# Status of the Ocean-Colour Algorithm working Group

ZPL on behalf the OCAG

January 15 – 17, 2004. Hyderabad, India.

# Outline:

1. The synthesized dataset

2. Preliminary results of some inversion algorithms

3. Next

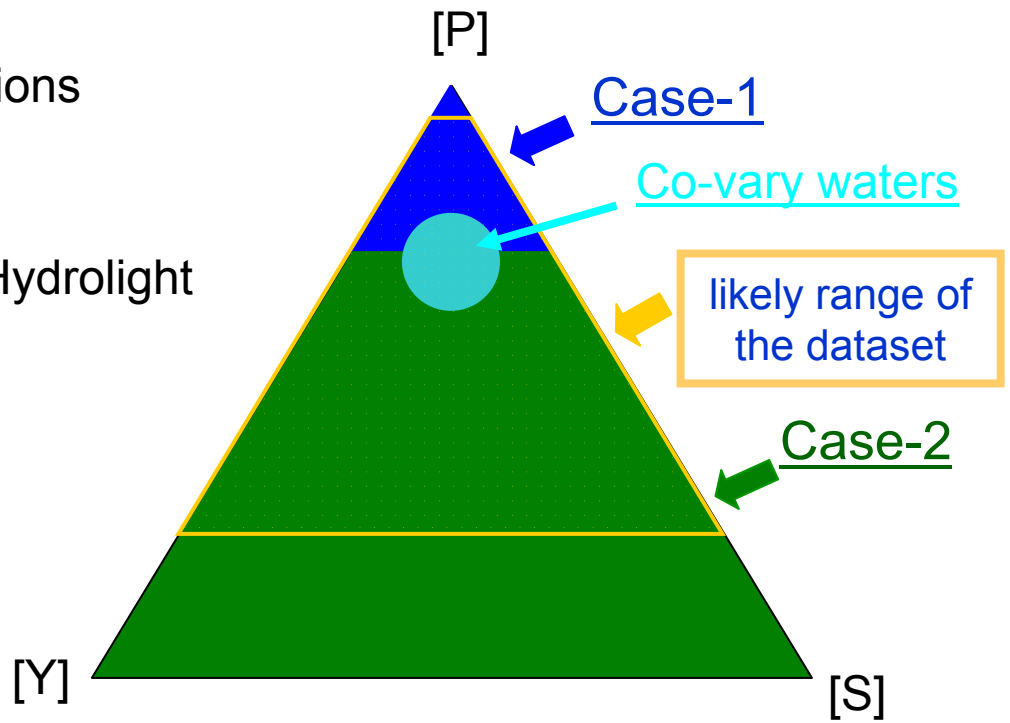
# 1. Some characteristics of the synthesized dataset

a. It includes Case-1 and Non-Case-1

b. Closely follow natural variations

c. Wide dynamic range

d. AOPs are simulated using Hydrolight



# 1. Some characteristics of the synthesized IOPs

Generally,

$$a(\lambda) = a_{\mathrm{w}}(\lambda) + a_{ph}(\lambda) + a_{dm}(\lambda) + a_{\mathrm{g}}(\lambda)$$

$$bb(\lambda) = bb_{\mathrm{w}}(\lambda) + bb_{\mathrm{ph}}(\lambda) + bb_{dm}(\lambda)$$

**Four-components** to model $a$.
**Three-components** to model *bb*.
**Independent phase functions** for water, phytoplankton, and detritus/mineral scatterings.

All components vary independently, but in a range selected by the group.

**So, for a low $a_{\mathrm{ph}}$, no extremly large $a_{\mathrm{g}}$ or $a_{\mathrm{dm}}$. Or, for a large $a_{\mathrm{ph}}$, no extremely low $a_{\mathrm{g}}$ or $a_{\mathrm{dm}}$.**

# 1. Characteristics continue:

$$a_{ph}(\lambda) = a_{ph}(440)\, a^{+}_{ph}(\lambda)$$

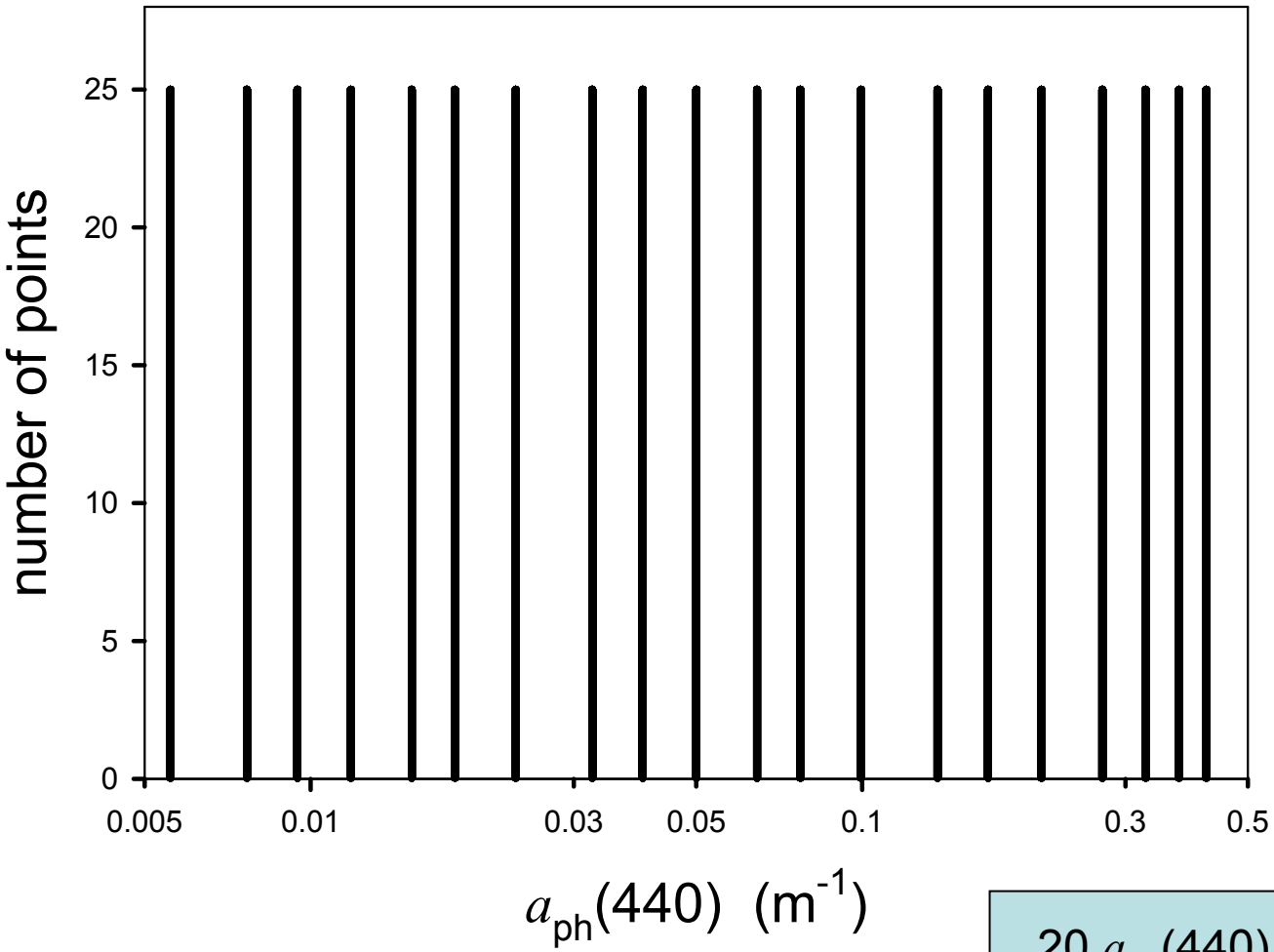
$$a_{dm}(\lambda) = a_{dm}(440)\exp(-S_{dm}(\lambda - 440))$$

