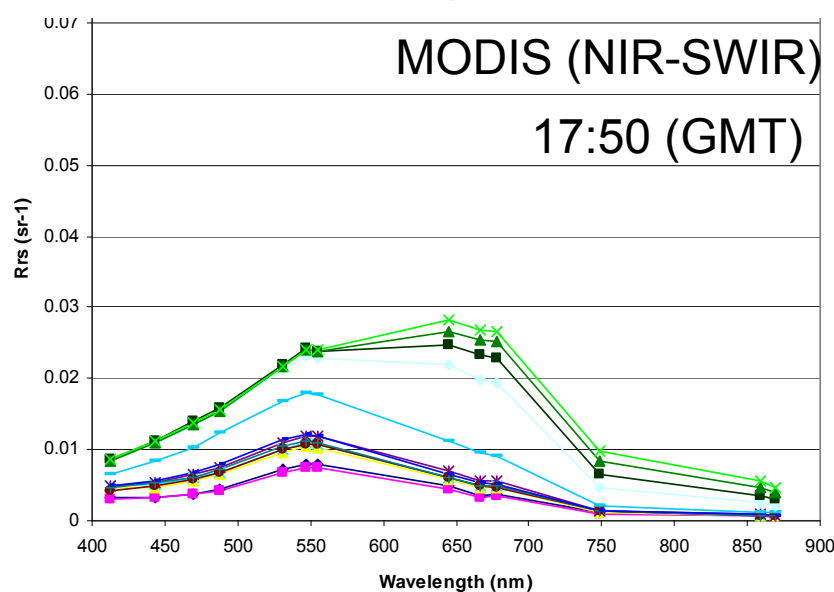
Reflectance spectrum (27Apr2011)



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