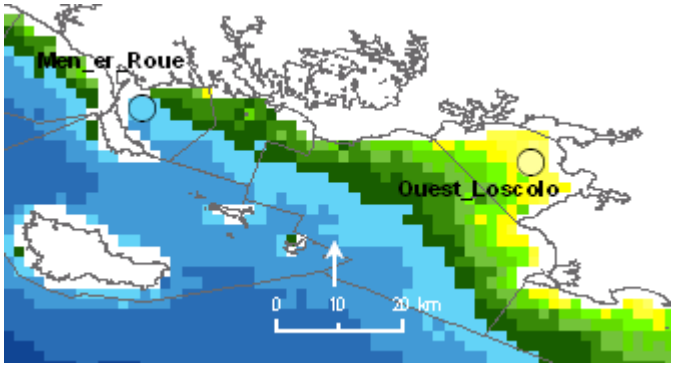
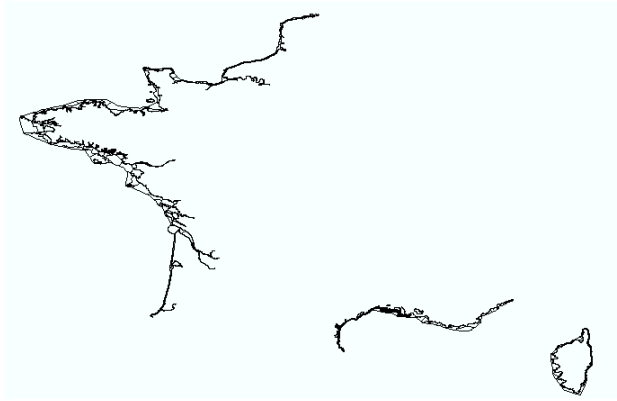
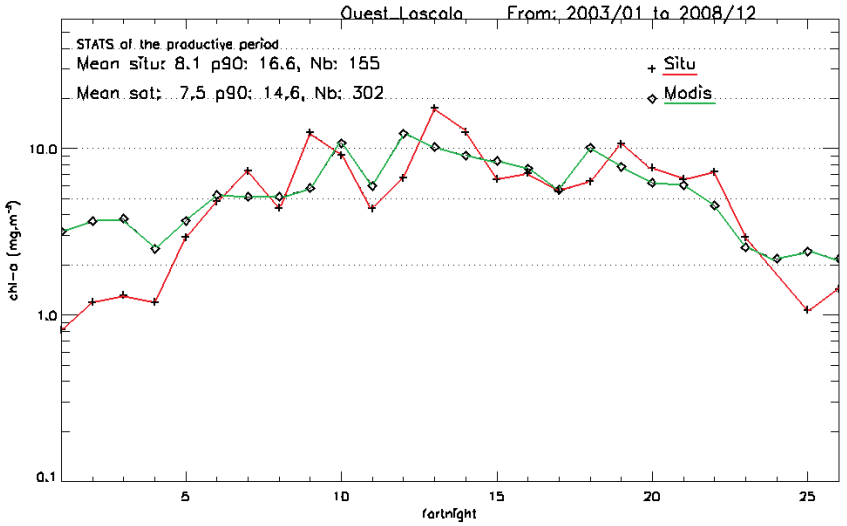
ICOL in Coast Colour

R. Santer, A. Ruesca, O. Danne, C. Brockman and O. Aznay

Motivation



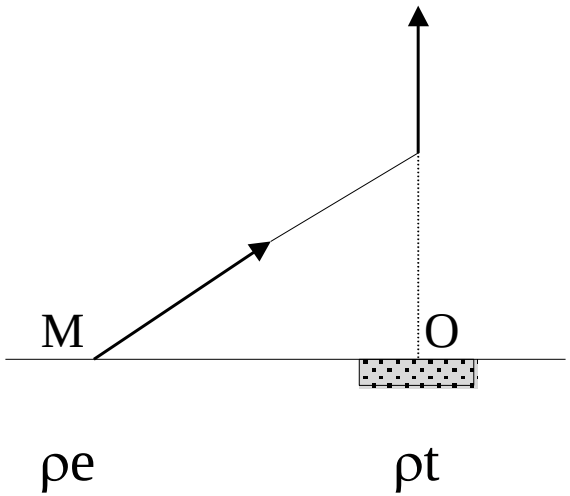




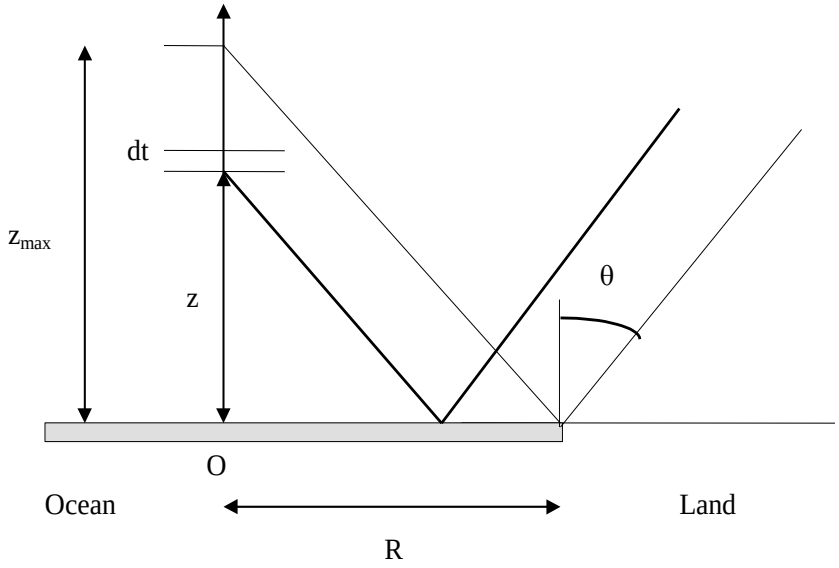
Eutrophication is near the coast line
Where the adjacency effects are

Francis GOHIN, Angéla TRABELSI et Marie-Madeleine DANIELOU

The two reflections: description



Isotropic reflection
by the land and water

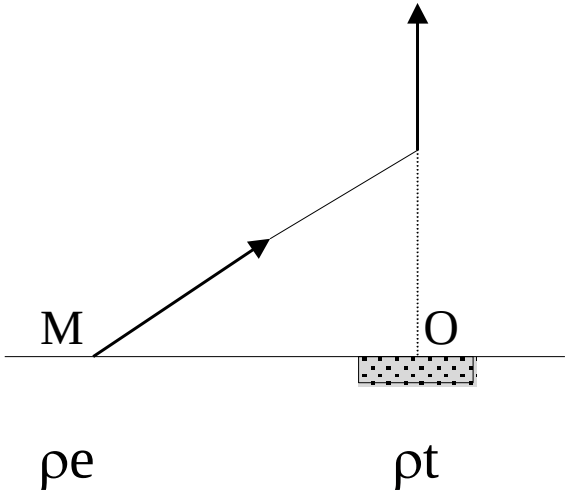


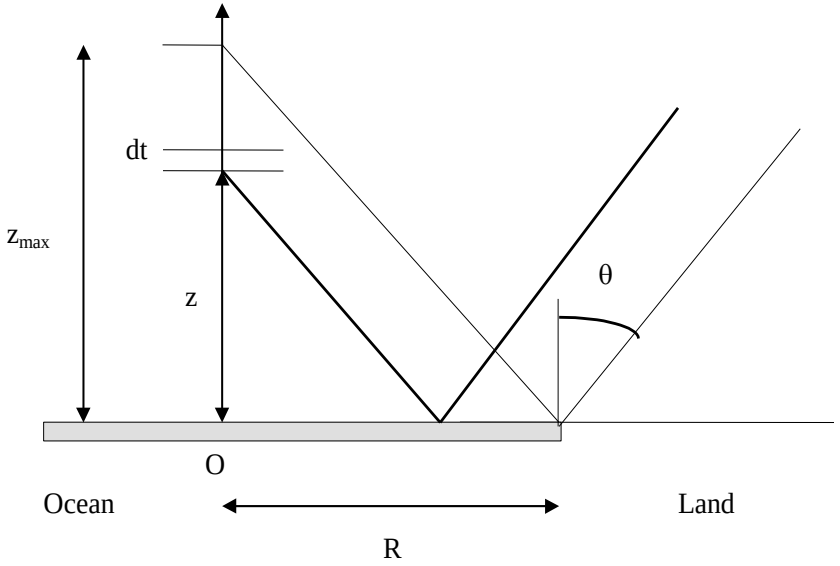
Specular reflection
Mainly by the water

In the NIR, between B12 and B13,
the land -water contrast is almost white:
bare soil, sand, vegetation, snow
have a little spectral dependence