$$a_{g}(\lambda) = a_{g}(440)\exp(-S_{g}(\lambda - 440))$$

variables

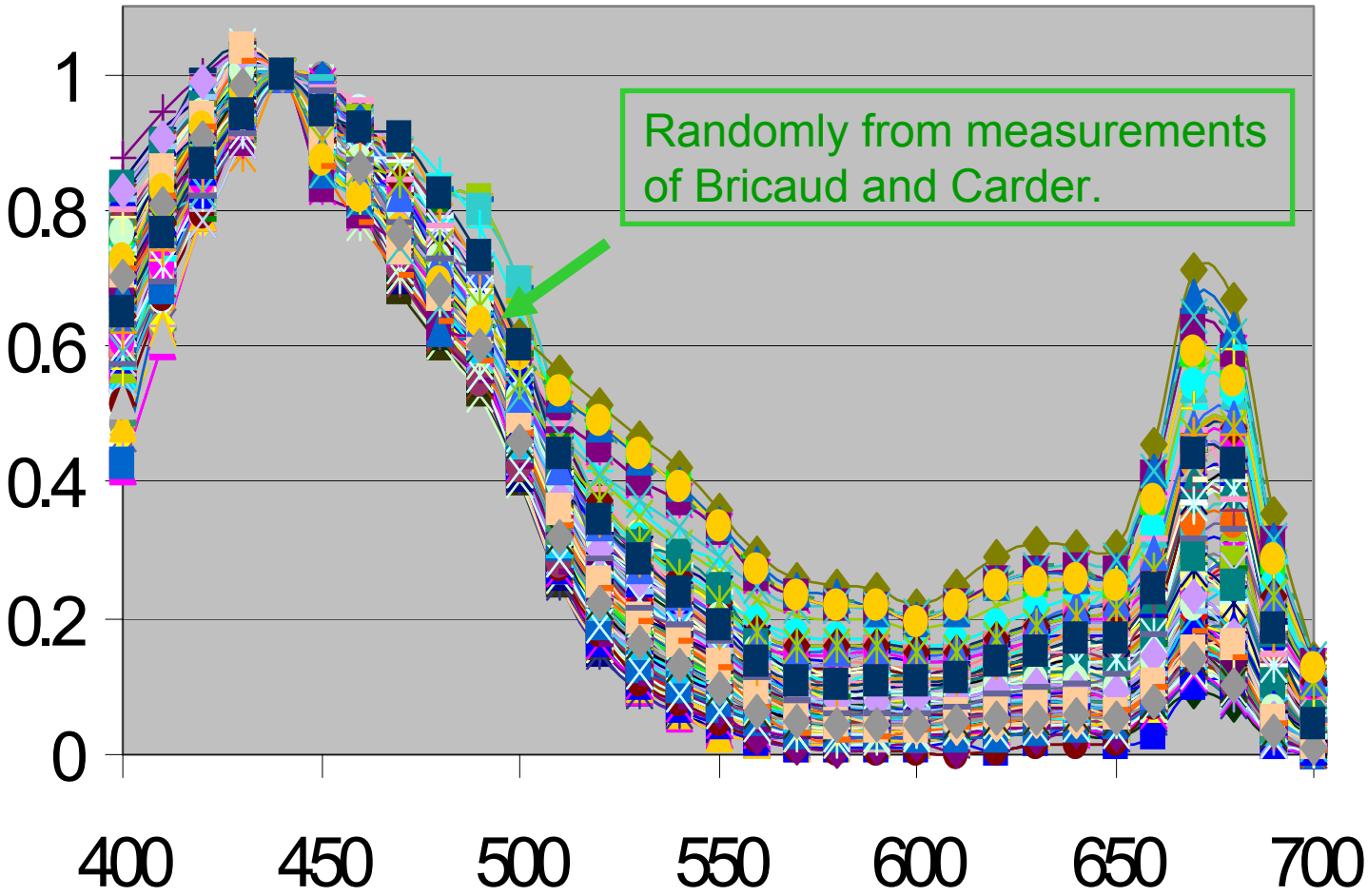
# 1. Characteristics continue:

$a_{ph}(440)$



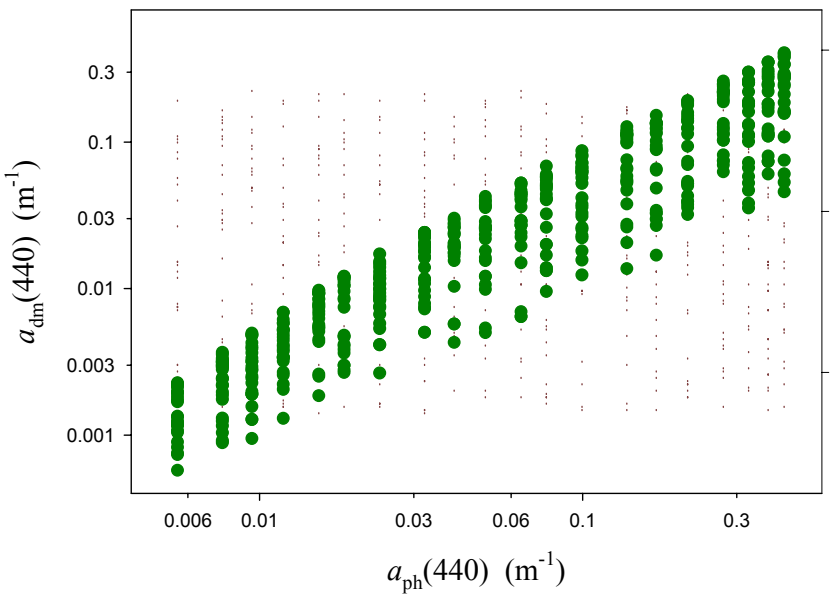

20 $a_{ph}(440)$ steps

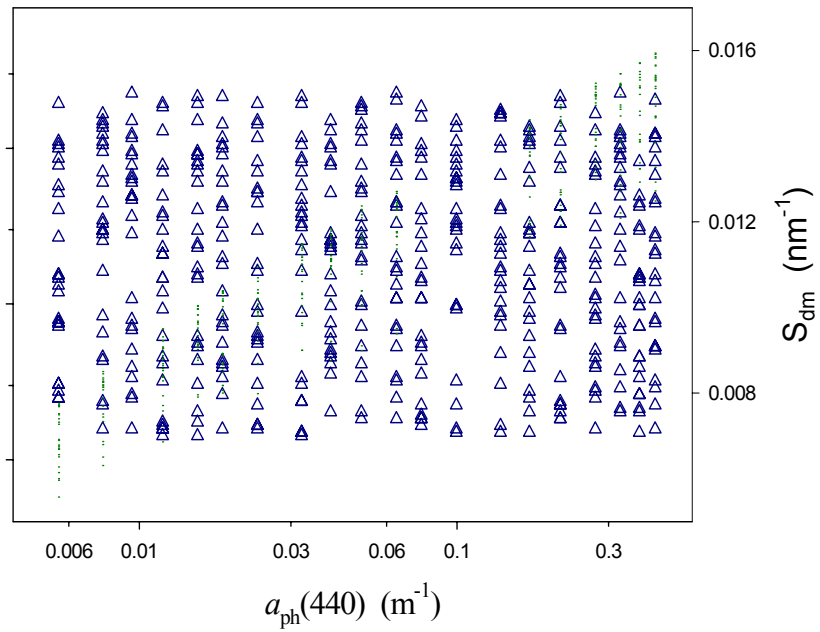
# Examples of $a^{+}_{ph}(\lambda)$



# 1. Characteristics continue:

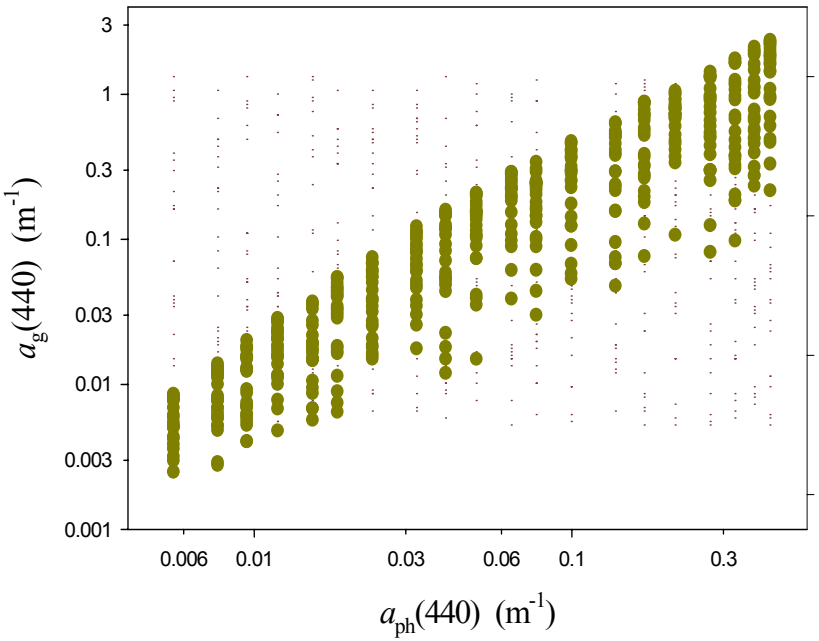
## $a_{dm}(440)$ and $S_{dm}$

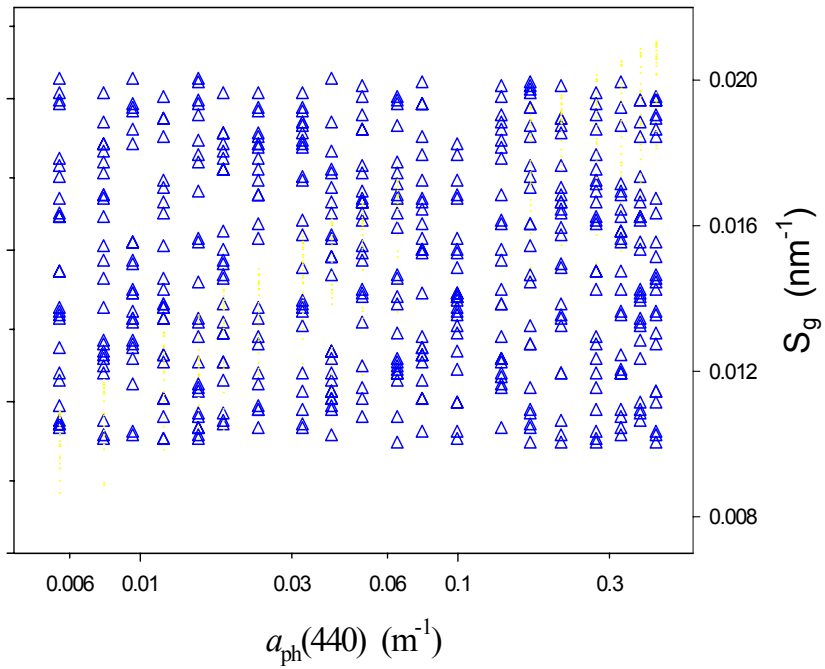


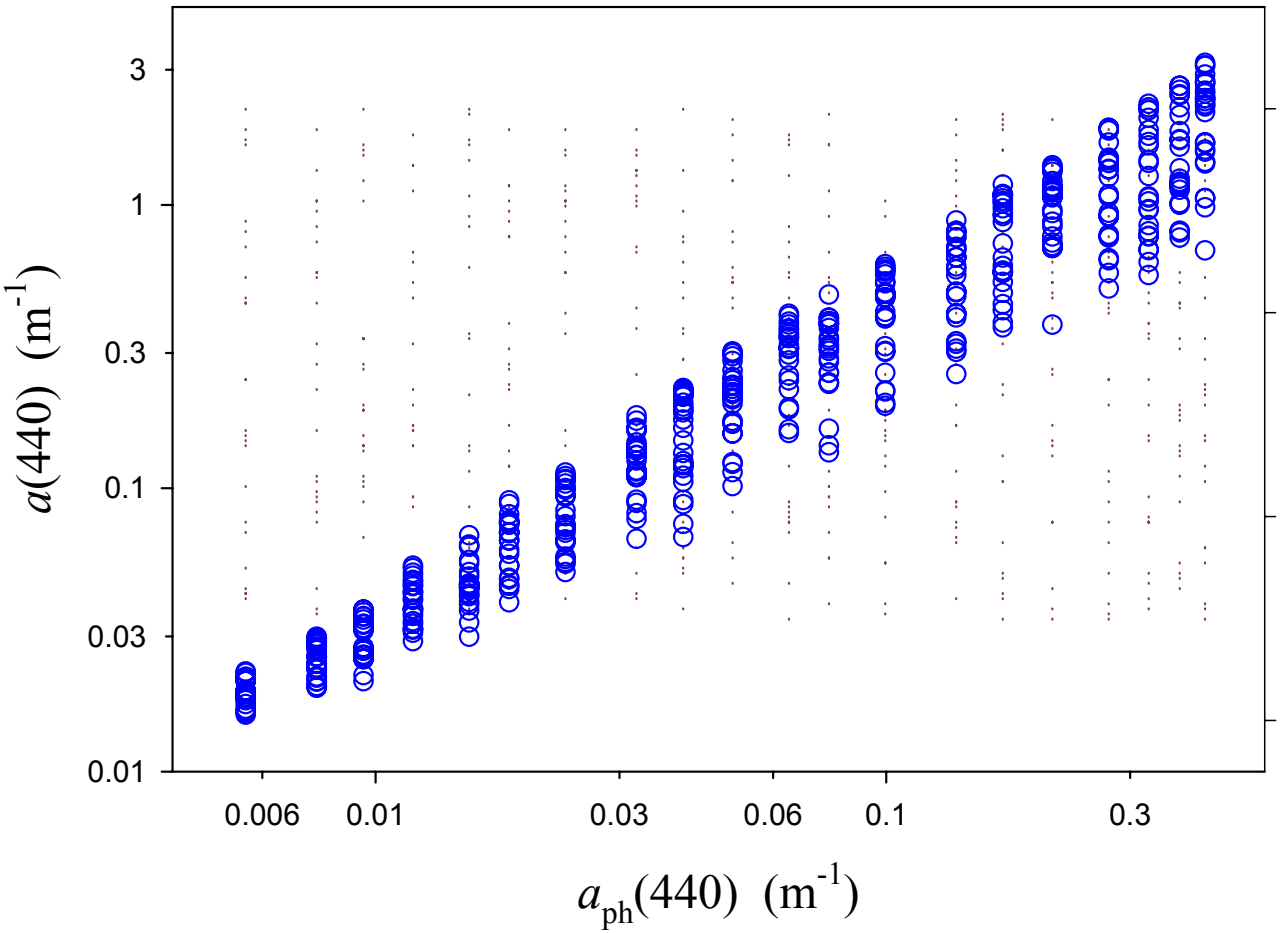
# 1. Characteristics continue:

$a_g(440)$ and $S_g$

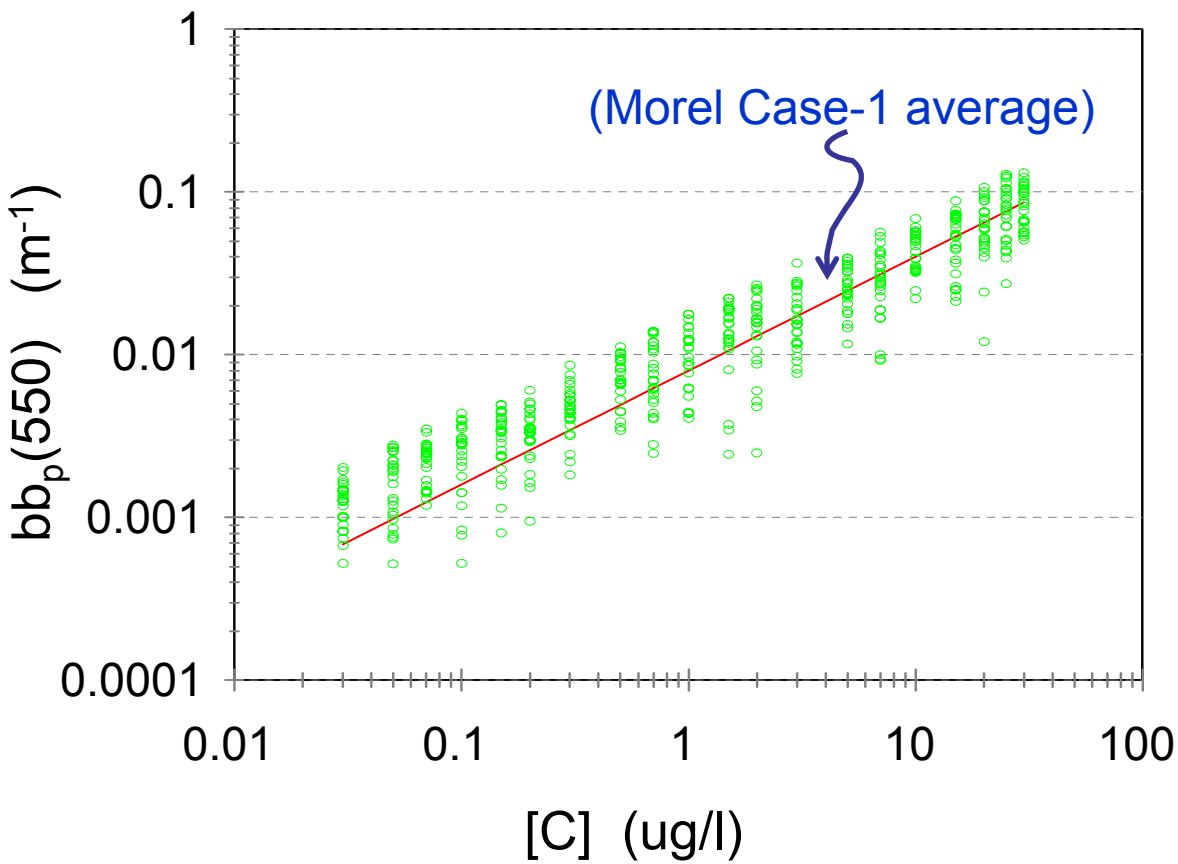


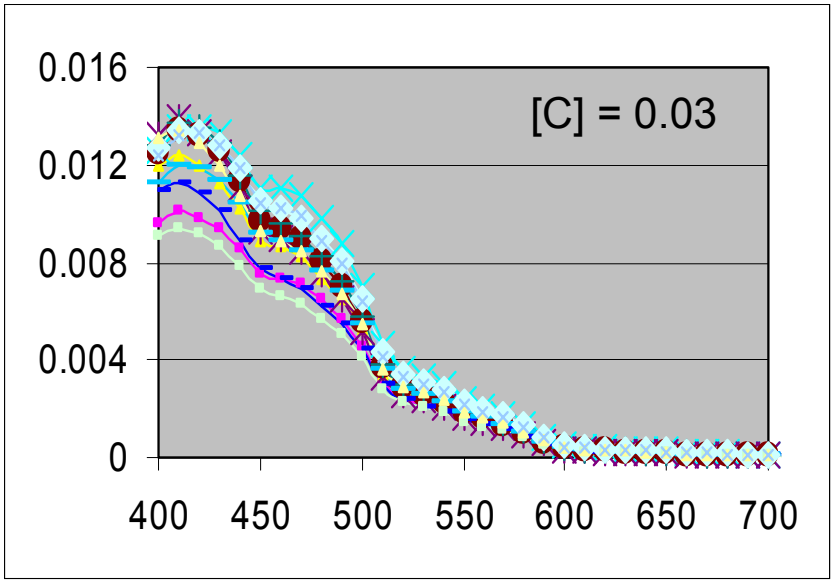
# 1. Characteristics continue:

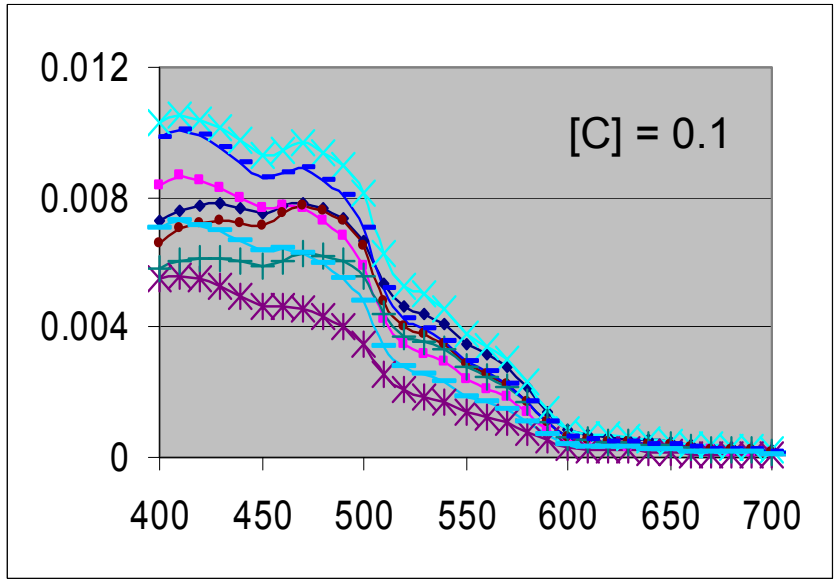


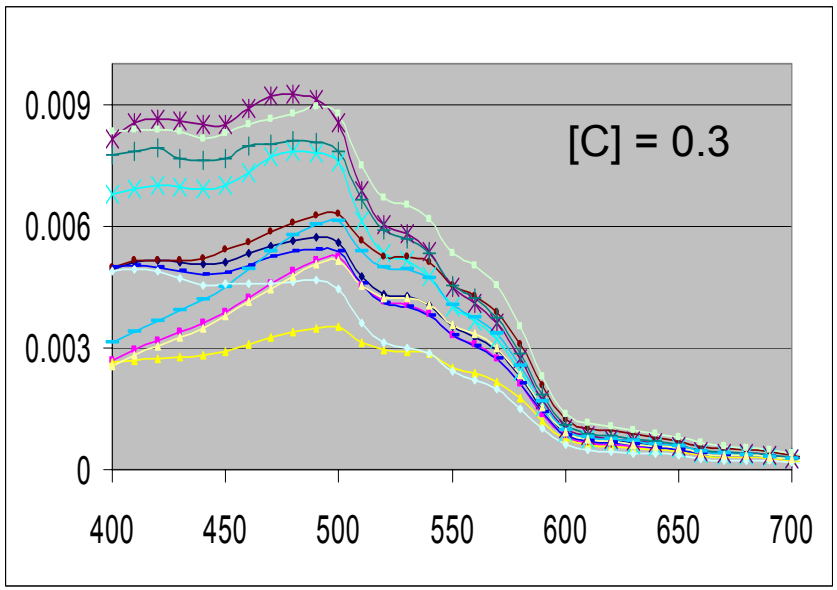
# 1. Characteristics continue:

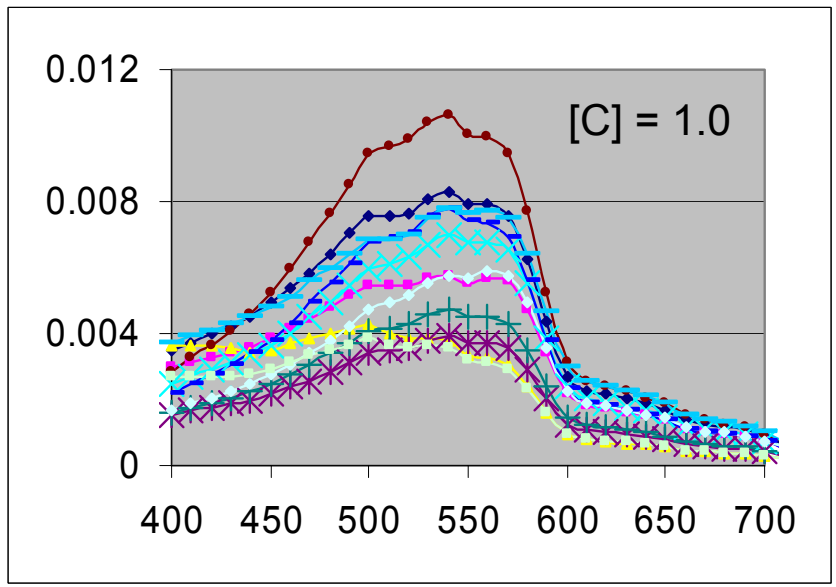


# Examples of simulated $R_{rs}(\lambda)$



# 2. Preliminary results of some inversion algorithms

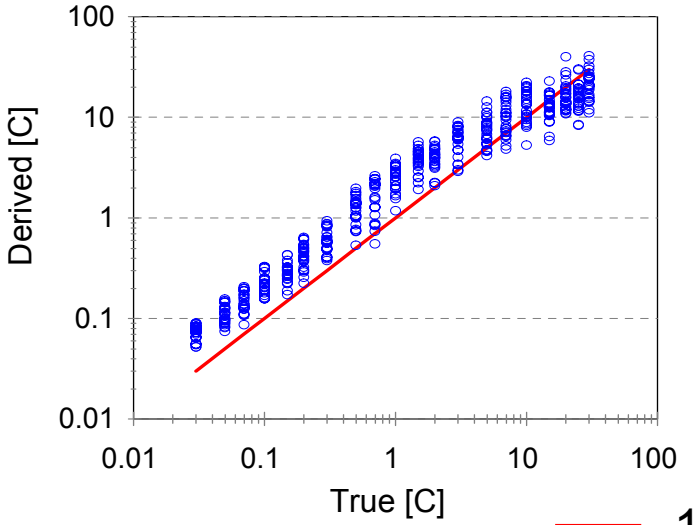
- A. Empirical algorithm
- B. Carder model-based algorithm
- C. Hoge/Lyon model-based algorithm
- D. Loisel model-based algorithm
- E. Lee model-based algorithm
- F. Maritorena model-based algorithm
- G. Lee model-based algorithm (optimization)
- H. Boss model-based algorithm
- I. Doerffer Neural-Net algorithm

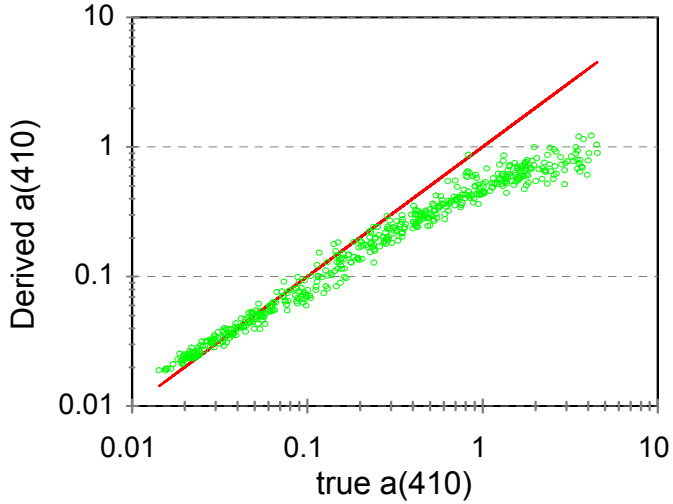
(NOT a fair comparison yet!)

# A. Empirical algorithm [SeaWiFS & Morel/Maritorena 2001]

**Approach**: OC4v4→[C]→K→a

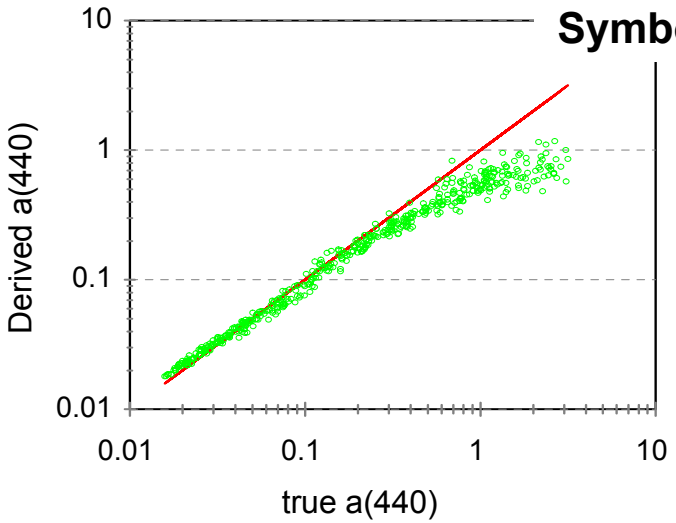
**Input**: Rrs(440, 490, 510, 555)