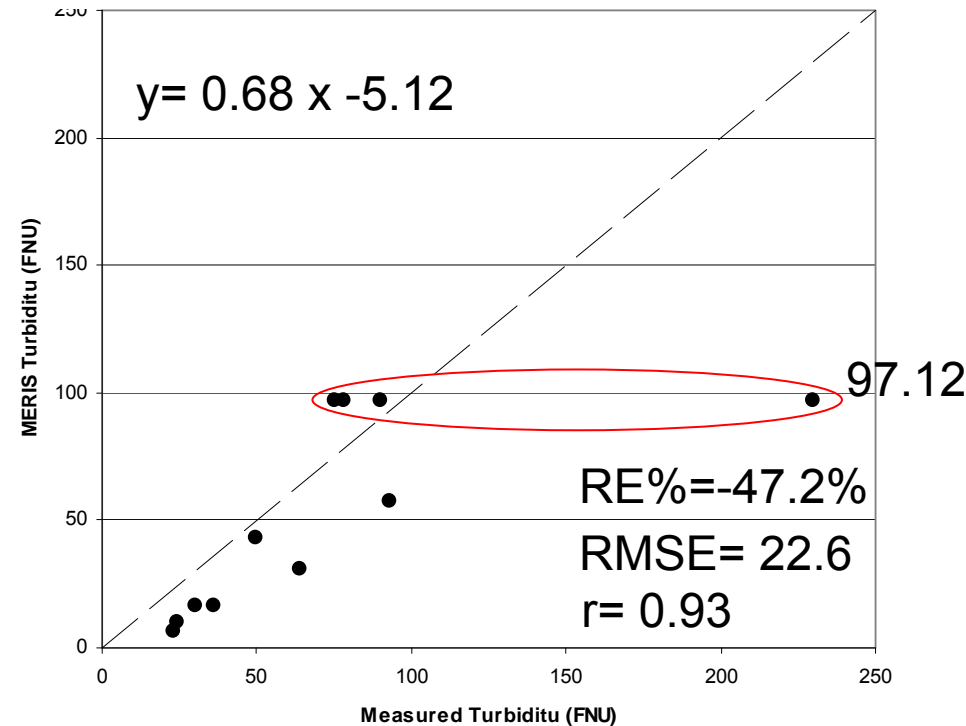
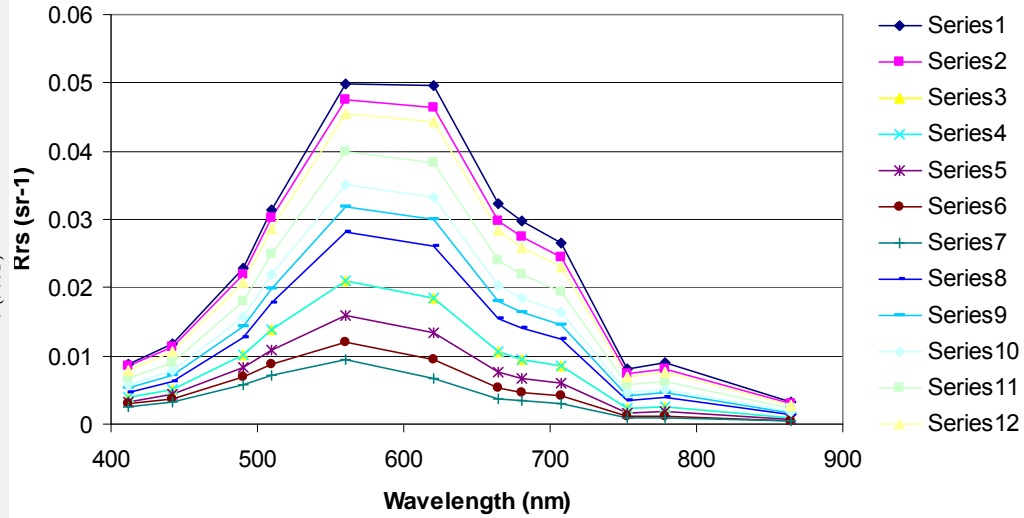
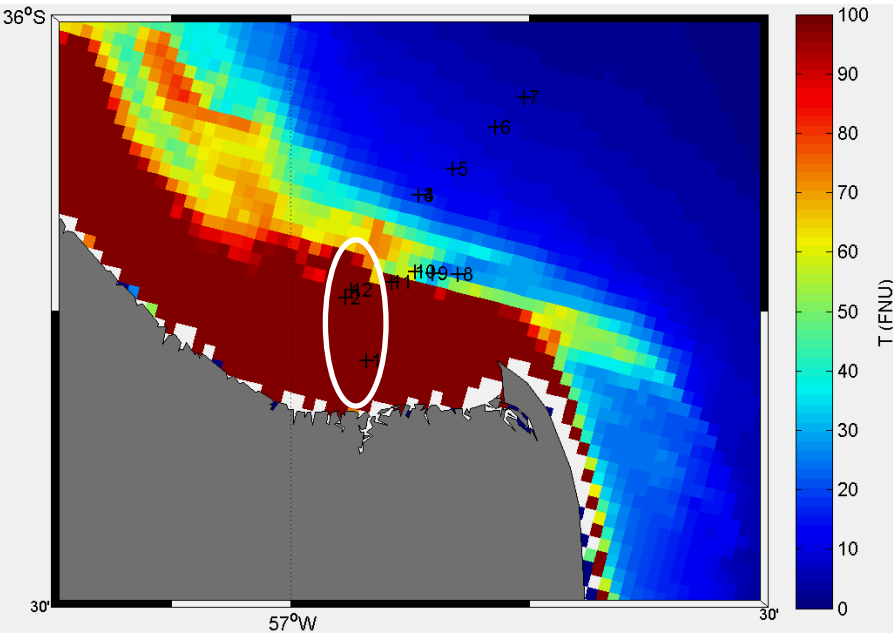