The Fresnel reflection is white

The adjacency effect: the scattering





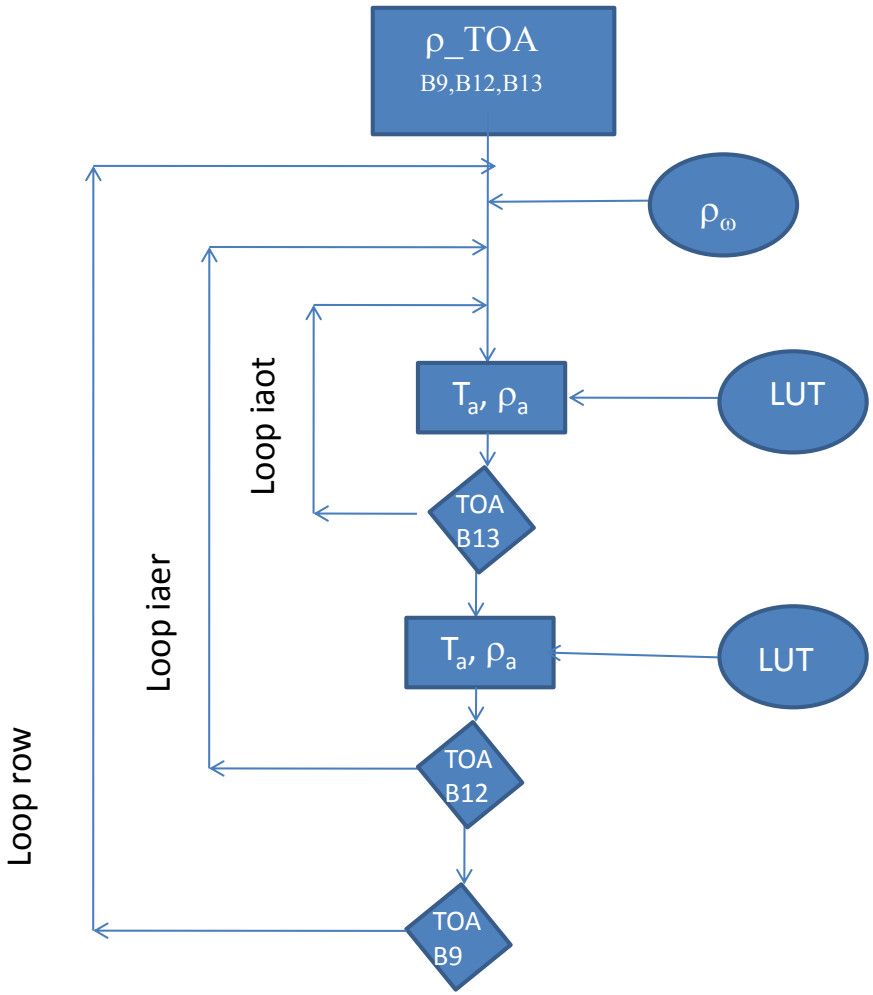
Isotropic reflection:
Proportional to the diffuse irradiance