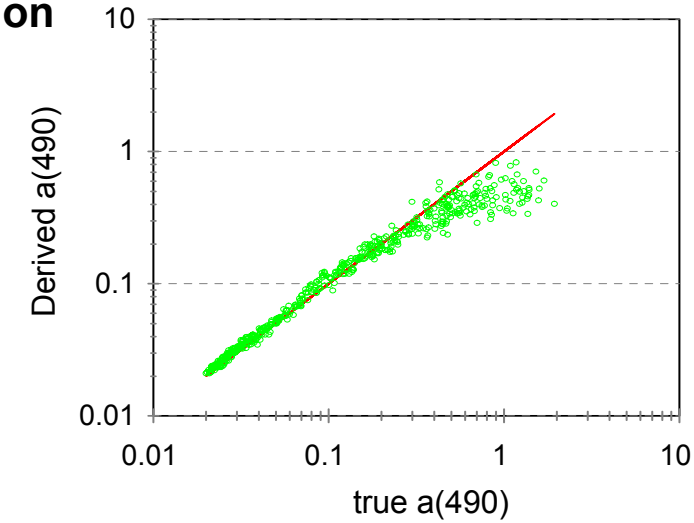



1:1

**Symbol: inversion**

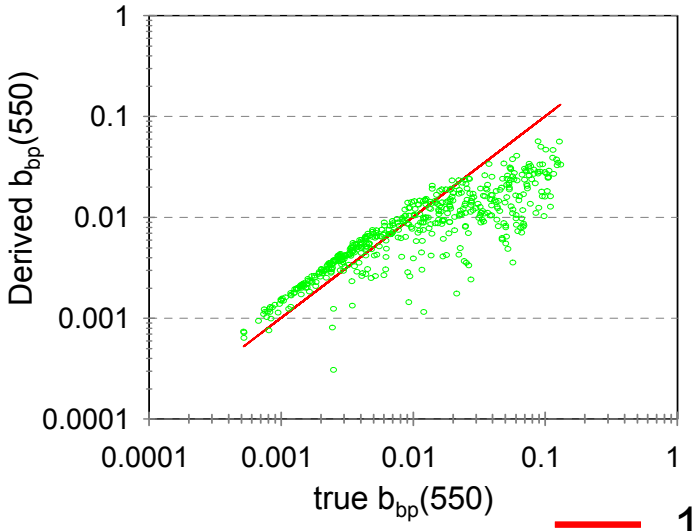


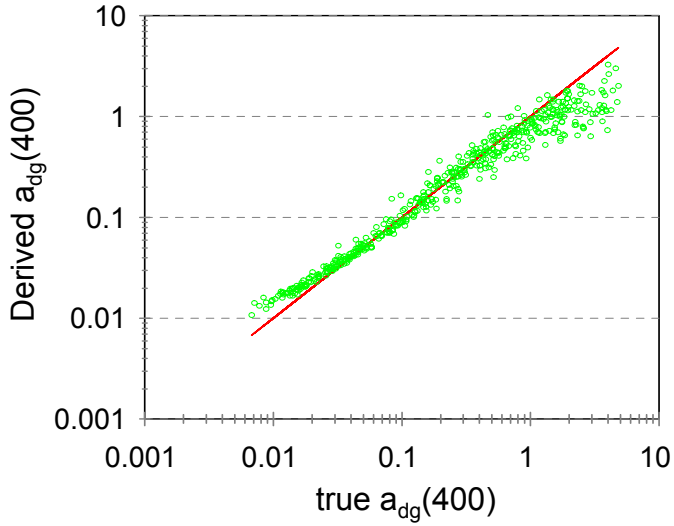



# B. Carder [1999] model-based algorithm

**Approach**: Rrs → a&$b_b$

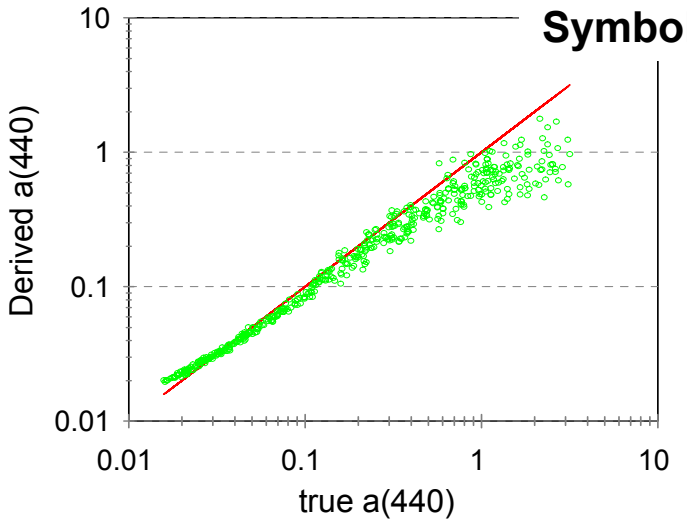
**Input**: Rrs(410, 440, 550)

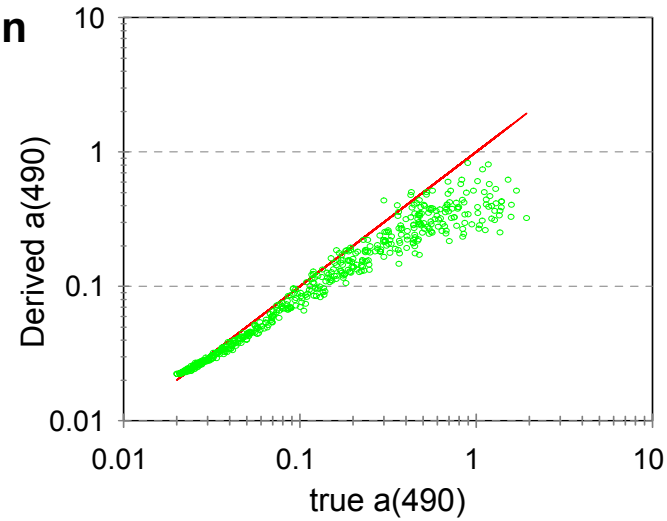



1:1

**Symbol: inversion**

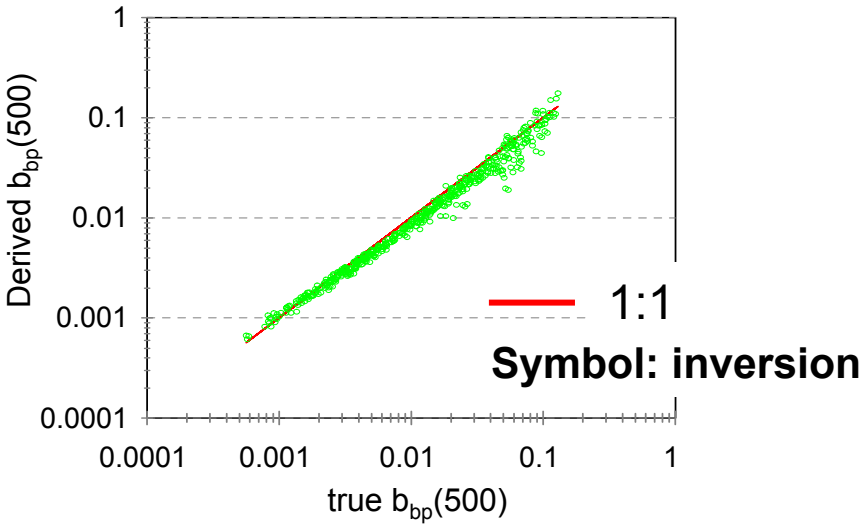


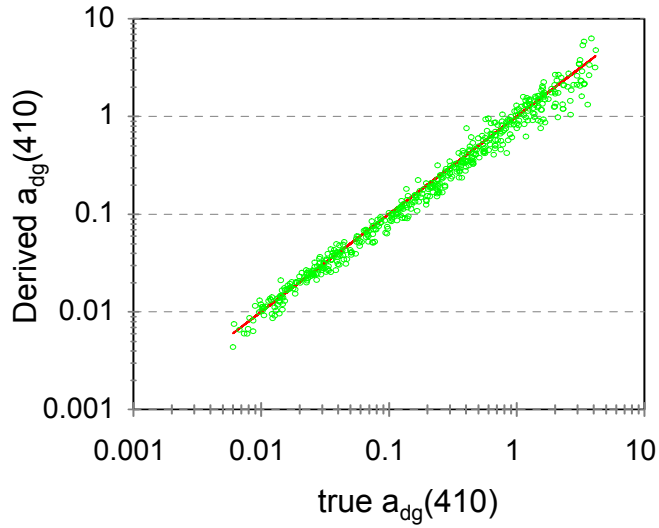



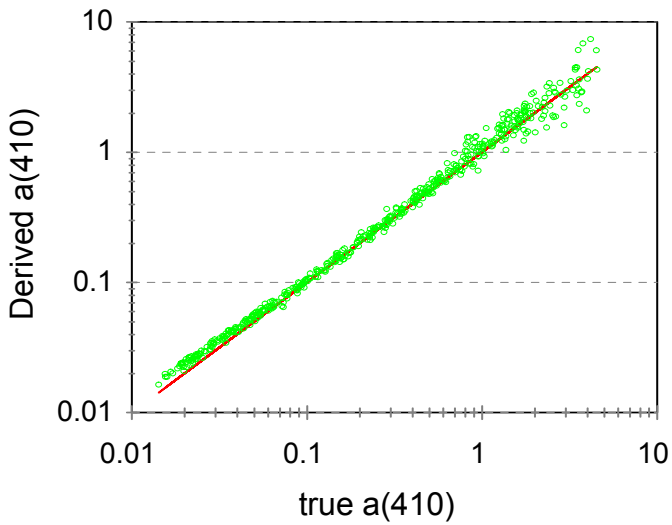
# C. Hoge/Lyon [1996] model-based algorithm