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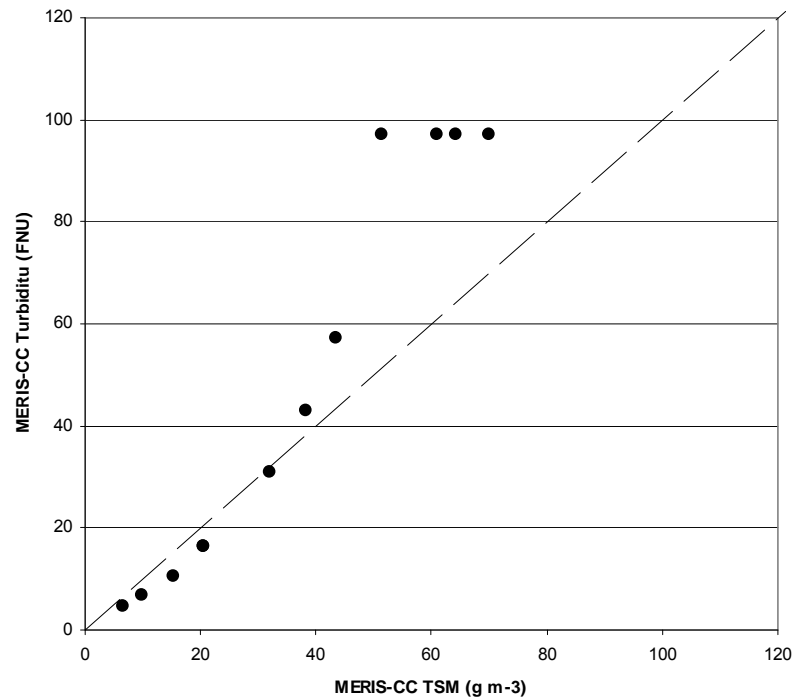
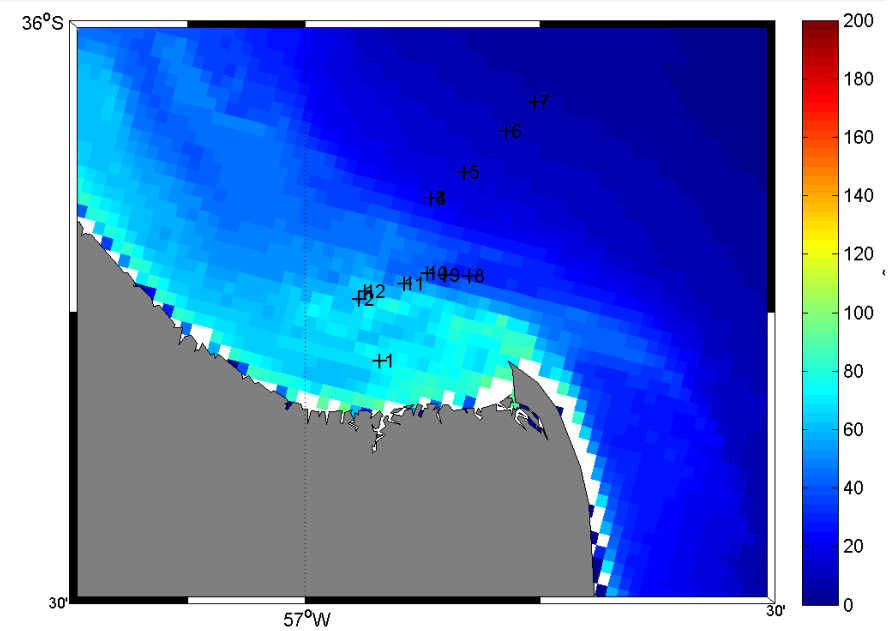
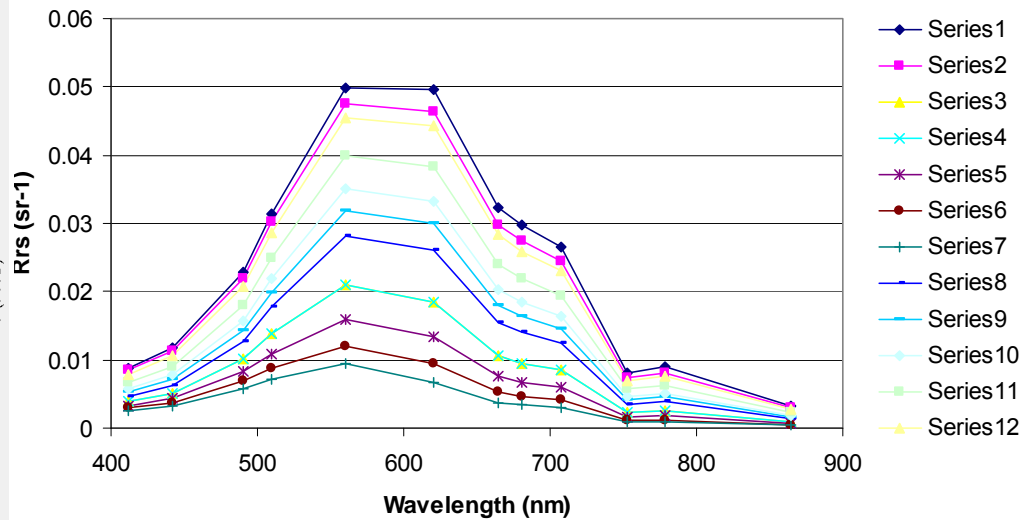
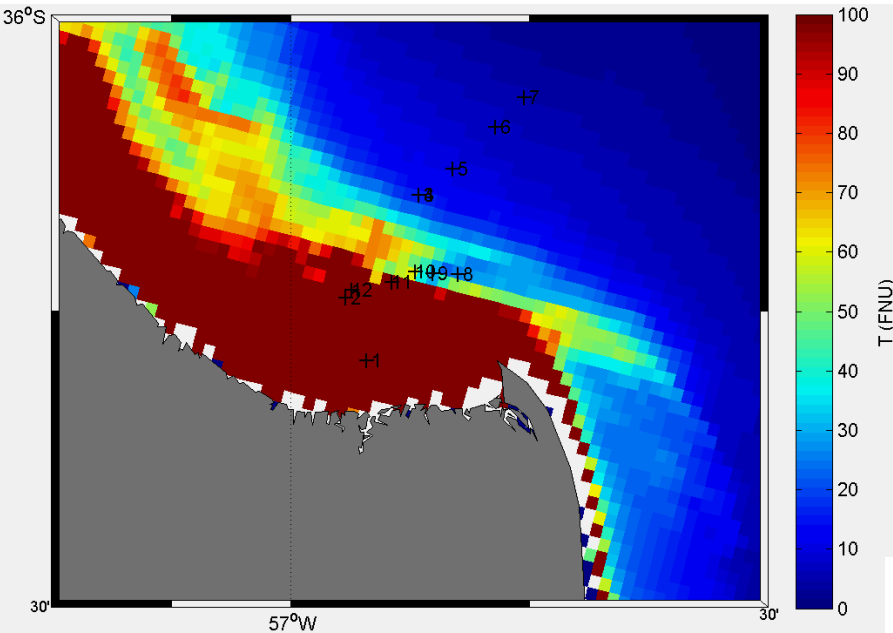


