



Regional Algorithm Round Robin
("Coastcolour Round Robin", CCRR)
First results

Bouchra Nechad¹

Kevin Ruddick¹

&

The 7 Algorithm Providers!^{2, 3, 4, 5, 6, 7, 8}



¹ Management Unit of the North Sea Mathematical Models
Royal Belgian Institute for Natural Science



Overview

- **Objectives**
- **Datasets**
- **Method**
- **Results**
- **Conclusions**



Objectives

- **Regional Algorithm Round Robin / Intercomparison of algorithms**
 - Best algorithms and products for users specific regions
 - Long term: “possible” consensus algorithm for case 2 waters

- **First results of algorithm intercomparison**



Datasets

AP#	CHL	TSM	a_{CDOM}	Z_{FU}	a_{phy}	a_{ly}	a_{tot}	a_{nap}	b_{tot}	b_{bot}	Kd	Rrs	FLG
Matchups, in situ and simulated datasets, MERIS images													
02	Dataset2	1	443, 1	-	-	-	490, 2	-	-	443, 1 490, 2	490, 2	-	-
	Dataset3	1	443, 1	-	-	-	490, 2	-	-	443, 1 490, 2	490, 2	-	-
Algorithm Providers (AP#) datasets													
03	Dataset2	1	1	-	-	-	-	-	-	-	-	-	-
	Dataset3	1, 2	1	443, 1	-	-	-	-	-	-	-	-	Yes
04	Dataset2	1	-	-	S, 2	S, 2	S, 2	-	-	S, 2	-	-	-
	Dataset3	1	-	-	S, 2	S, 2	S, 2	-	-	S, 2	-	-	-
06	Dataset2	1	1	1	-	-	-	-	-	-	-	-	Yes
	Dataset3	1	M, 1	1	M, 1	-	M, 1	-	M, 1	-	-	-	Yes
In this presentation:													
13	Dataset2	-	-	-	-	-	-	-	-	-	-	M, 2	iter
	Dataset3	1	M, 1	443, 1	-	-	-	-	-	-	-	M, 2	iter
Simulated data (Dataset 3)													
14	Dataset2	1, 2	1, 2	443, 1	-	-	-	-	-	-	-	-	Yes
	Dataset3	1	1	M, 1	-	M, 1	X	M, 1	M, 1	M, 1	-	-	Yes
15	Dataset2	-	-	M, 1, 2	1, 2	M, 1, 2	X	M, 1, 2	-	-	-	M, 1, 2	-
	Dataset3	-	-	M, 1, 2, 3	1, 2, 3	M, 1, 2, 3	X	M, 1, 2, 3	-	-	-	M, 1, 2, 3	-