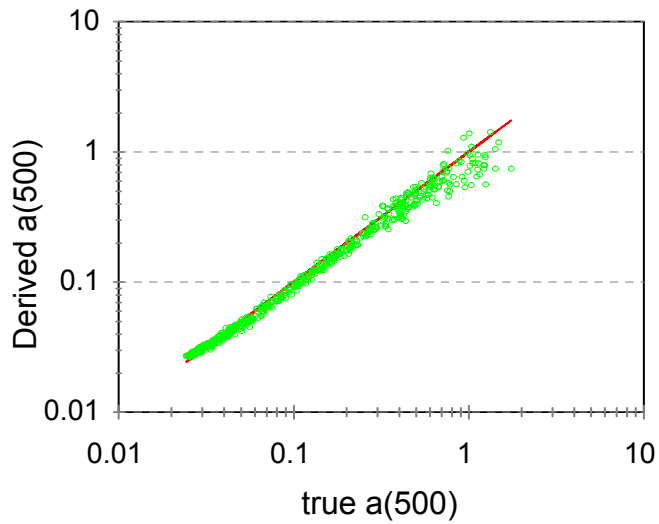
**Approach**: Rrs → a&$b_b$ {LMI}

**Input**: Rrs(410, 500, 590)



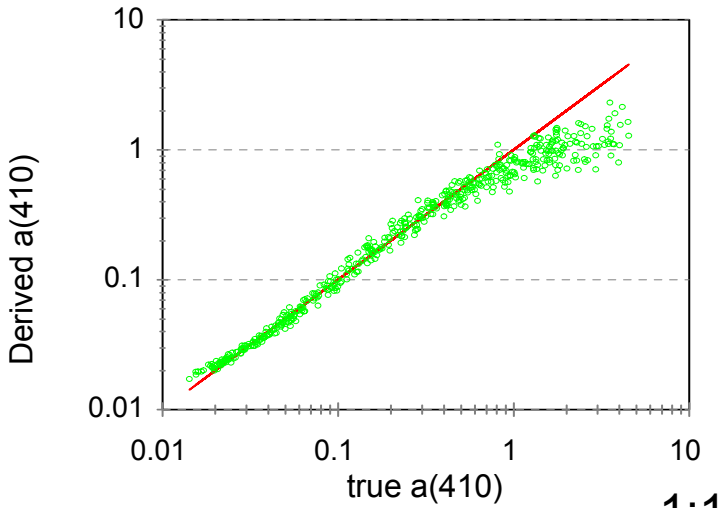



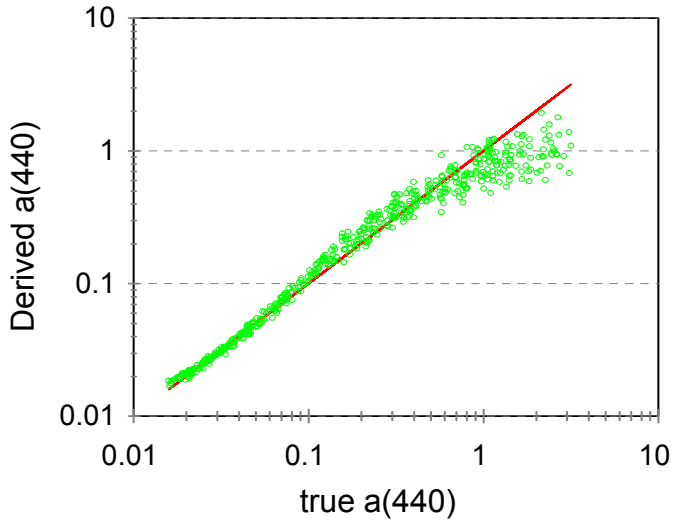



# D. Loisel [2001] model-based algorithm

**Approach**: Rrs→Kd→a&$b_b$

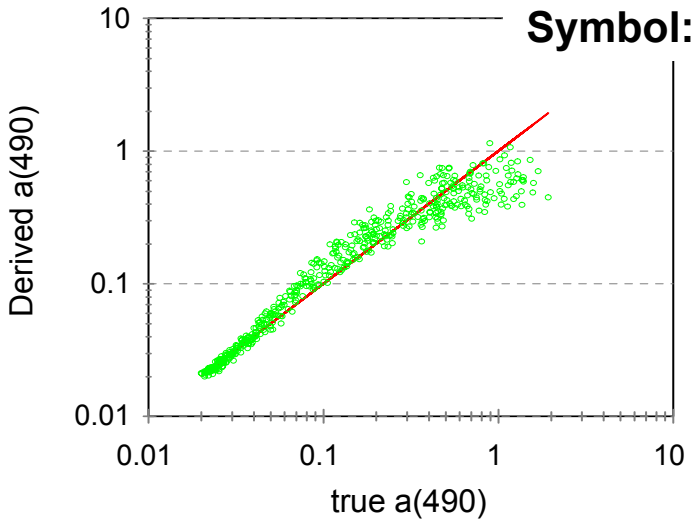
**Input**: Rrs(410, 440, 490, 555)