Specular reflection
Proportionnal to a radiance

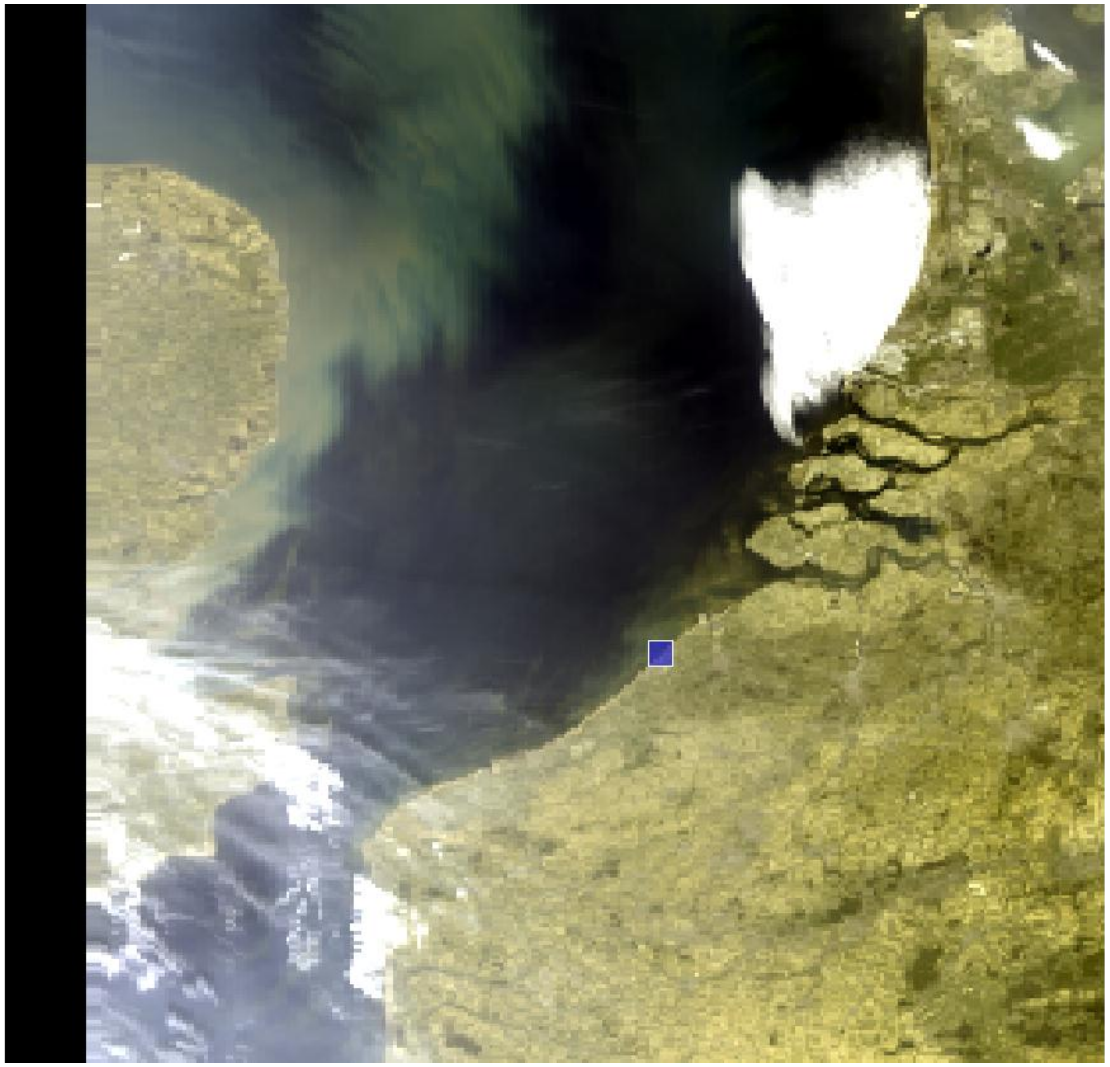
Proportional to the optical thickness

Main outlines

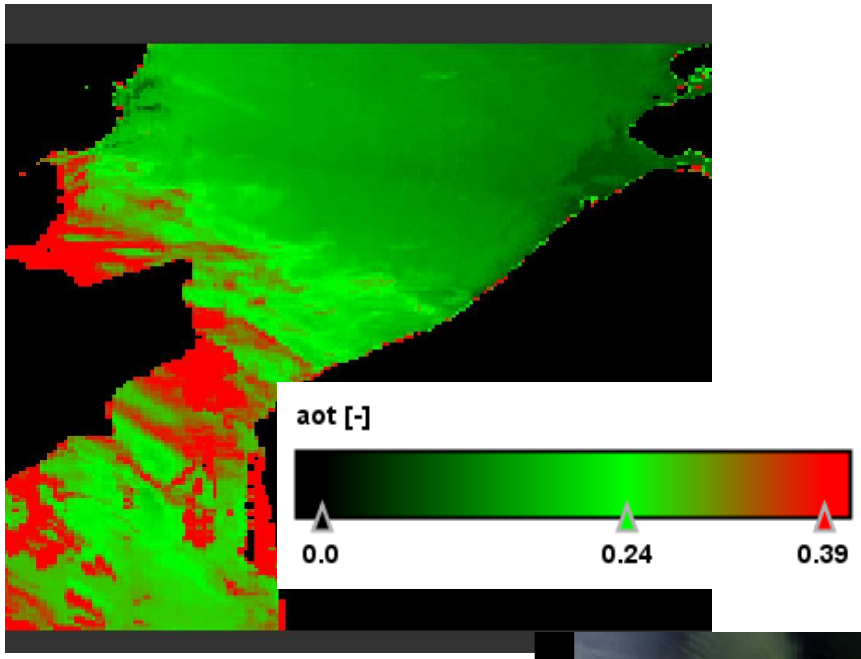
- Retrieval of the aerosol model: principle and illustration
- Validation of the aerosol model
- Influence of ICOL on the L2 water product
- ICOL at L2

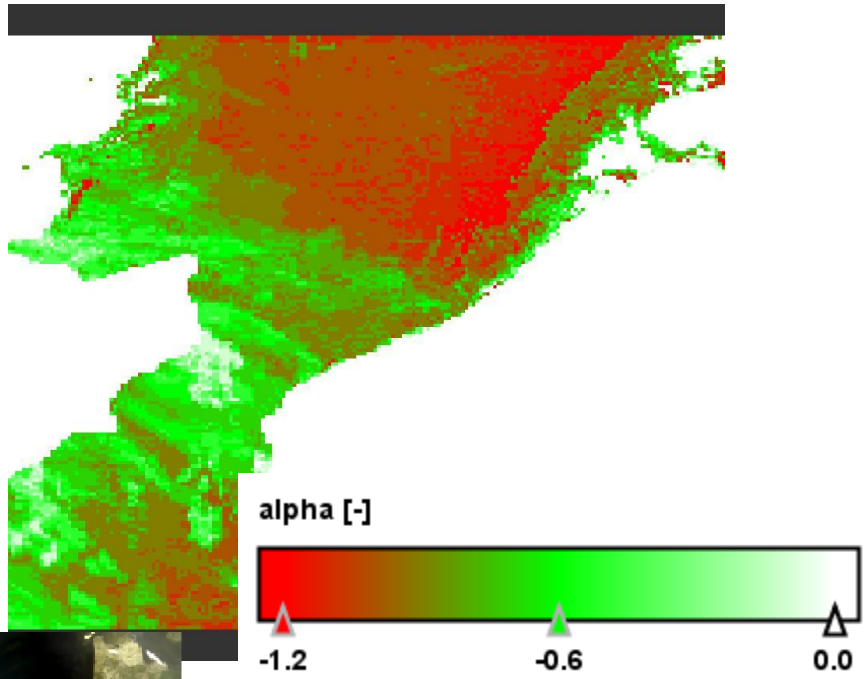

ρ_TOA
B9,B12,B13
ρω
Ta, ρa
LUT
TOA
B13
Ta, ρa
LUT
TOA
B12
TOA
B9
Loop iaot
Loop iaer
Loop row

ICOL Processing Results



The adjacency effect: illustration on the aerosol product





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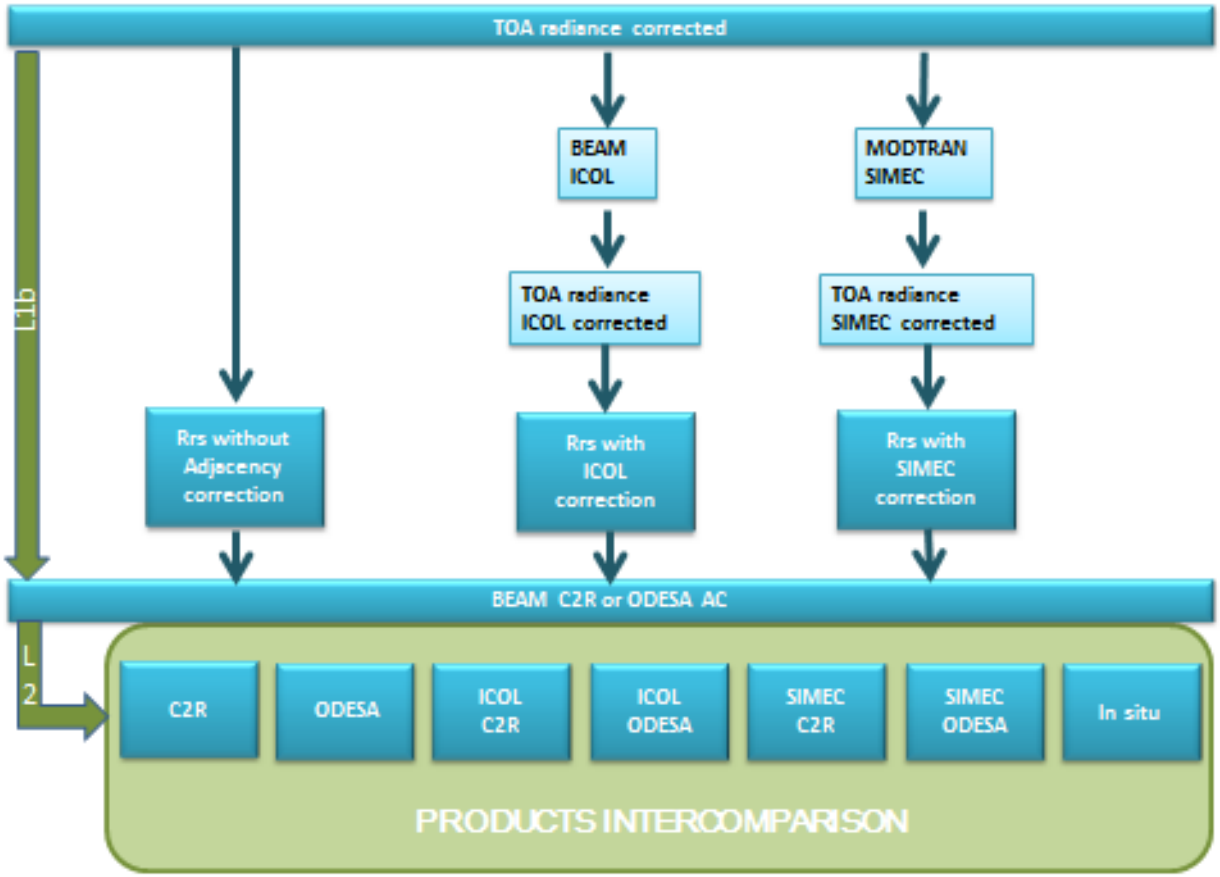
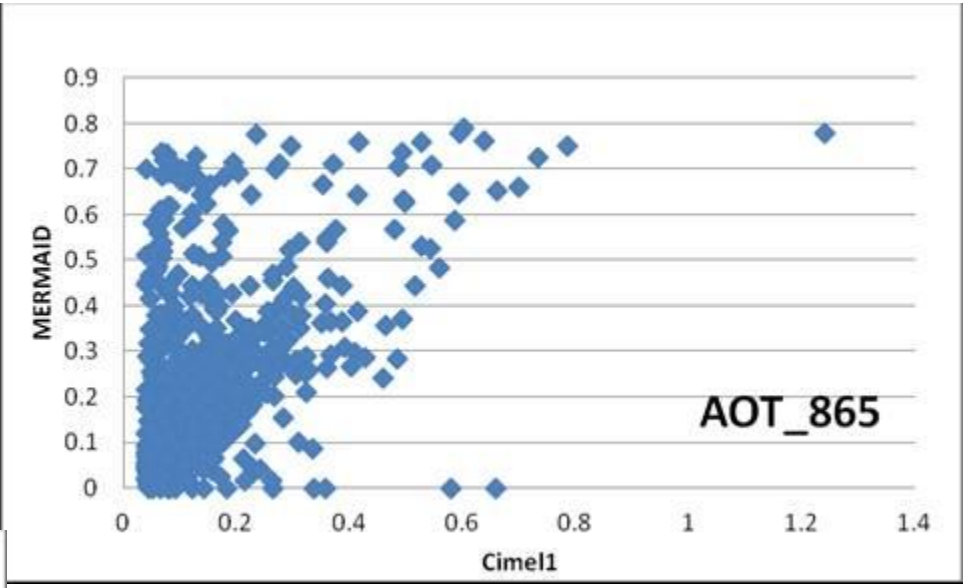
The intercomparison game