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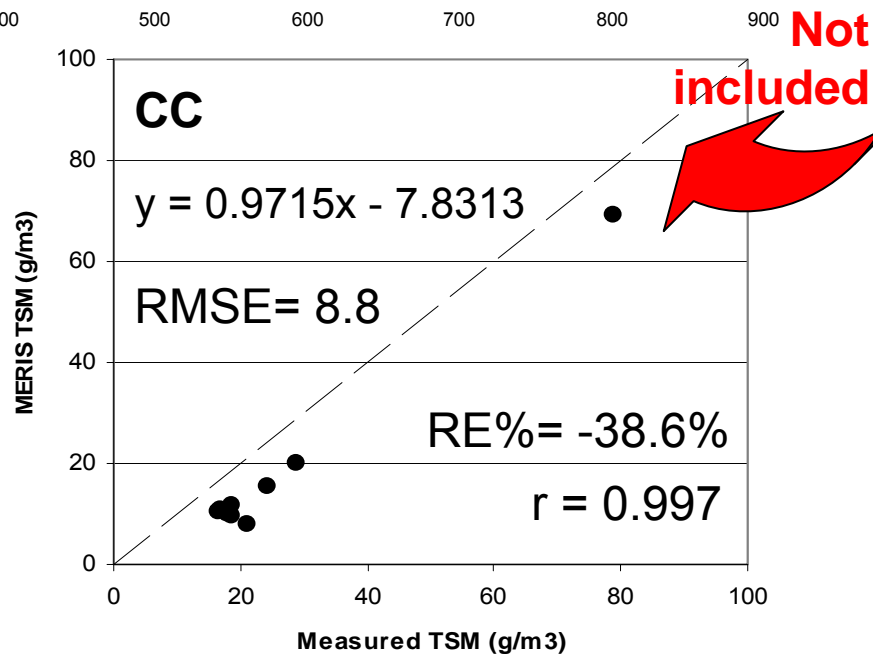
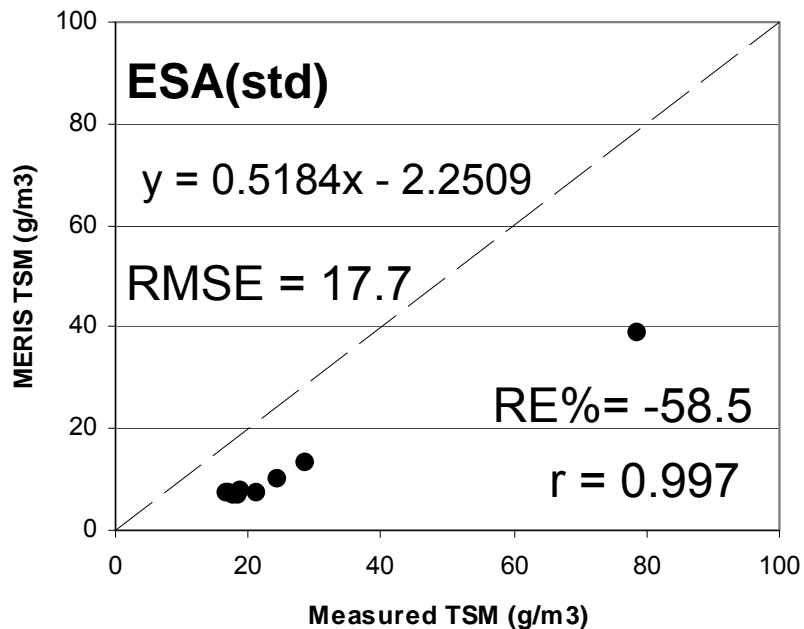
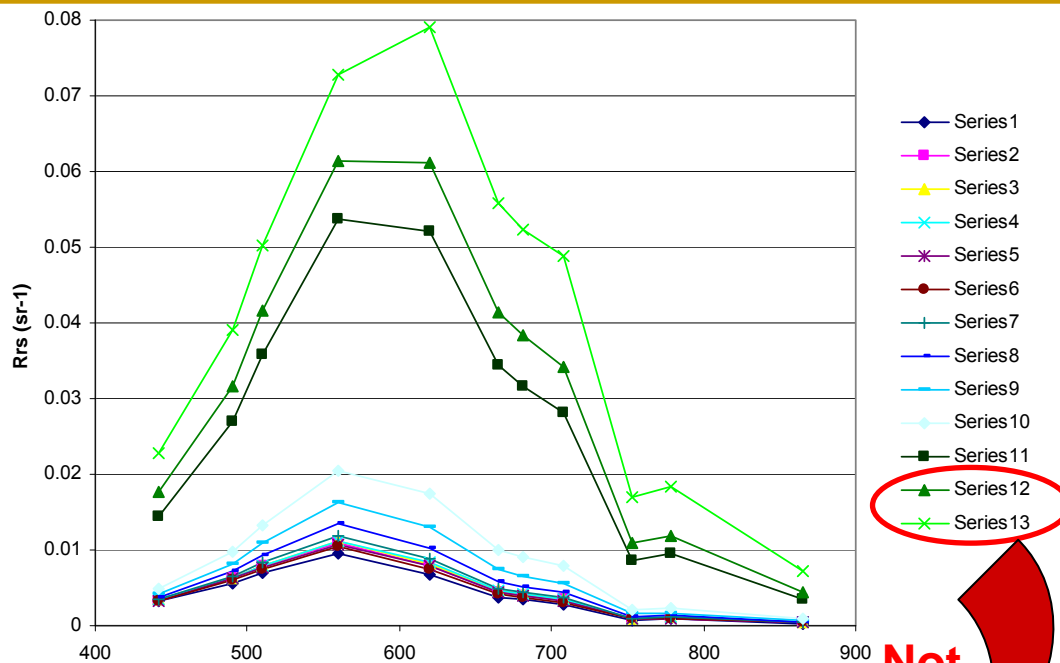
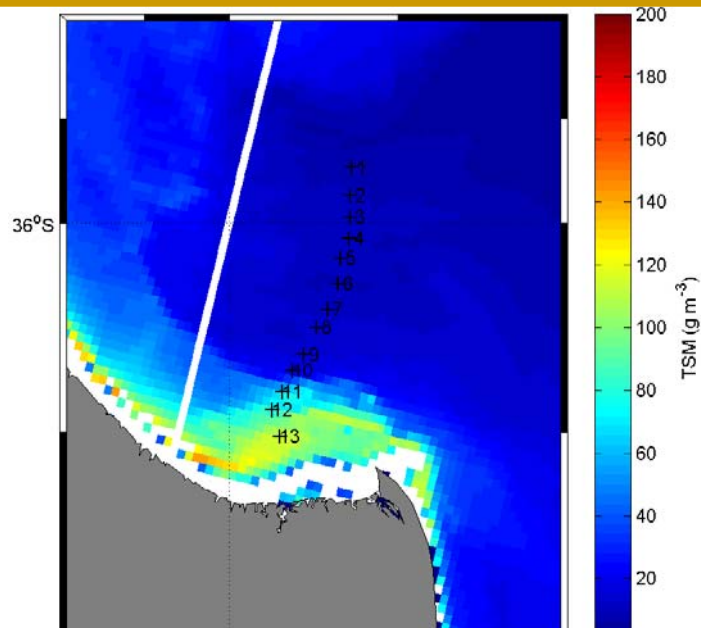
4) Product Validation: Turbidity (20 Dec 2010)



