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Status and perpective for the validation of the MERIS 3rd reprocessing Level 2 products

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Documentation status for 3rd reprocessing

MERIS level 1 and Level 2 DPMs

RMD

ATBDs (incomplete)

Where?: Google !

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Outline of strategy followed after 2d reprocessing. Phase 1:

-calibration verification and adjustment (see vicarious adjustment ATBD)

-Validation of marine reflectances not too close to the coast (= when ICOL not needed)

Tool: MERMAID with marine reflectance matchups

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Issues encountered during Phase 1:

Necessity to realign marine reflectances provided by PI's with MERIS level 2 definition to avoid comparing apples and oranges (implemented in MERMAID)

Necessity to perform band-shift corrections for OC-AERONET data (implemented in MERMAID)

Necessity to take polarization into account in computing the sky dome reflection for above-water radiometry to ensure consistency with MERIS reflectance definition (being implemented in MERMAID)

Other issues encountered during Phase 1:

Absence of cheap convenient calibration facilities in Europe

Poor tilt corrections for irradiance sensors

Straylight issues for spectrometers

Instability of TRIOS irradiance sensor calibration

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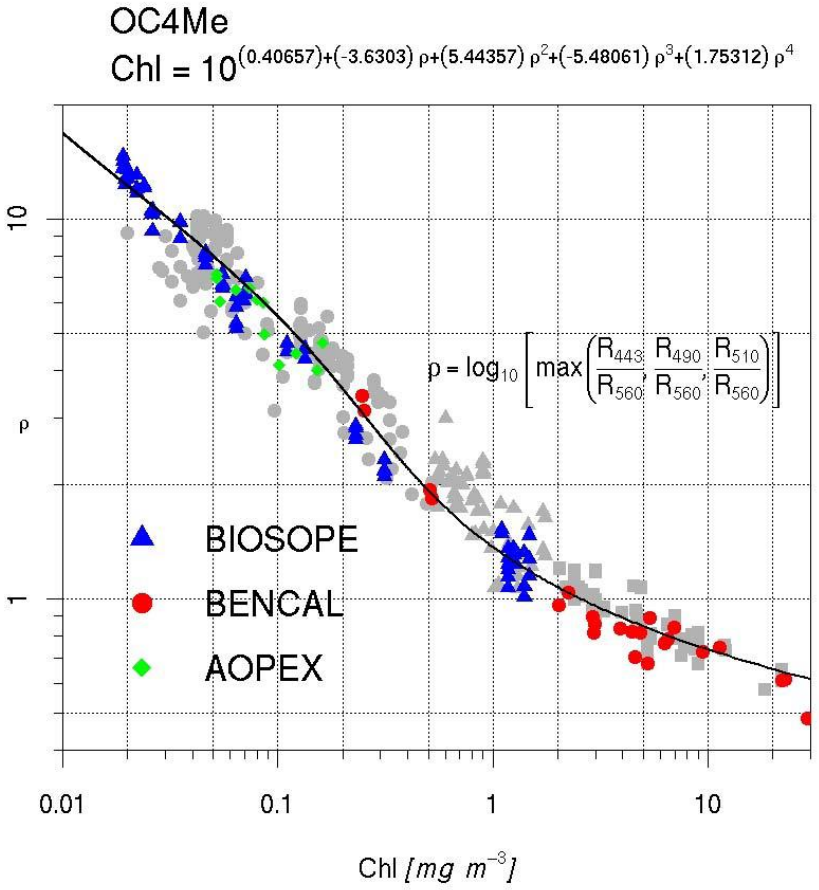

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From OC4Me

$dAPI1/API1 = (- 3.63 + 12.5r - 16.5\ r^2 + 7r^3)\log_{10}dr$

$r=\log_{10}[\max(R_{443}/R_{560}, R_{490}/R_{560}, R_{510}/R_{560})]$

$0.5 < r < 20$

log10dr can be estimated at about 0.01, which is compatible with MERMAID findings

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In plain words there is a 98% probability that