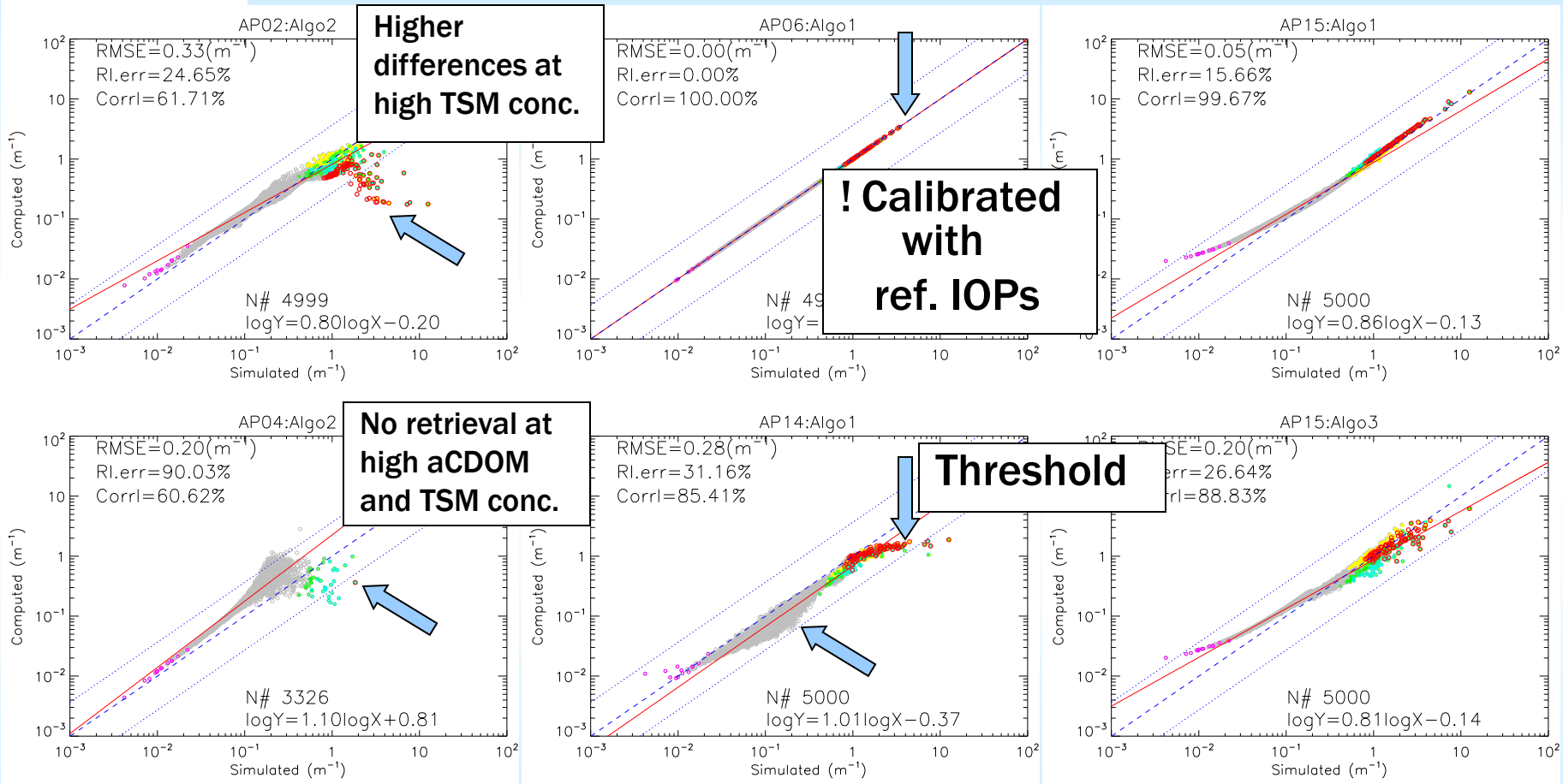
Method

- **AP# results against simulated and in situ (=reference) data**
- **“Performance of retrieval” (PR):**
 - RMSE, relative errors and correlation
 - Number of valid results
- **Dataset 3:**
 - PR of IOPs (when available)
 - PR of concentrations (when available)
 - Cross-parameters relationships (e.g. reference IOPs versus AP-CHL)
- **Dataset 2:**
 - PR of CHL and TSM



Results (1/3) Total absorption

$a_{tot}(490nm)$



Cyan: $a_{phy}^*(443) \leq 0.008 m^2 g^{-1}$
 Pink $a_{phy}^*(443) > 0.08 m^2 g^{-1}$