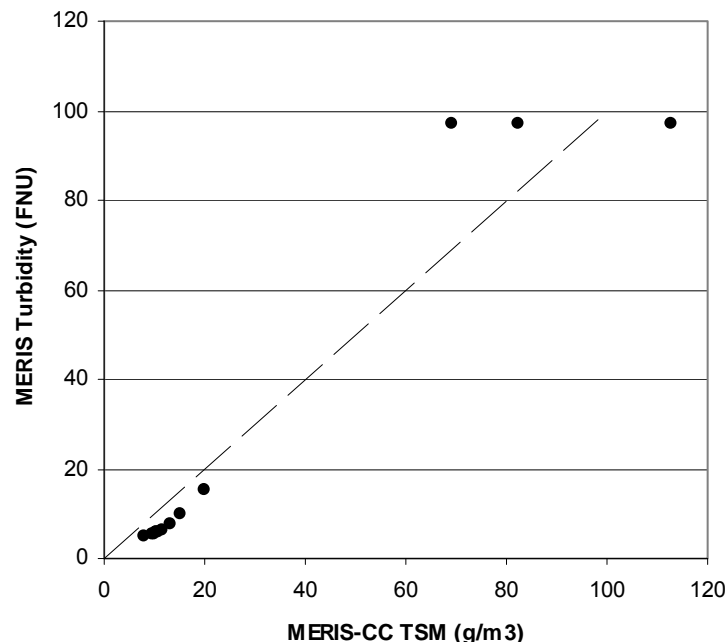
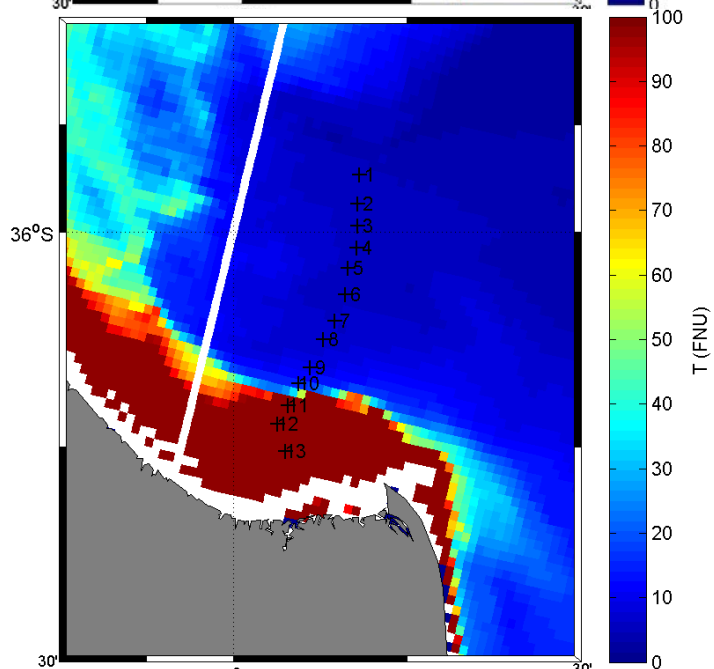
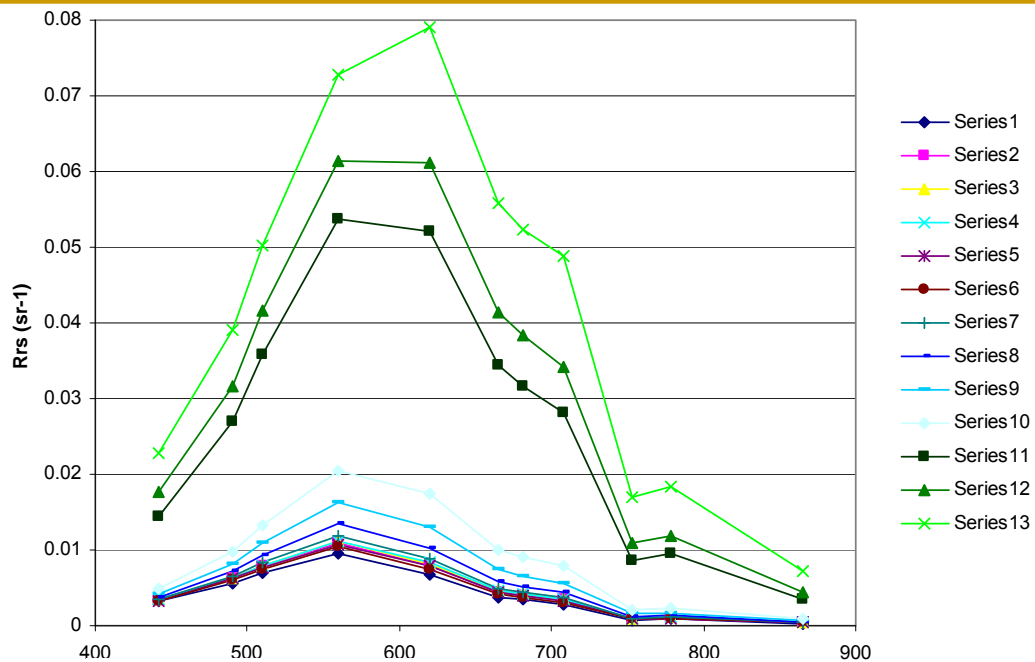
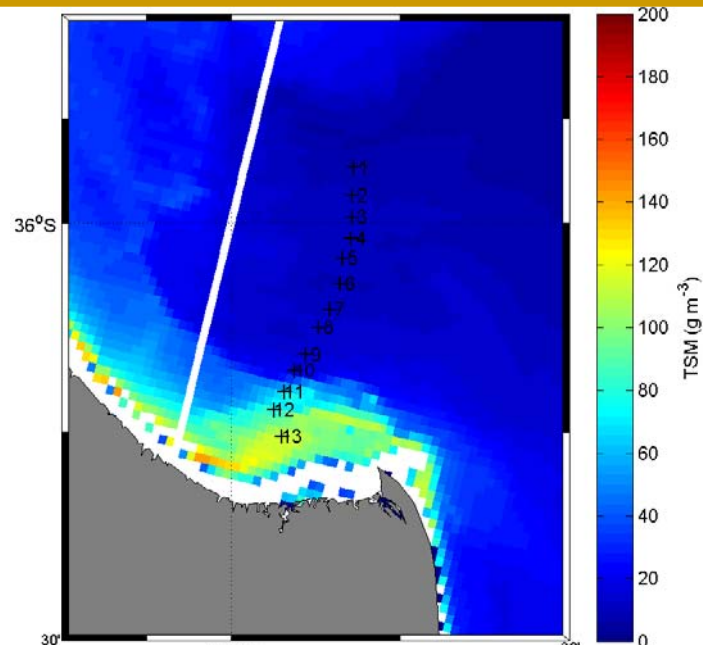
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