$0.5AP1 < Chla\_tot < 2AP1$,

To be compared to

API1 (mg m^{-3})	dAPI1/API1
0.03	0.5
0.2	0.05
20.	0.02

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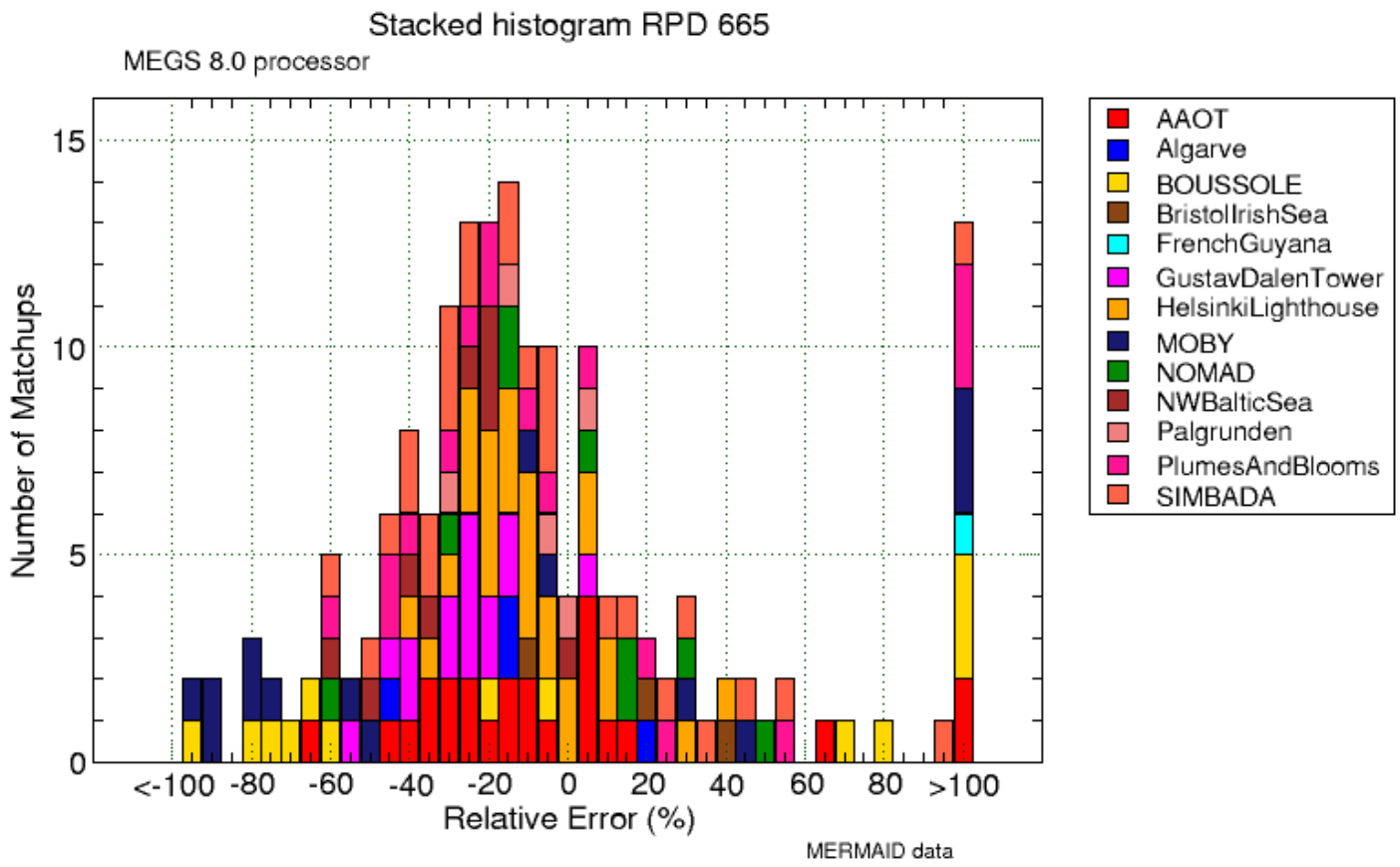

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Conclusion of Phase 1

Optical measurements protocols document finalized

Vicarious adjustments for the NIR and VIS documented

Accuracy of reflectances in the visible on target (<10%)

Uncertainties in API1 definition larger than error propagation in OC4ME.

Marine reflectances at 665 nm underestimated in coastal sites. [NB define coastal ☺]

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Phase 2: Sanity checks on Case2R NN Inversion.