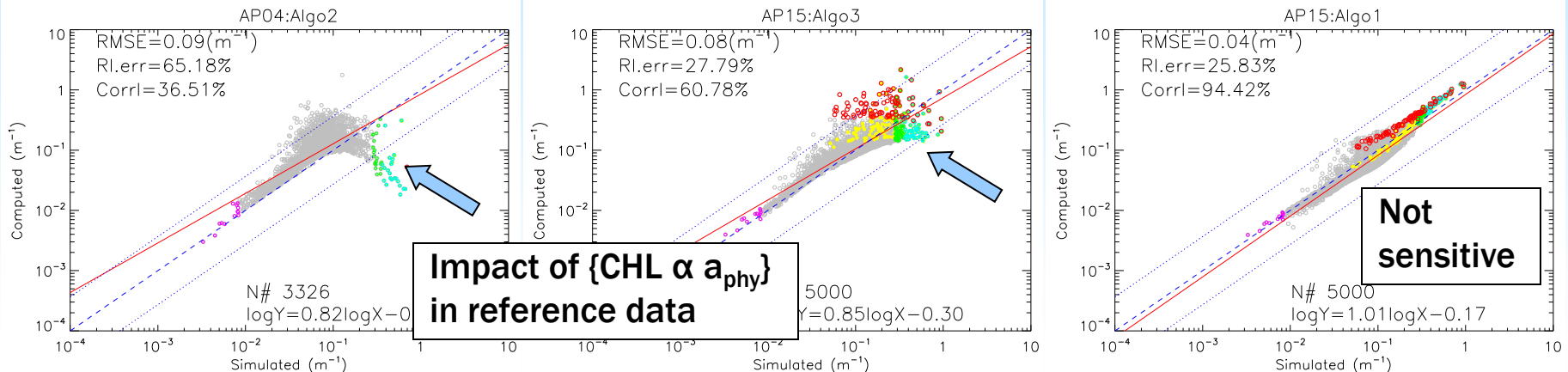
Red: TSM > 30 g m⁻³

Green: CHL > 30 mg m⁻³

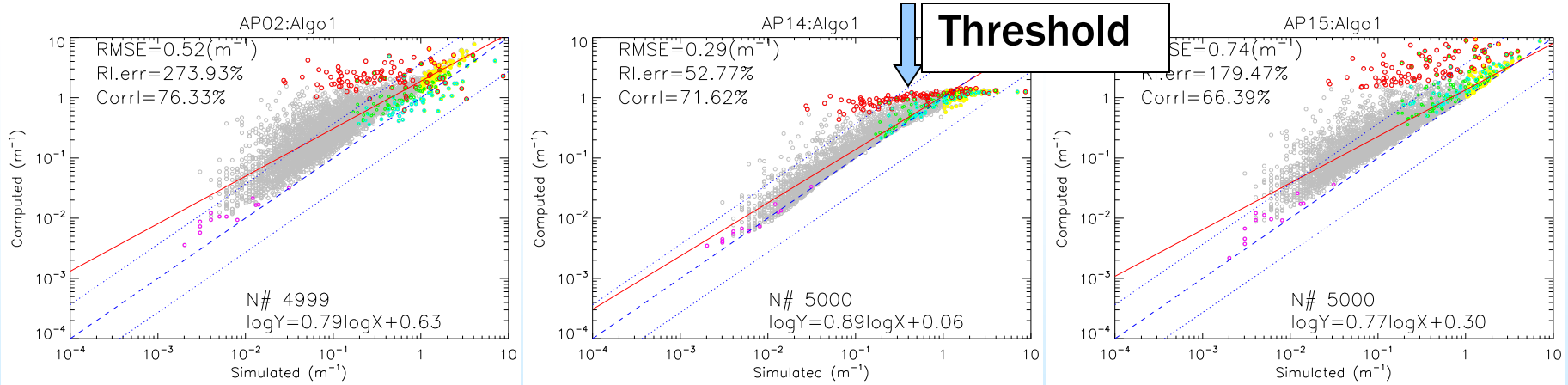
Yellow: $a_{CDOM}(443) > 1 m^{-1}$



$a_{phy}(490nm)$ Results (2/3) Pigment & CDOM absorption



$a_{CDOM}(443nm)$



Cyan: $a_{phy}^*(443) \leq 0.008 m^2 g^{-1}$
 Pink $a_{phy}^*(443) > 0.08 m^2 g^{-1}$