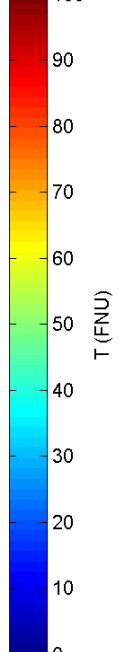
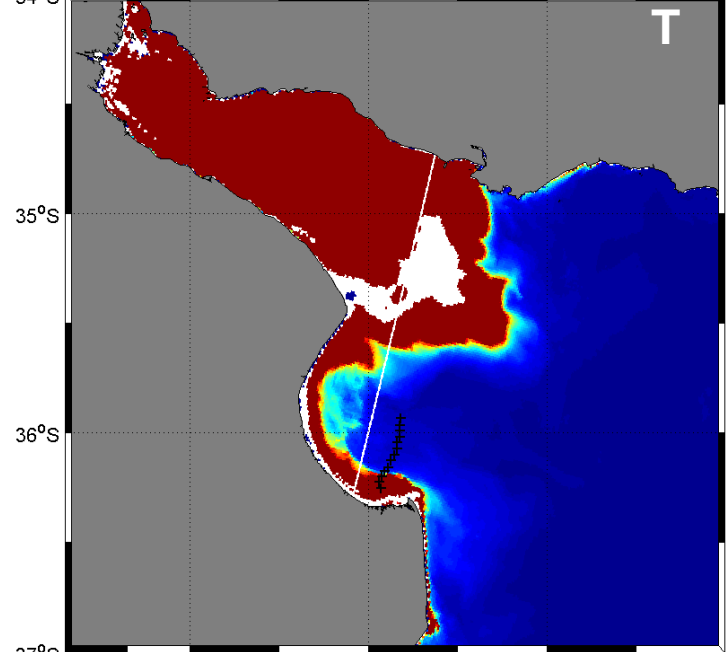
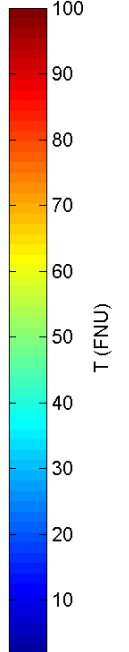
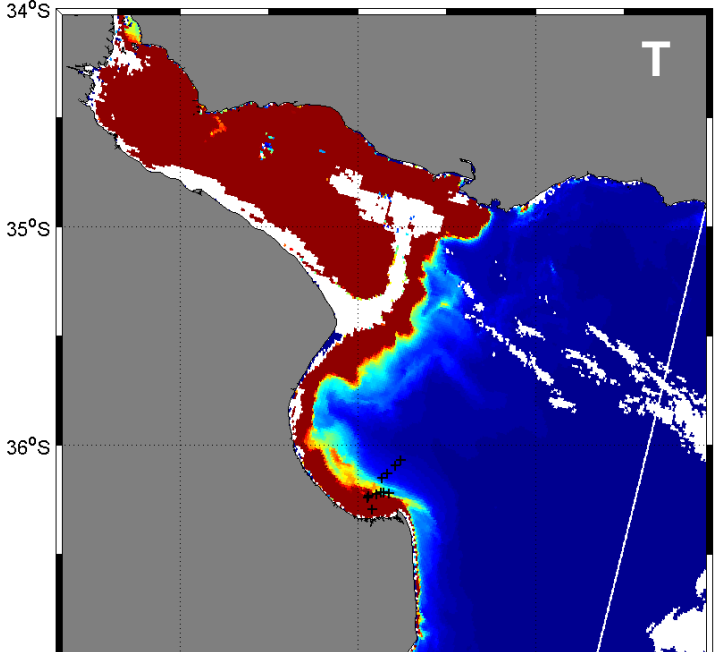