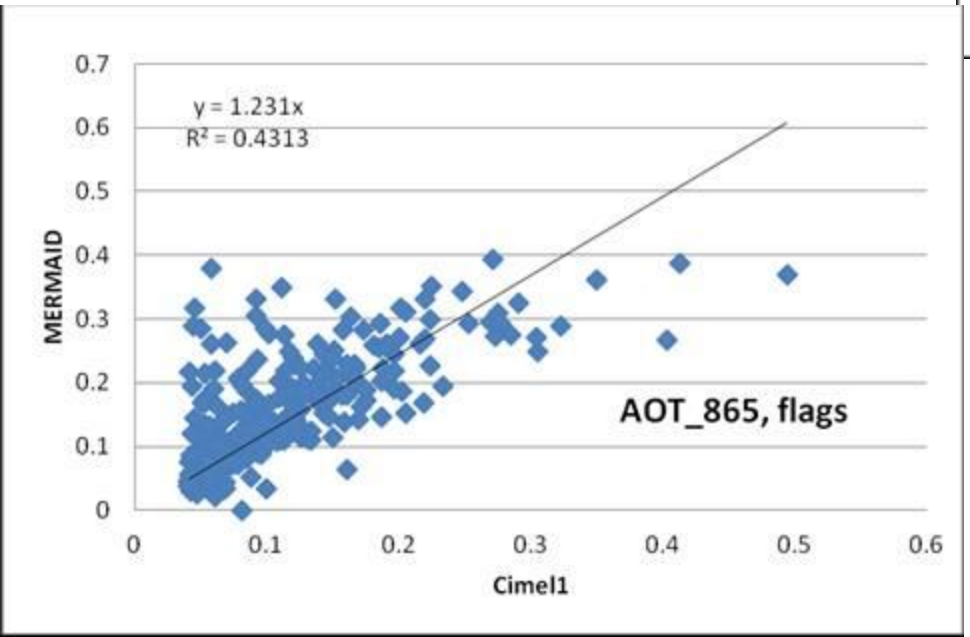


AERONET in MERMAID

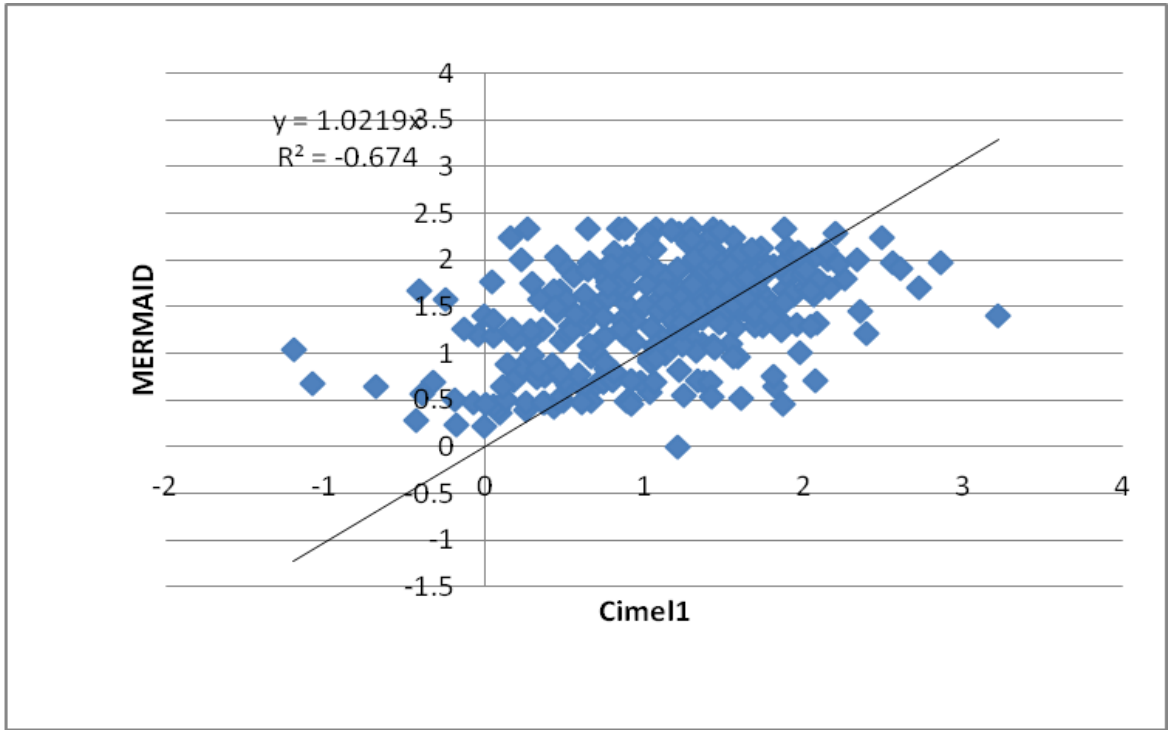
AAOT	579	472	179
AbuAlBukhoosh	80	76	28
CoveSEAPRISM	135	89	31
GustavDalenTower	129	78	41
HelsinkiLighthouse	292	236	15
LJSCO	4	2	0
MVCO	114	61	27
Palgrunden	30	14	4
Total	1363	1028	325

number of matchups, of AOT measurements, the number of matchups with AOT measurements and no MEGS flags