Red: TSM > 30 g m⁻³

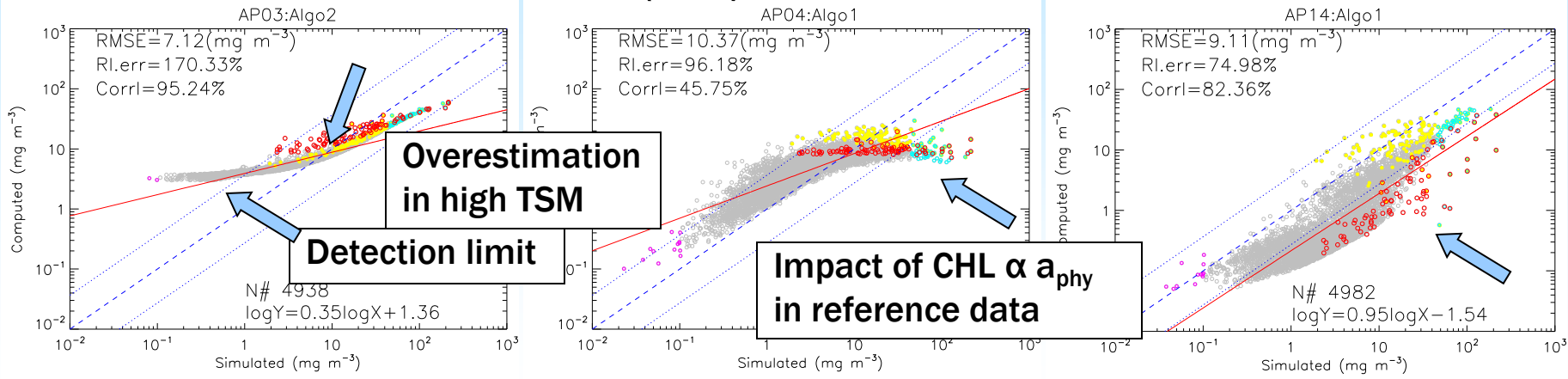
Green: CHL > 30 mg m⁻³

Yellow: $a_{CDOM}(443) > 1 m^{-1}$

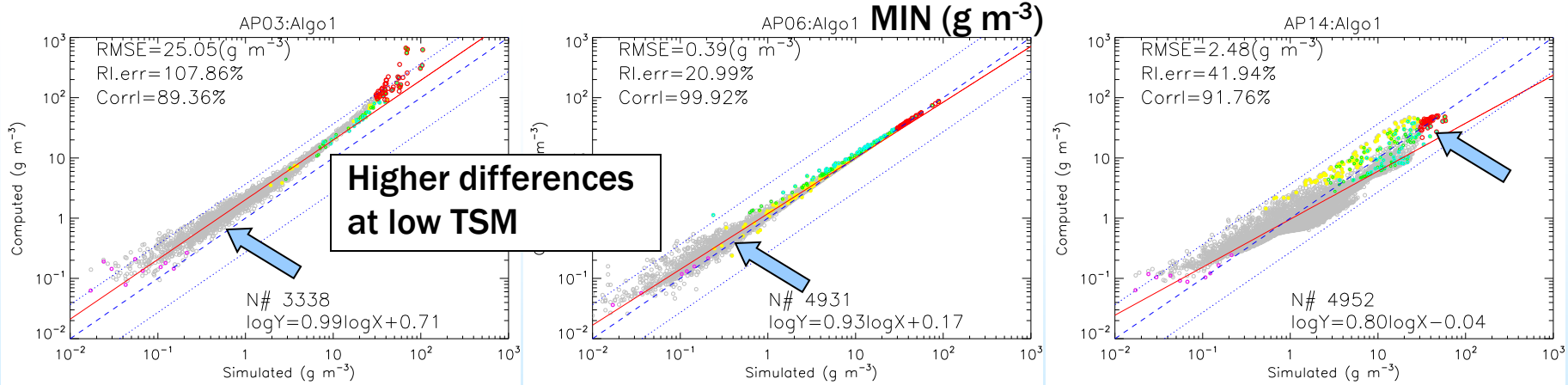


CHL (mg m^{-3})

Results (3/3) Concentrations



TSM (g m^{-3})