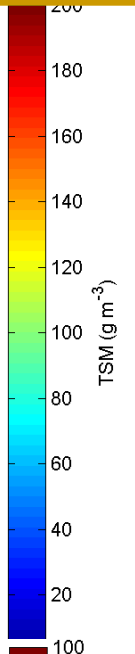
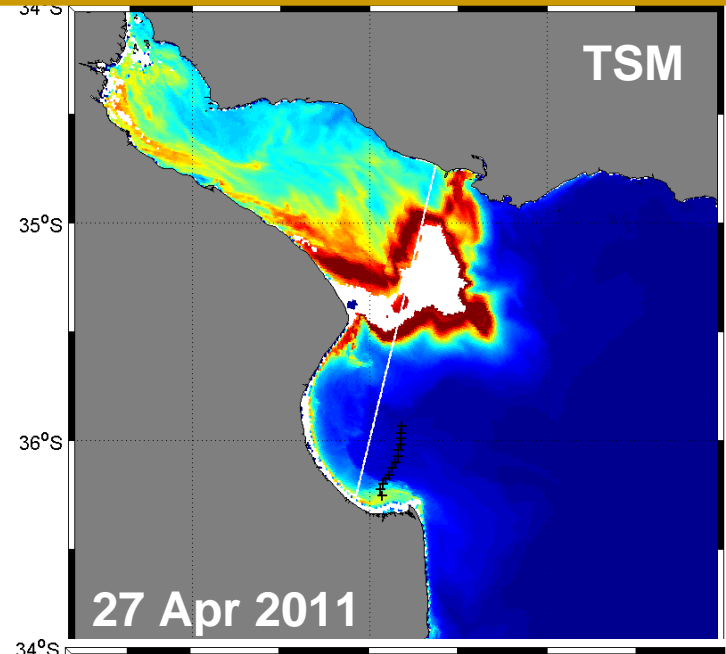
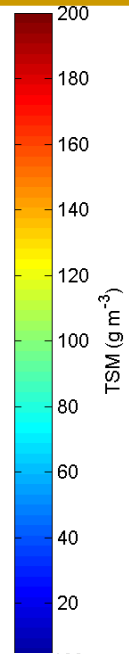
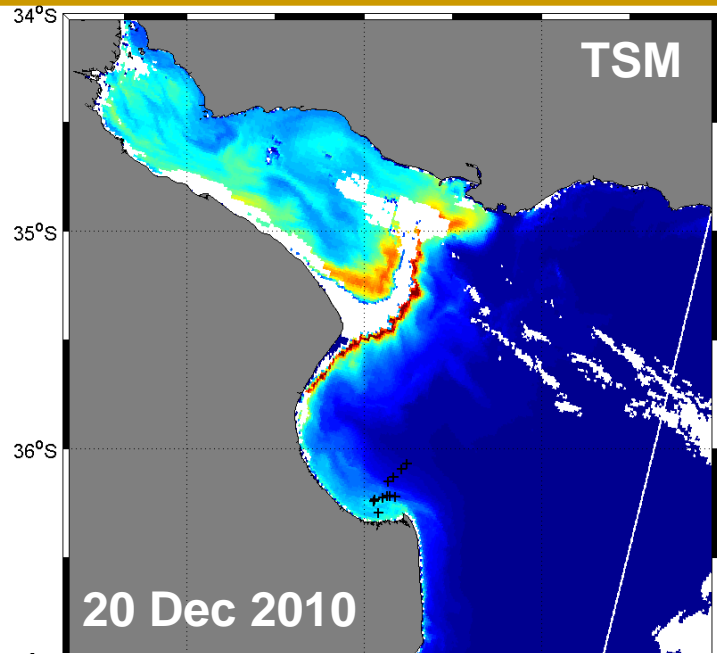
4) Product Validation: TSM (27Apr2011)