Inversion is in terms of IOPs. According to RMD the three IOPs used in the bio-optical model are:

-Total scattering at 442 nm, assuming a ratio of backscattering to scattering of 0.02 and a slope of -0.4 *+white scatterer to model whitecaps*

-Total pigment absorption at 442 nm, indexing a series of 212 spectra from the North Sea and Skagerrak

- Yellow substance and bleached sediment absorption at 442 nm

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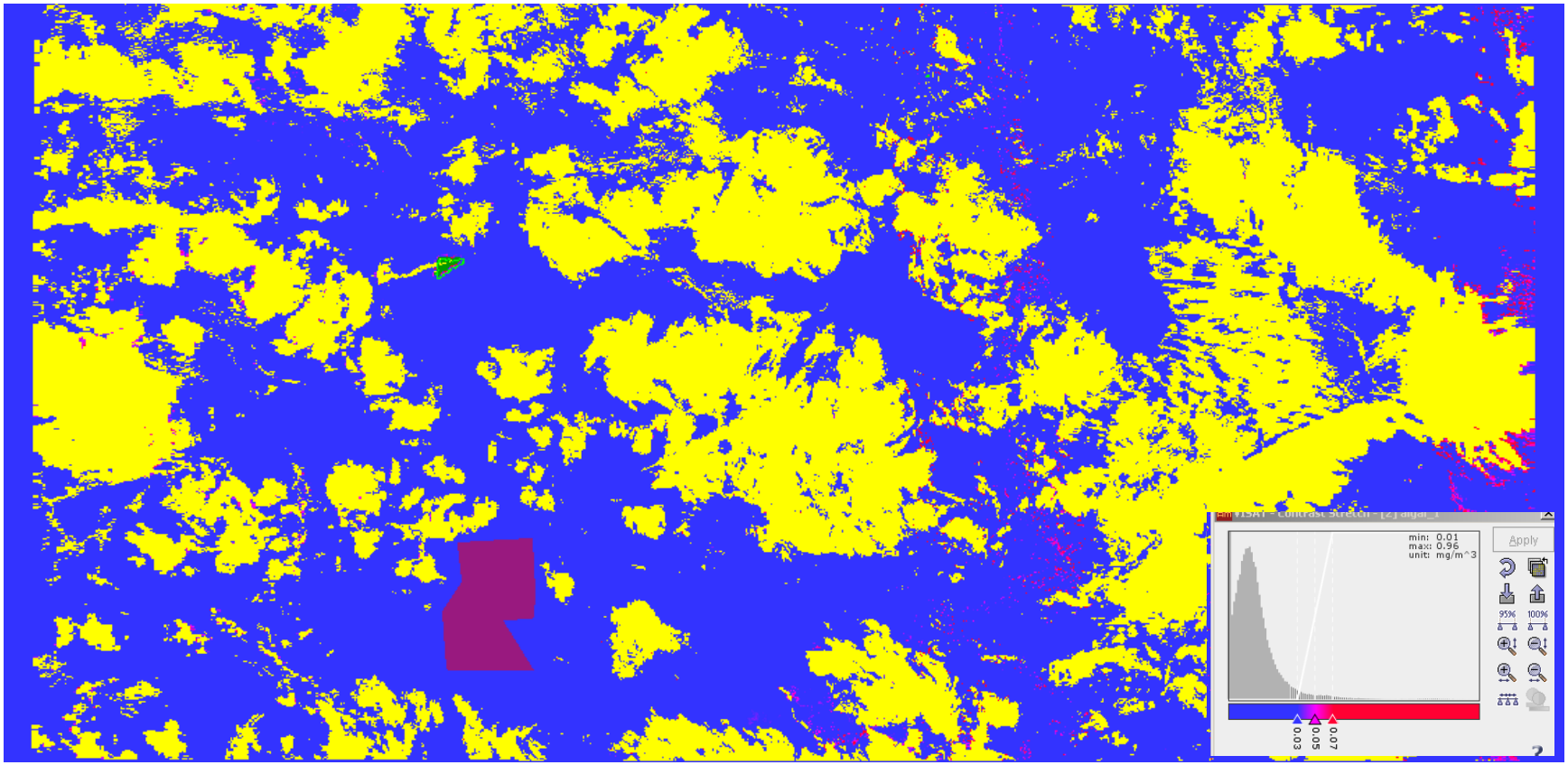