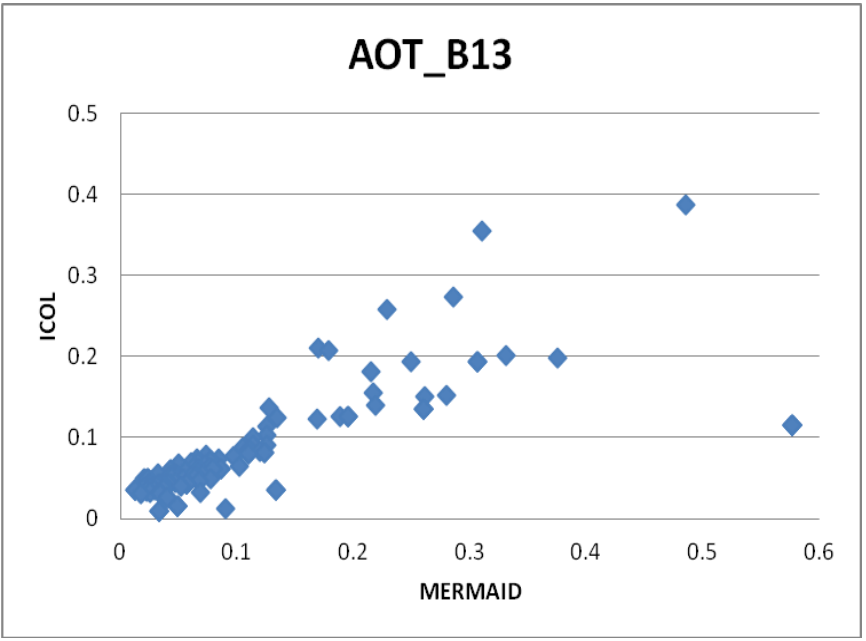


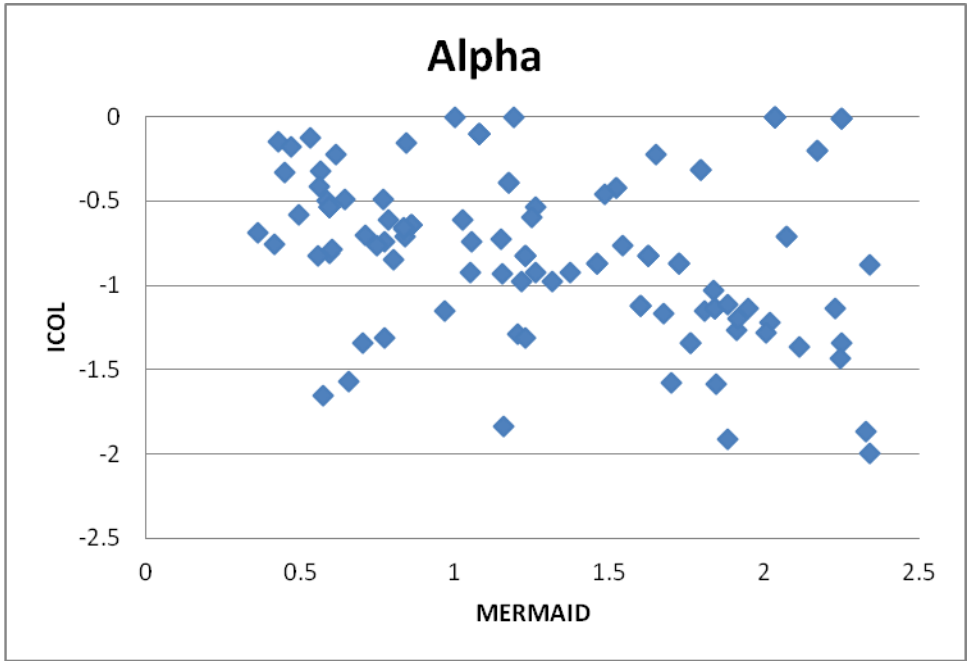
Angstroem


y = 1.0219x
R² = -0.674
MERMAID
Cimel1
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-1
0
1
2
3
4

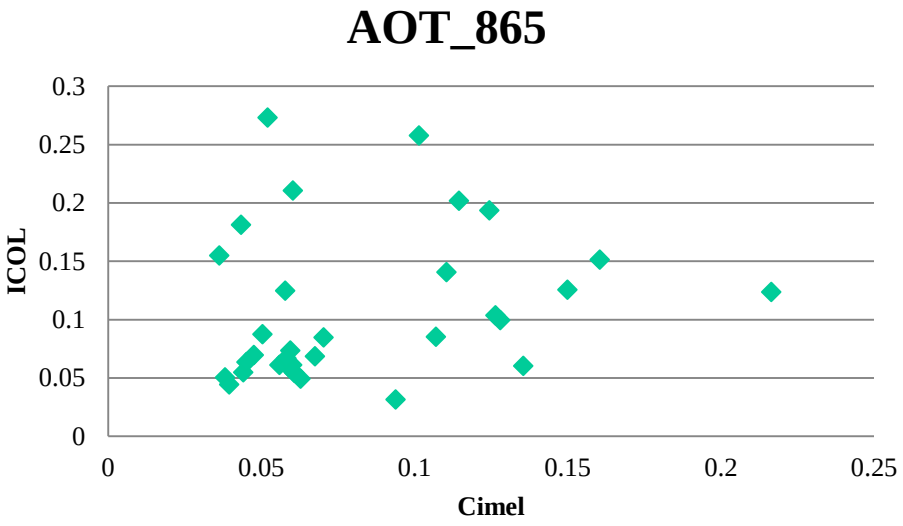
ICOL & MERMAID aerosol product

Algarve	19
EastEngChannel	12
MUMMTriOS	58
MVCO	115
NOMAD	72
NWBalticSea	9
Palgrunden	26
PlumesAndBlooms	91
SIMBADA	31
LJCO	4