Cyan: $a_{\text{phy}}^*(443) \leq 0.008 \text{m}^2 \text{g}^{-1}$
 Pink $a_{\text{phy}}^*(443) > 0.08 \text{m}^2 \text{g}^{-1}$

Red: TSM > 30 g m^{-3}

Green: CHL > 30 mg m^{-3}

Yellow: $a_{\text{CDOM}}(443) > 1 \text{m}^{-1}$

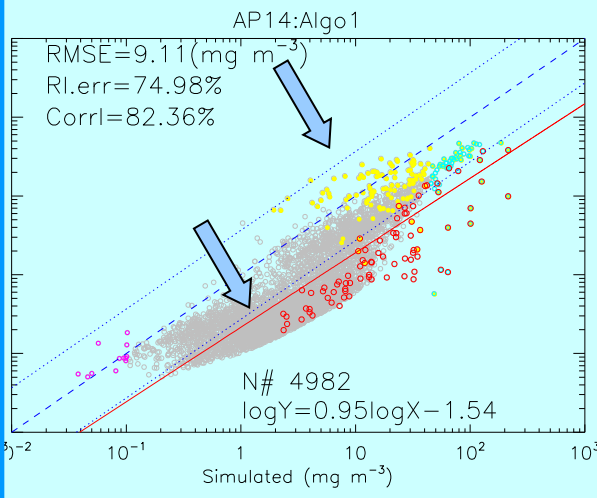
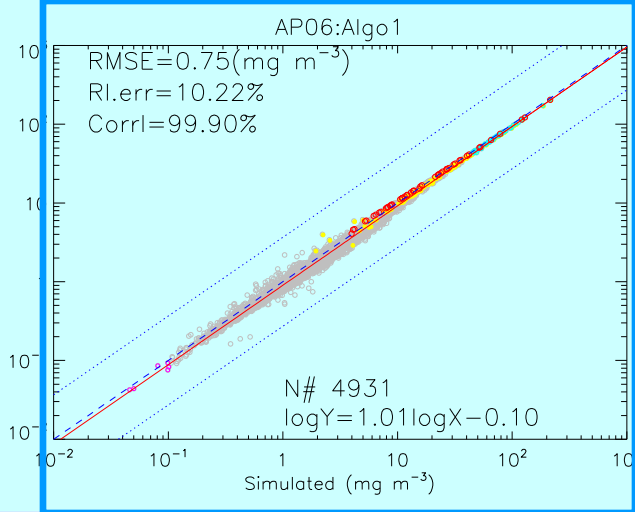
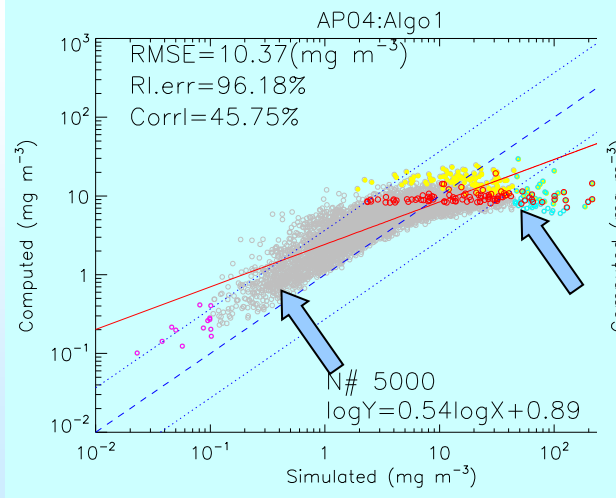
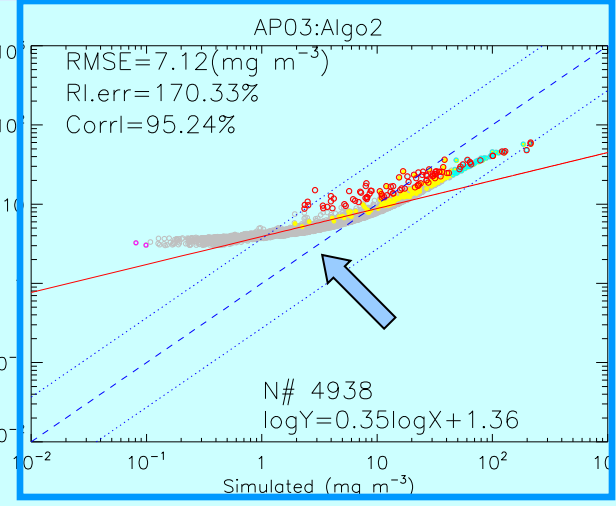
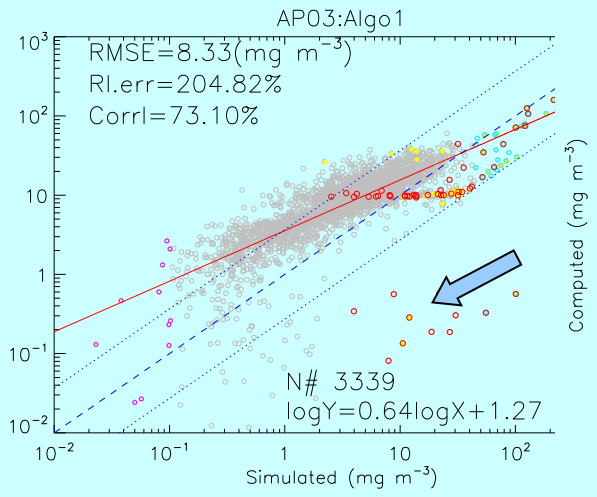
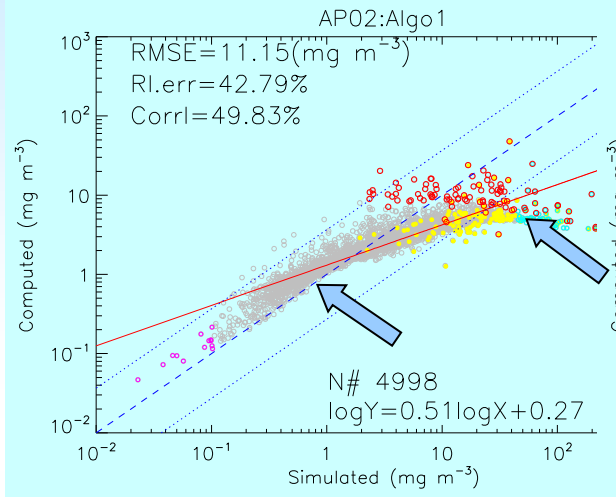