Easter Island 0.5/12/2003 AP1

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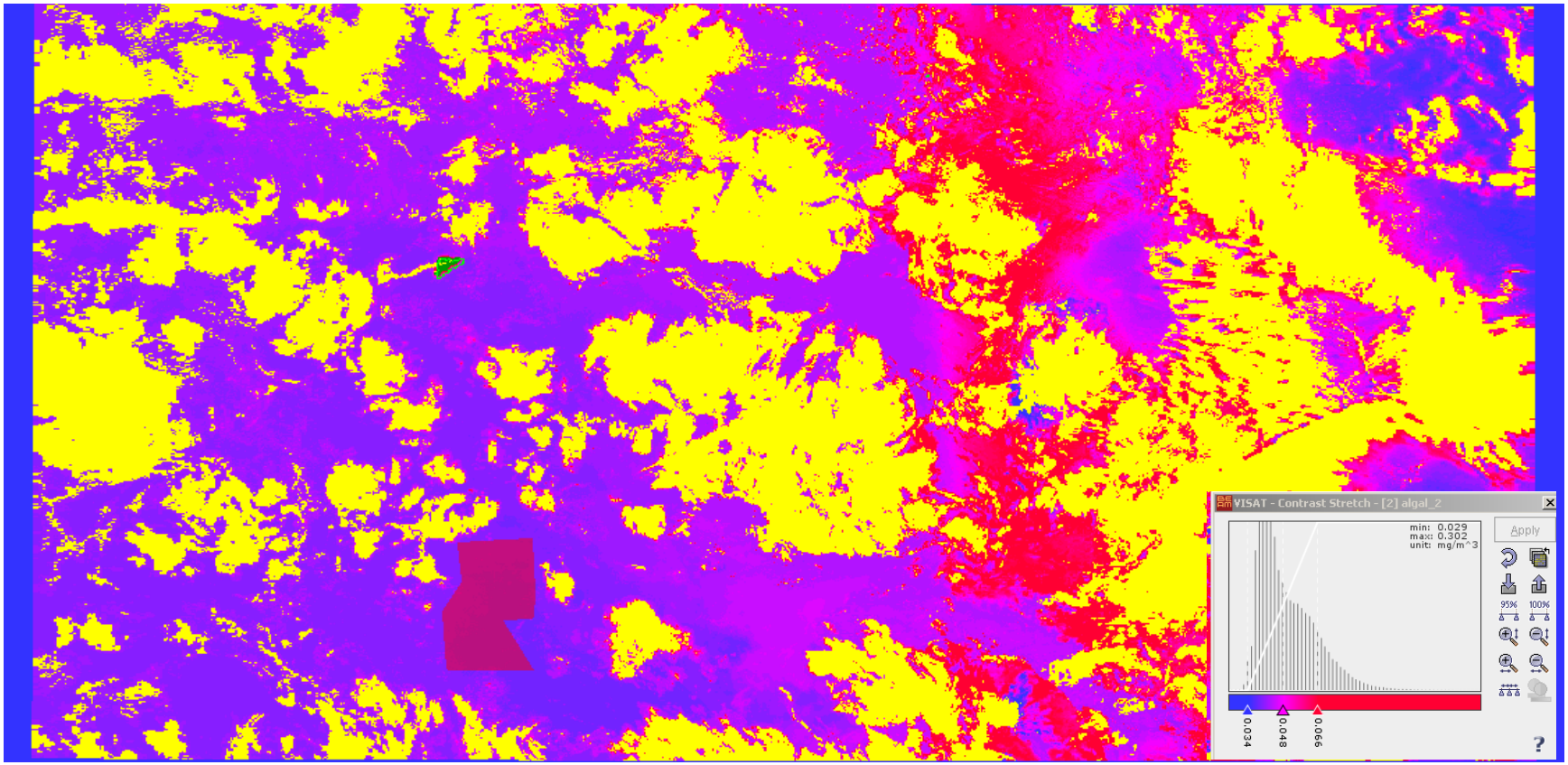
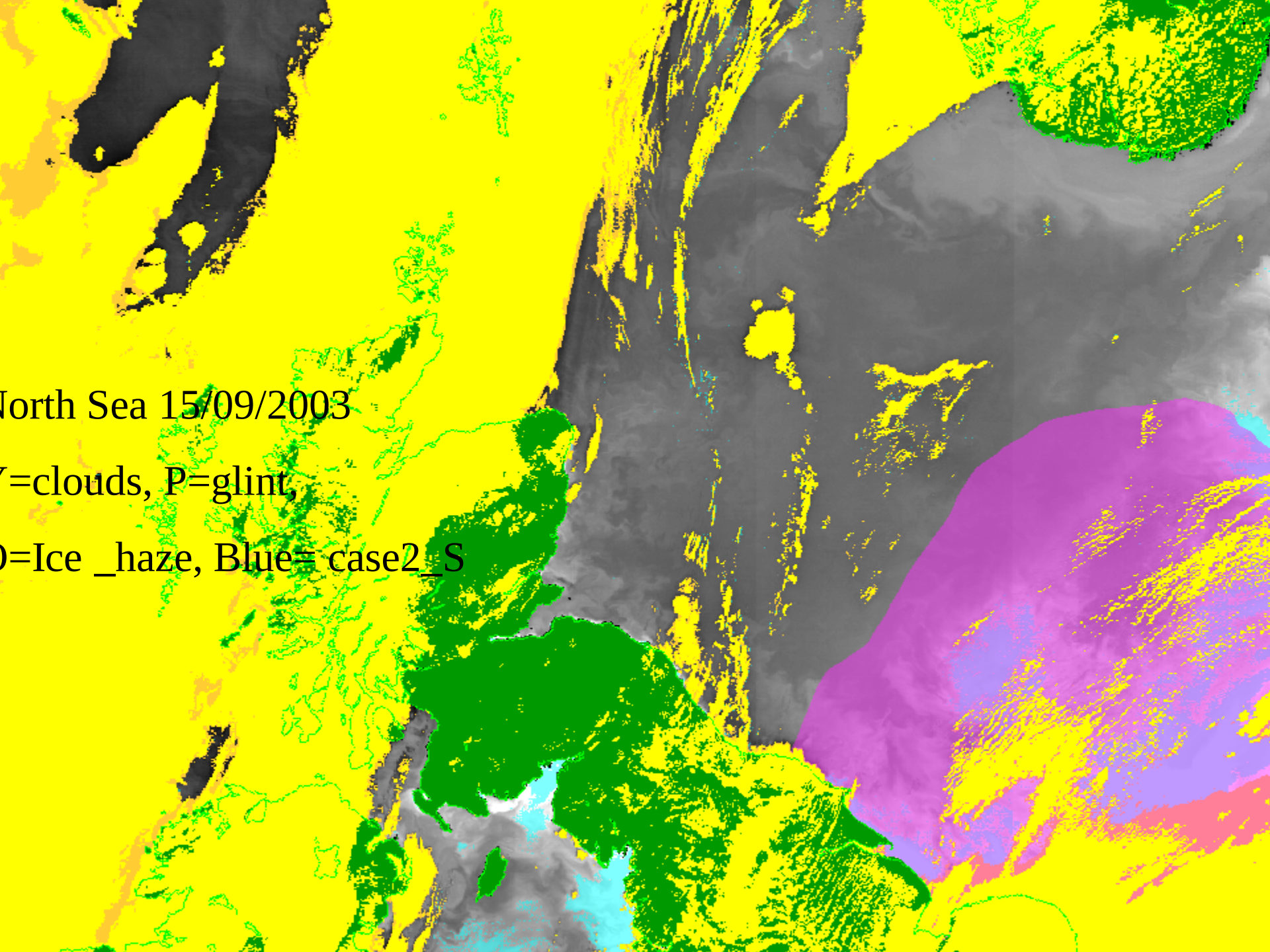