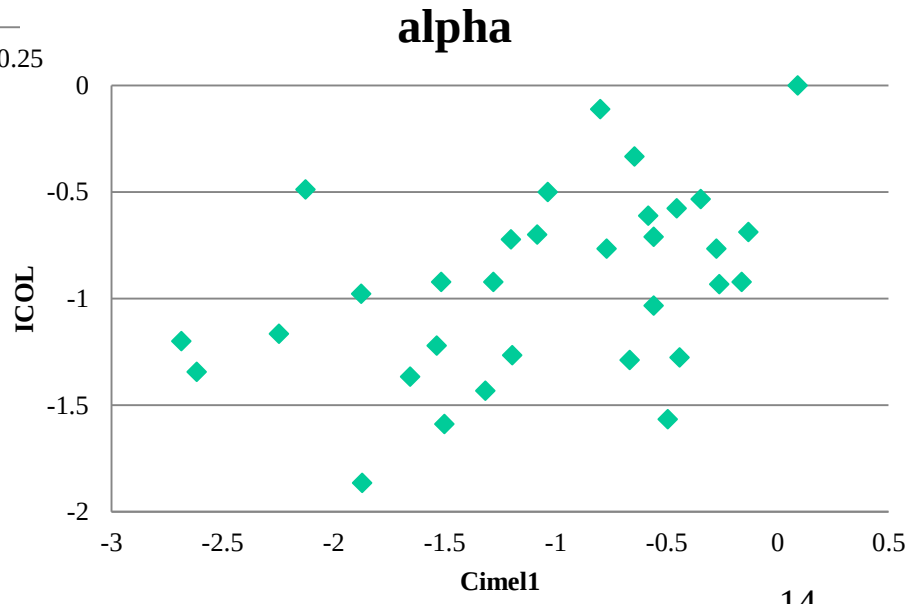




ICOL and AERONET



MVCO	27
Palgrunden	4



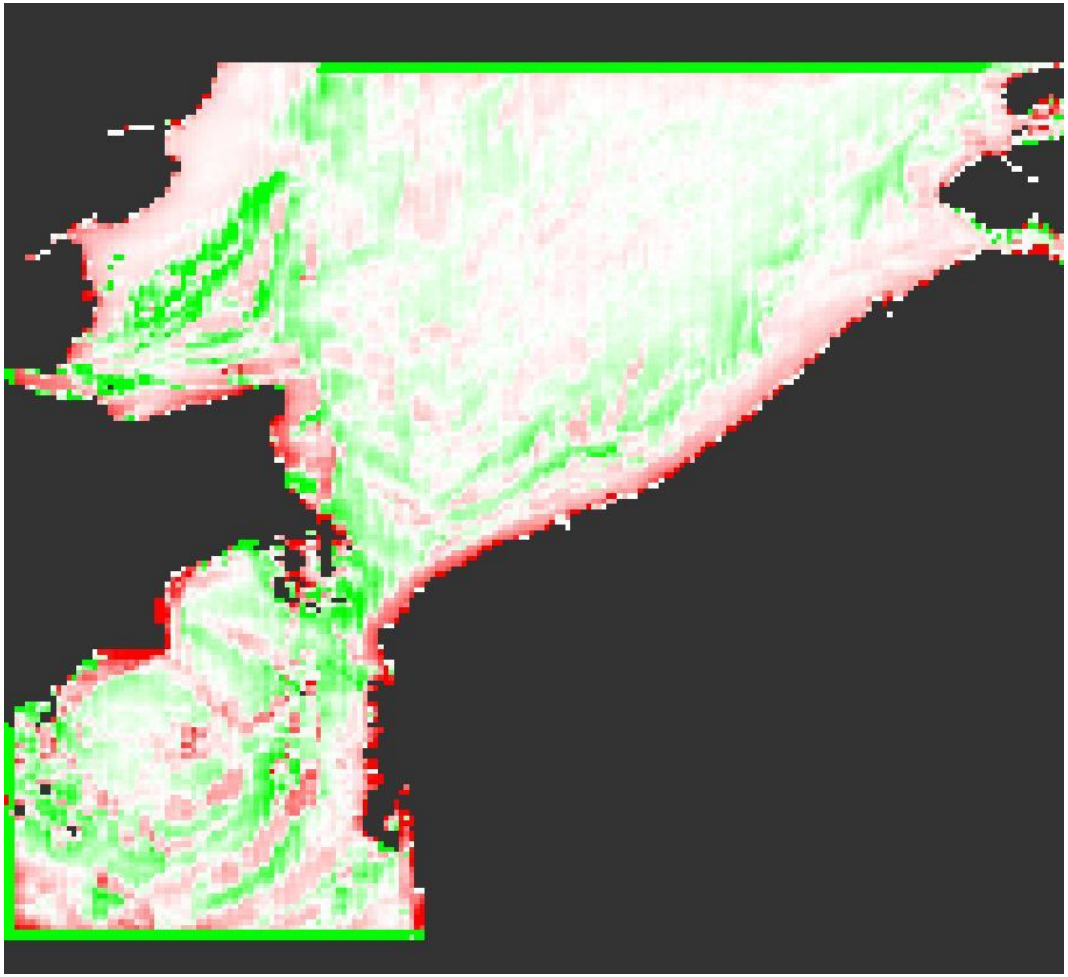
Conclusion 1 on ICOL aerosols

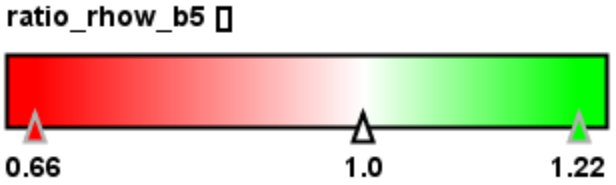
- ICOL is doing qualitatively what we expect:
  - Making the aerosol homogeneous at coast line
  - Going in the right way compared to MEGS
- ICOL is doing quantitatively what it can:
  - A first reasonable comparison with AERONET
- What next:
  - More validation with AERONET (AERONET in a MERIS data base)
  - Analyse the impact of the clouds

Main outlines

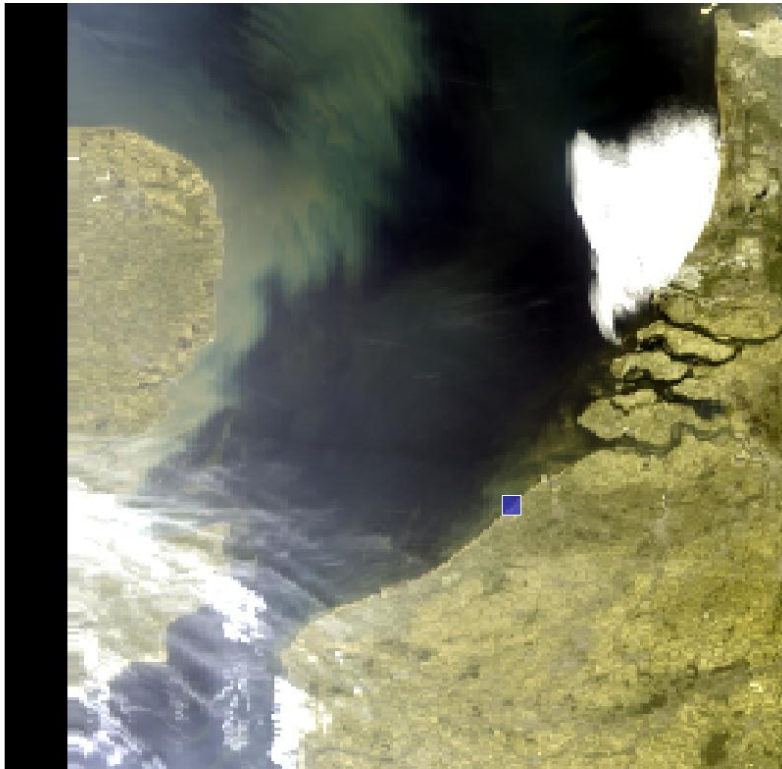
- Retrieval of the aerosol model: principle and illustration
- Validation of the aerosol model
- Influence of ICOL on the L2 product
- ICOL at L2