- Indonesia
- Mediterranean
- Oregon
- Benguela
- Gulf of Mexico
- North Sea(MUMM)
- North Sea(GKSS)

Total=346 data

Results (1/2) CHL

CHL (mg m⁻³)

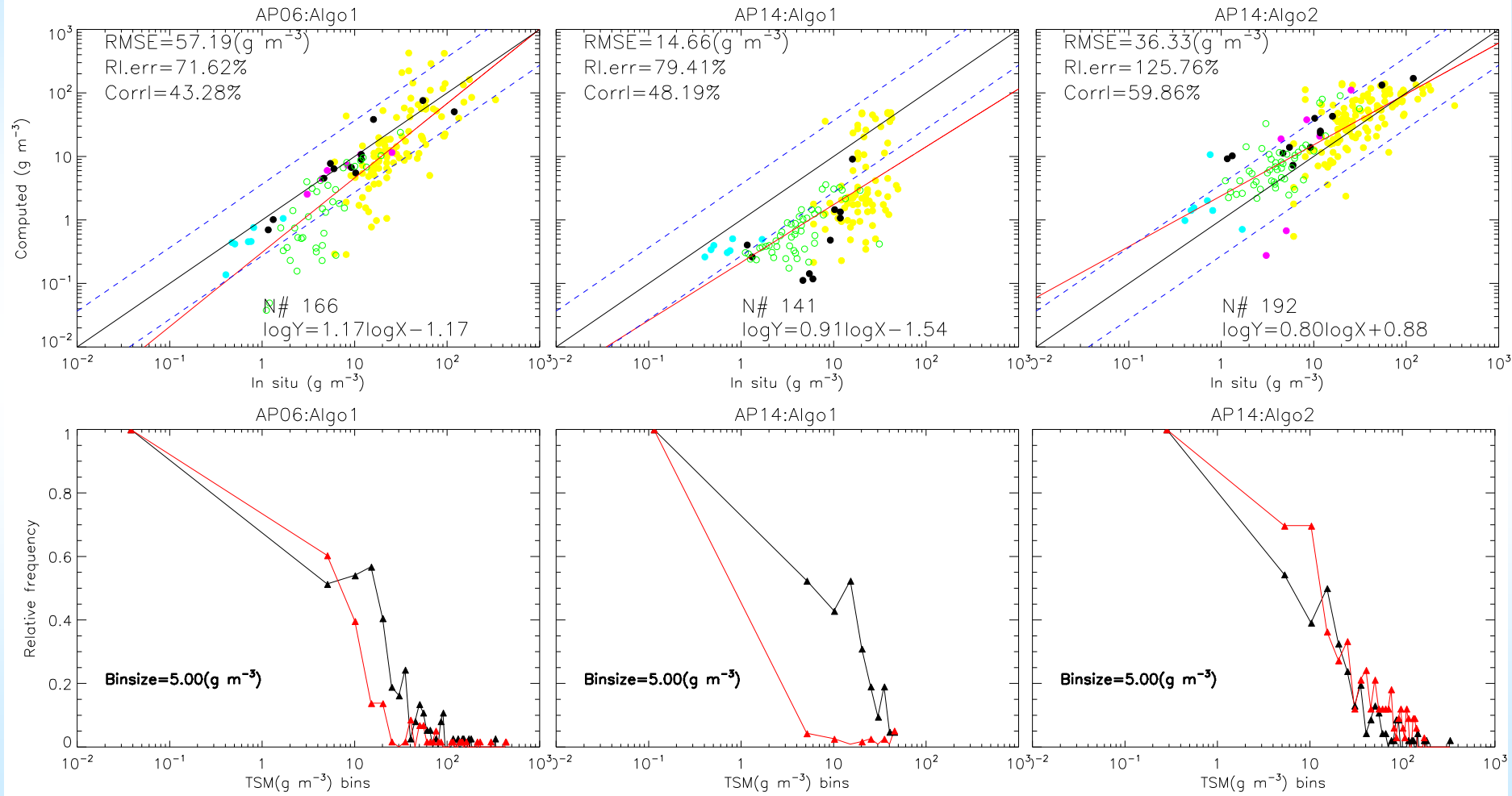


- Indonesia
- Mediterranean
- Oregon
- Benguela
- Gulf of Mexico
- North Sea(MUMM)
- North Sea(GKSS)

Total=192 data

Results (2/2) TSM

TSM (g m⁻³)



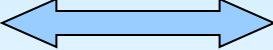
Conclusions (1/2)

PARAM	AP06 AP13	AP06 AP13	AP06 AP13
a_{tot}			
a_{phy}			
a_{CDOM}			
CHL			
TSM/MIN	AP06 AP13	AP06 AP13	AP06 AP13

BUT WHY?
CCRR ... Workshop
on Friday!



Conclusions (2/2)

- Algorithm design  Performance
- For discussion with APs:
 - Specific IOPs and algorithm calibration
 - Algorithm performance as function of concentration range/region?
 - Automatic quality flagging
 - Underlying reflectance model
- ... CCRR report and publication(s)
- **Big THANKS** to CCRR in situ reflectance (709nm band!) Data Providers
 - Dr. Yu-Hwan Ahn
 - Dr. Jim Gower
 - Dr. Mark Dowell
 - Dr. Stewart Bernard
 - Dr. Zhonping Lee
 - Dr. Bryan Franz
 - Dr. Thomas Schroeder and Dr. Arnold Dekker