4) Product Validation: TSM (27Apr2011)



La Plata River Estuary



Alternative algorithm

- Band-difference algorithm

Based on 1-band algo
(Nechad et al. 2009)

$$\rho_w = \frac{T}{A_1 + T/C_1}$$

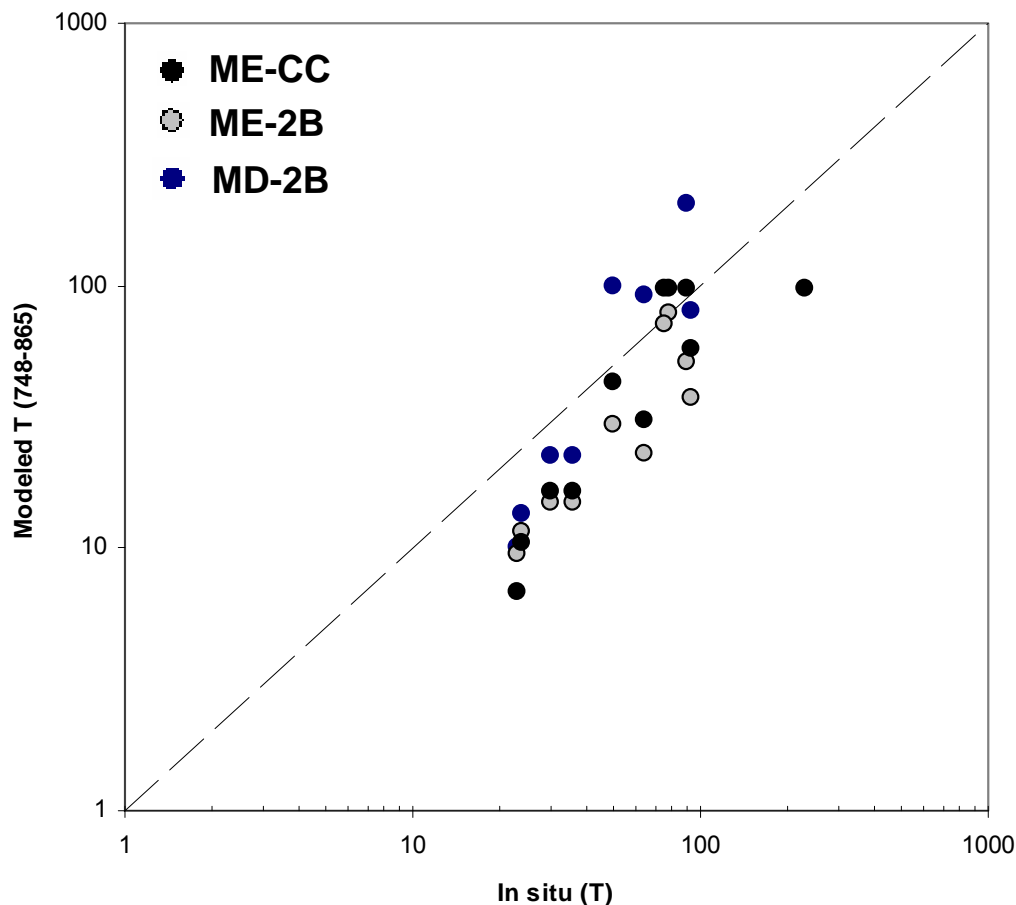


Band diff. of Rayleigh-corrected Ref.
using SWIR (Dogliotti et al. 2011)

$$\Delta\rho_w^{1,2} = \frac{T}{A_1 + T/C_1} - \frac{T}{A_2 + T/C_2}$$

MERIS: 753-865 nm

MODIS: 748-859 nm



	APD	RMS-log	r	N
ME-CC (T)	-47.2	0.326	0.93	7
ME-2B (ρ_{rc})	-43.0	0.308	0.77	10
MD-2B (ρ_{rc})	-4.7	0.248	0.83	7

Quality Issues

- Cloud mask (masks water pixels at southern coast)
- TOA Reflectance & **AC** out-of-range in the Turbidity Maximum

AC assessment

- No complete separation of TOA into atm and water component in the estuary

Reflectance Spectrum

- Main differences between Rrs ESA-std and CC is 400-700 nm (not NIR bands) and for high reflectance (in situ data is needed)

Product Validation

- Turbidity product underestimates & saturates at 97.12 FNU (re-calibration?)
- TSM product performed well for concentrations up to 80 mg m⁻³ (higher TSM?)

Thank you!