ICOL and the water reflectance



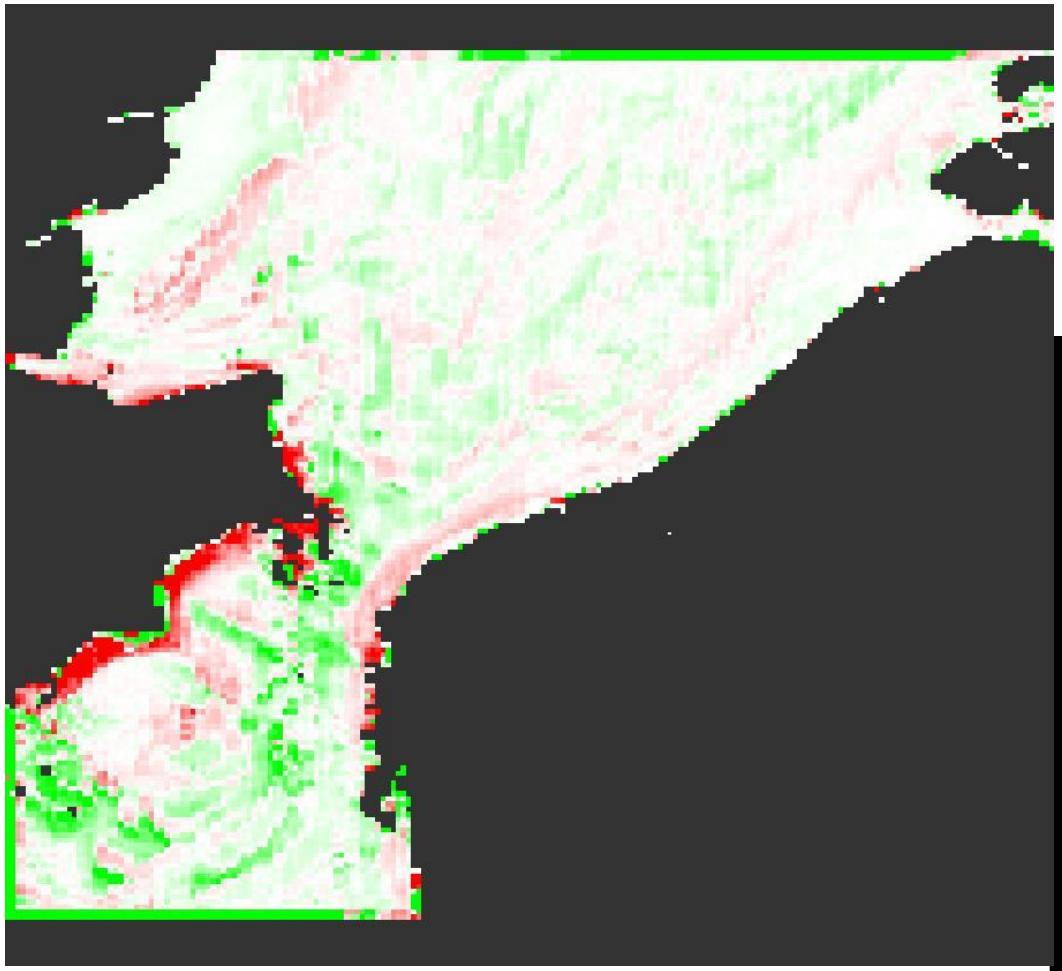


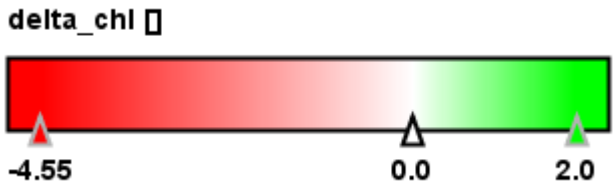
Ratio Rhow_B5(with/without)

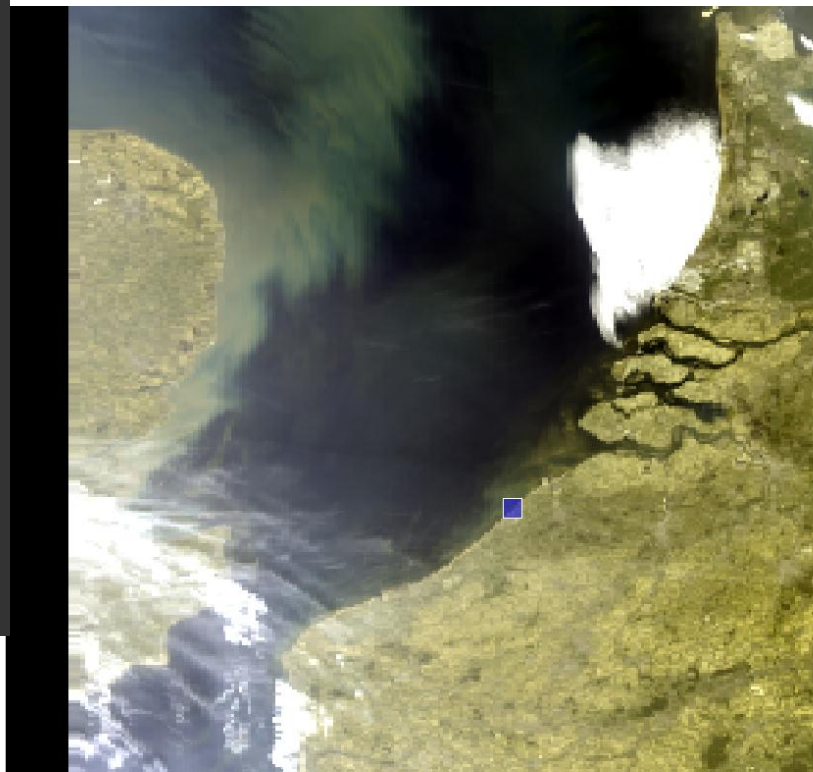


ICOL and the Chla1

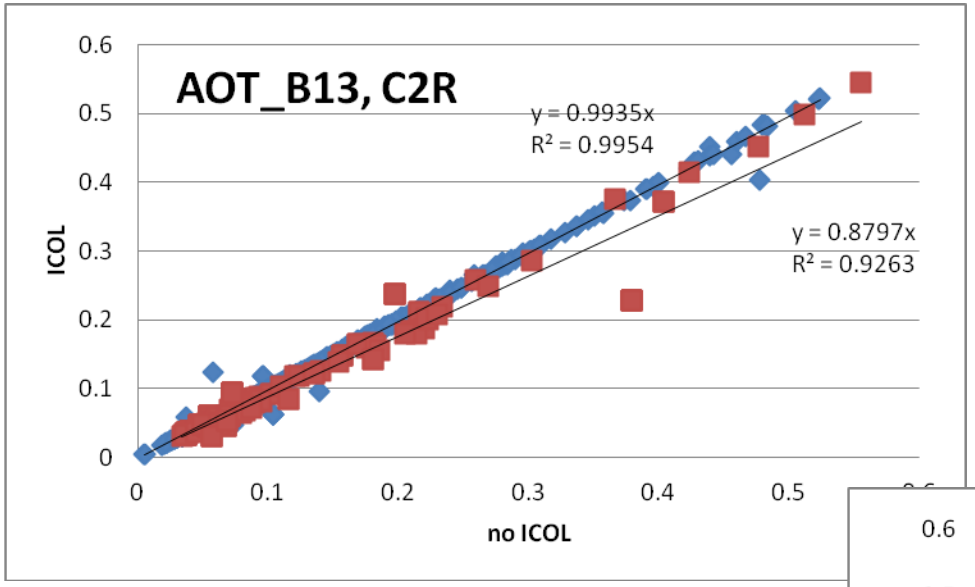
Difference in chlorophyll_a (without ICOL-with ICOL)