Easter island 05/12/2011 Chl2


North Sea 15/09/2003
Y=clouds, P=glint,
O=Ice _haze, Blue= case2_S

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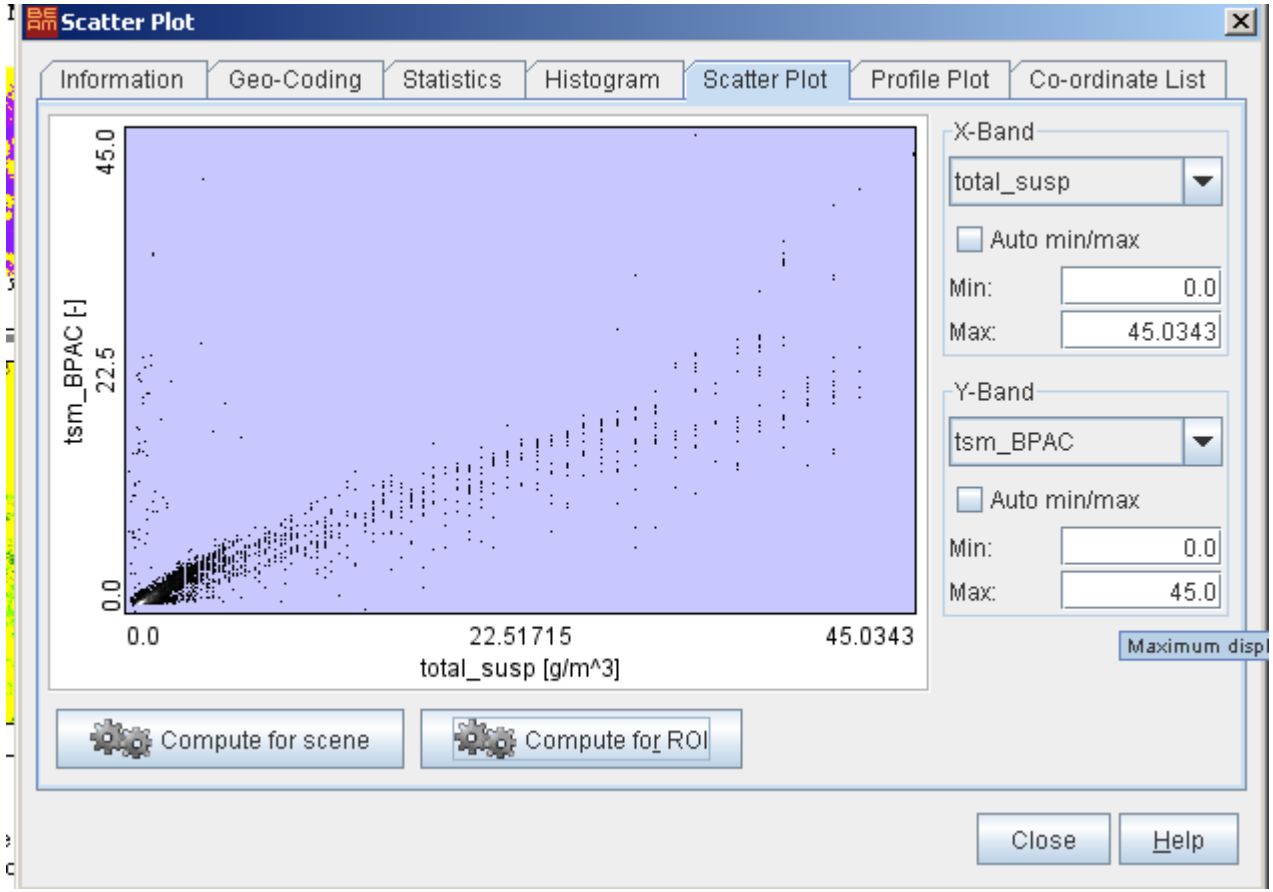

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Phase 2: Validation strategies for concentrations (ongoing)

- Comparison of MERMAID reflectances with NN reflectances in ODESA

-Inversion of reflectances into concentrations using NN trained on local bio-optical properties and comparison with MERIS images (Davide)

-Match-up database for concentrations: MERMAID upgrades (Chla_tot, Chla, TSM, IOPs, … Kathryn)

-Comparison with matchups from BioMap (JRC?)

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First conclusions of Phase 2

Chl2 concentrations saturate at 0.04 in oligotrophic waters

No quality flags for Case2 NN activated

Case2R NN behaviour in the glint problematic

Good agreement with BPAC in case2_S waters

No attempt to solve adjacency effects in Level2

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Issues encountered during phase 2

- Normalization of reflectances into match-up geometry (under evaluation in MERMAID). Easier that normalization of matchups to nadir view.

- Poor documentation of bioptical model for NN case2R

- Poor understanding of what Level 2 products are, leading to comparisons against nature.

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Chla_tot measured by HPLC = Chla_tot measured by spectrophotometry = API1

Chla_only measured by HPLC = Chl2

Protocols => Chla_tot_HPLC_NIVA not equal to Chla_tot_HPLC_JRC (see Kai & Elisabetta)

Chla_ fluorometry not acceptable for matchups