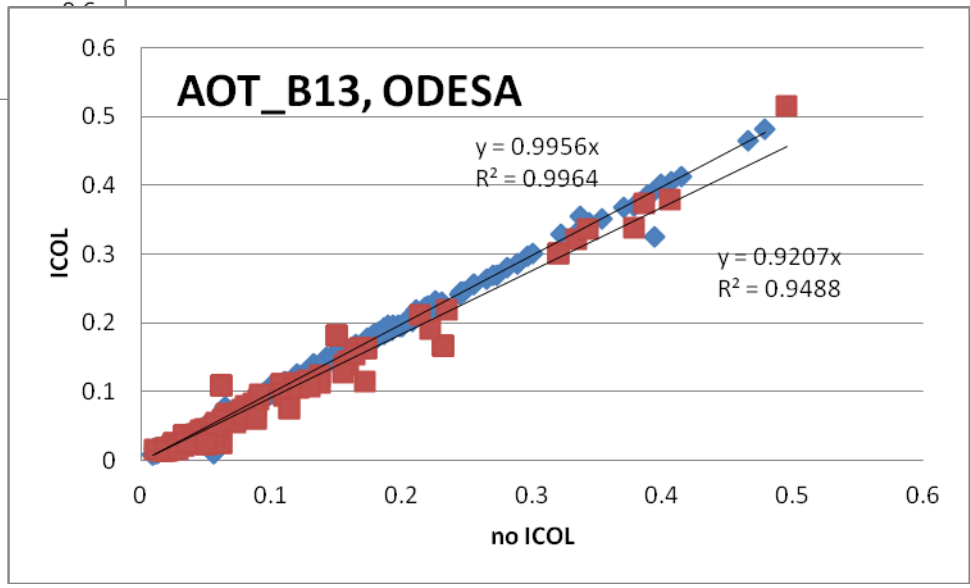
The C2R AOT



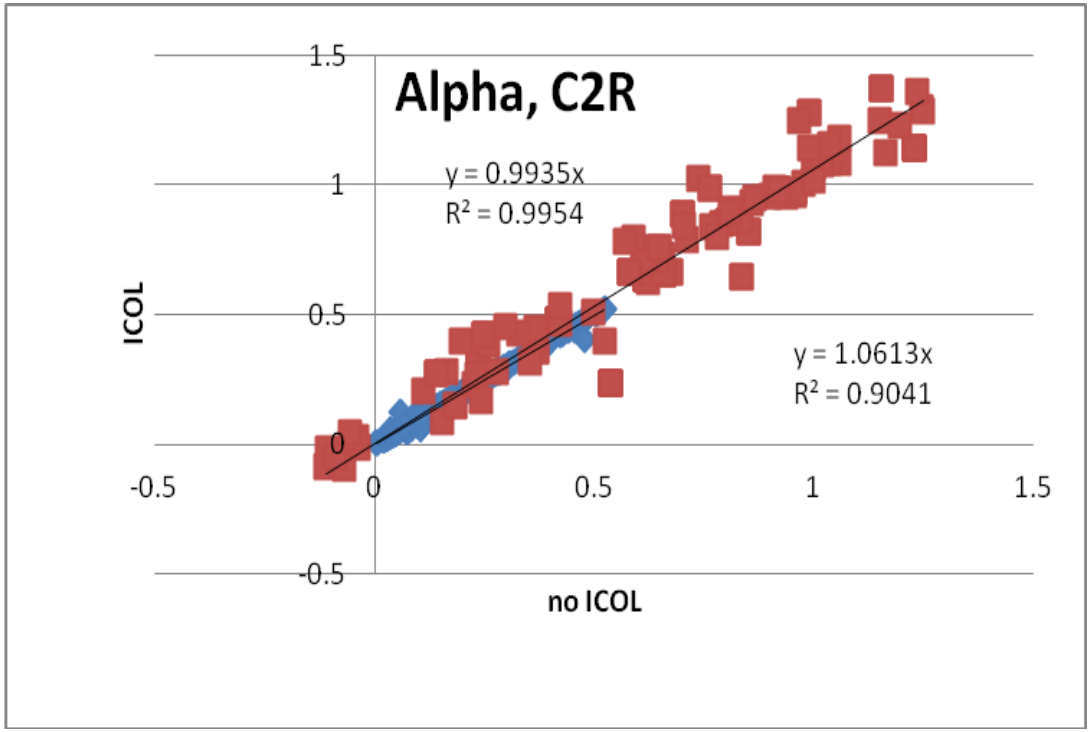
Blue: Rayleigh
Red=Rayleigh+aerosols

No Rayleigh impact

Aerosol correction goes in the right way

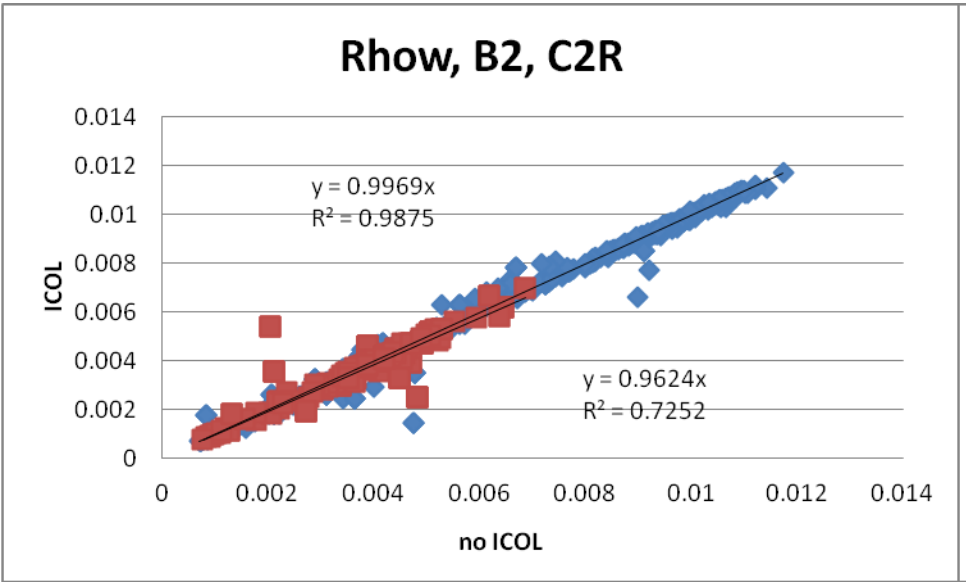


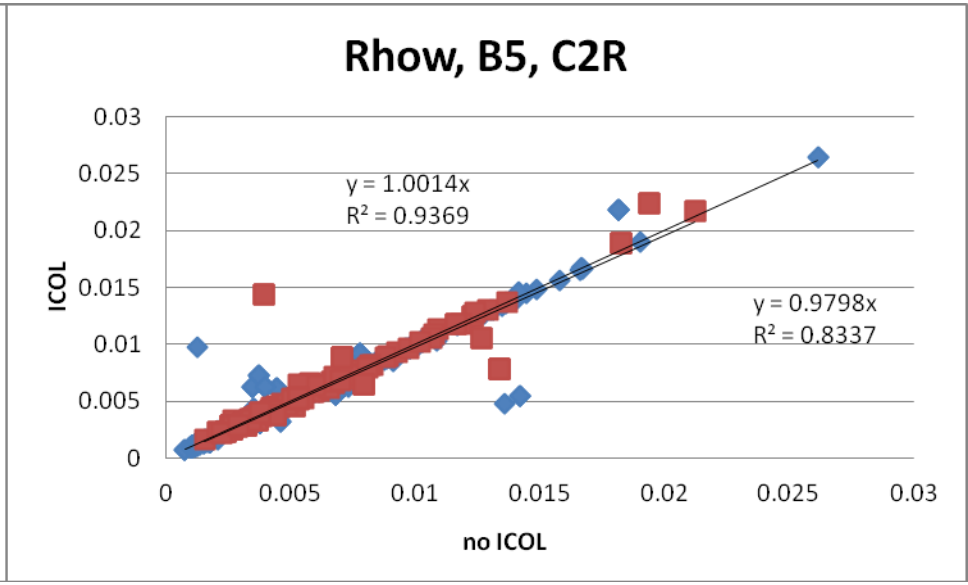
The C2R Angstroem



The land water contrast does not change much between B12 & B13=>α is stable

Water reflectance





- Very small impact

ICOL lambertian indicators

$< LF_R >= \tilde{LF} \otimes \tilde{W}_R$ » Land_AE_Ray

$< LF_a >= \tilde{LF} \otimes \tilde{W}_a$ » Land_AE_aer

$< CF_R >= \tilde{CF} \otimes \tilde{W}_R$ » Cloud_AE_Ray

$< CF_a >= \tilde{CF} \otimes \tilde{W}_a$ » Land_AE_Ray

$< LF_R >$	$< CF_R >$	$< LF_a >$	$< CF_a >$
0.044	0.011	0.028	0.004

Conclusion 2 on ICOL L2

- ICOL impacts on the L2 product
- Usefull to know if ICOL is needed for the validation, through:
  - Simple ICOL indicators
  - Analysis of L2

Main outlines

- Retrieval of the aerosol model: principle and illustration
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- Influence of ICOL on the L2 product
- ICOL at L2

Present status of ICOL

- If ICOL correctly models the AE
- If we can correctly retrieve the aerosols
- ICOL can made the atmospheric correction

ICOL to be done

- Need to use more accurate LUTs (the forward model)
- Need to implement and check a new algorithm

Acknowledgement

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