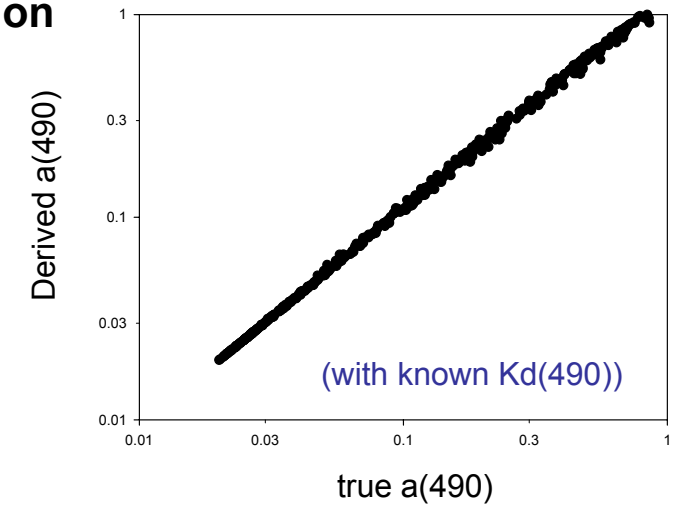



1:1

**Symbol: inversion**

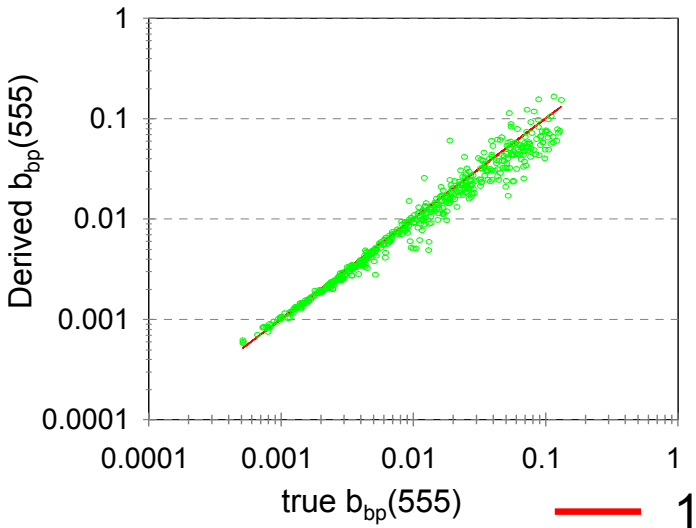


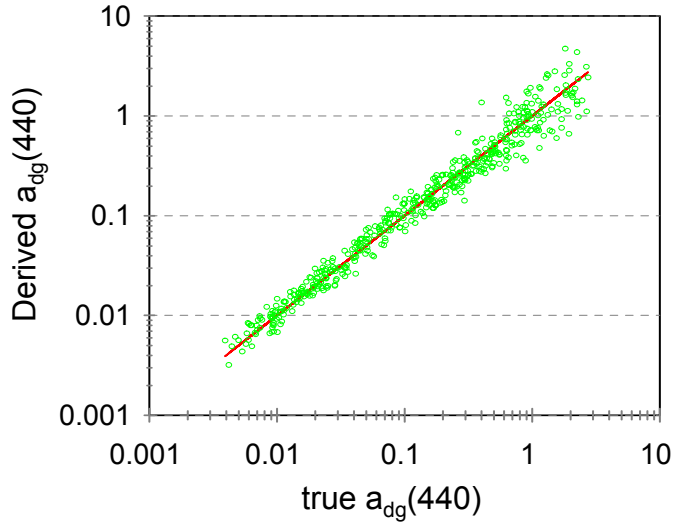



# E. Lee [2002] model-based algorithm

**Approach**: Rrs→a&$b_b$ {QAA}

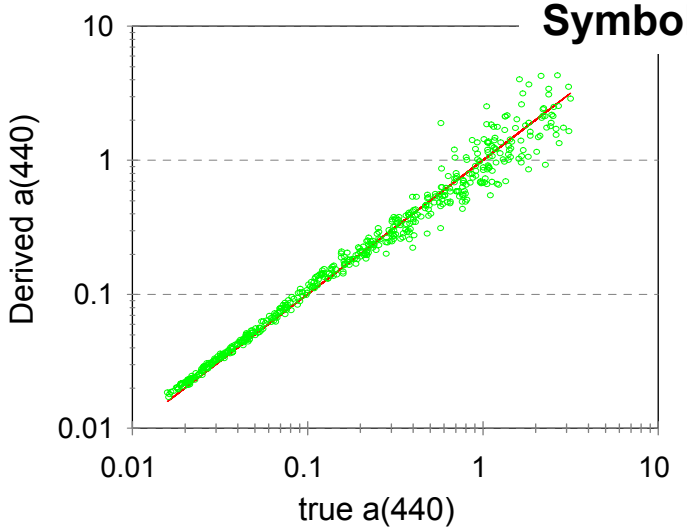
**Input**: Rrs(410, 440, 490, 510, 555)

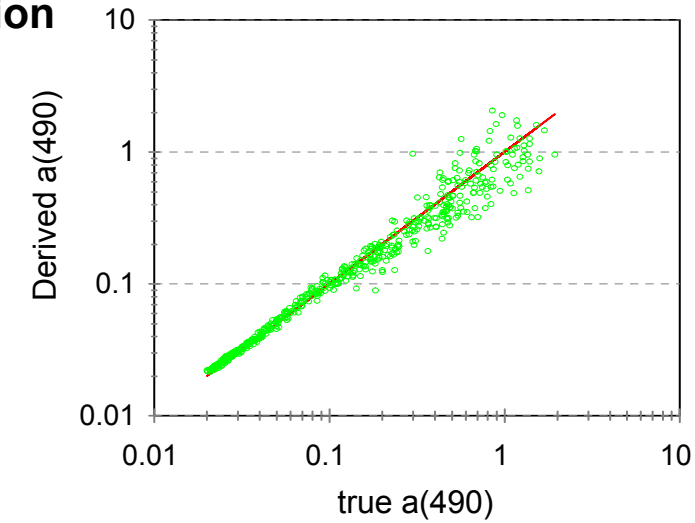



1:1

**Symbol: inversion**

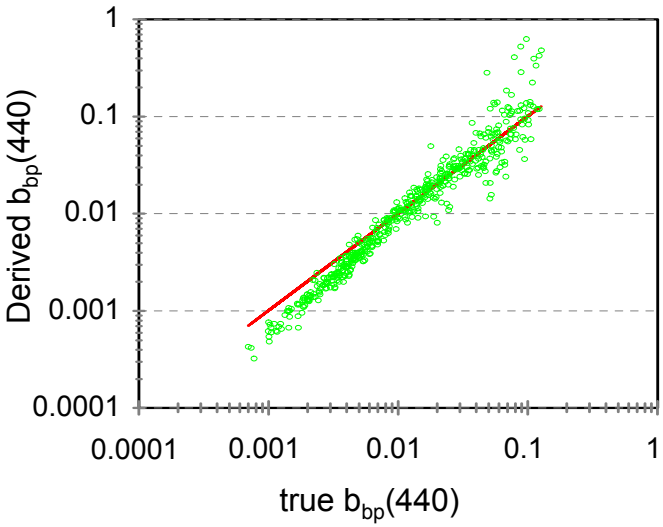


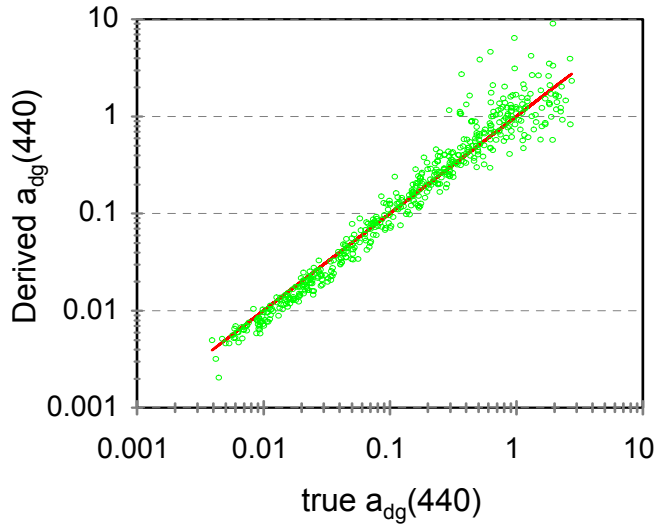



# F. Maritorena [2002] model-based algorithm

**Approach**: Rrs→a&$b_b$ {optimization}

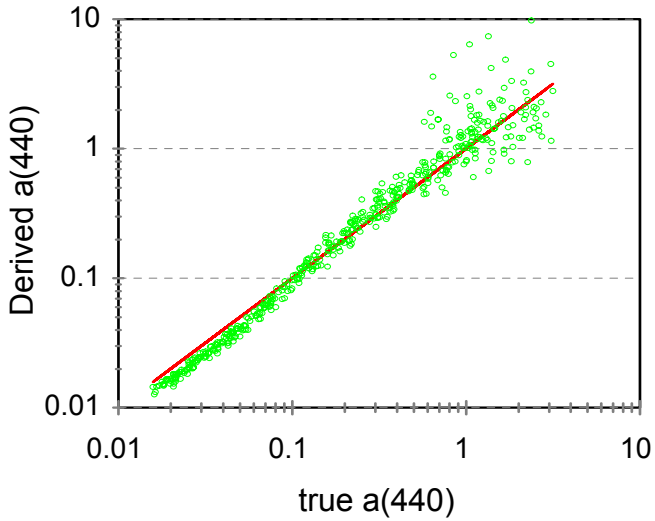
**Input**: Rrs(410, 440, 490, 510, 555)




1:1

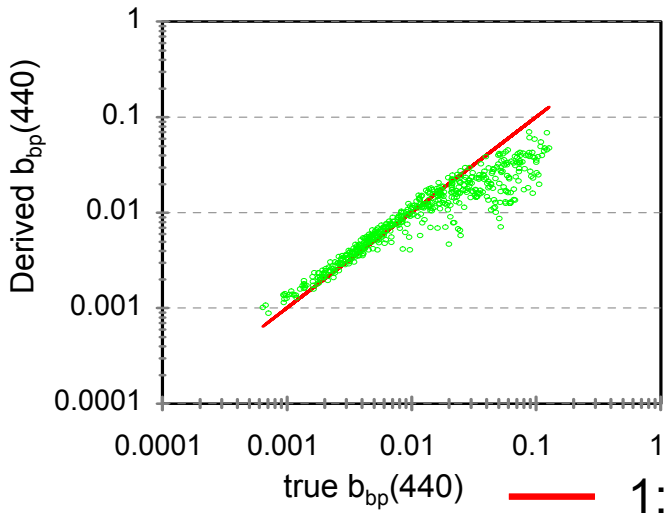
**Symbol: inversion**

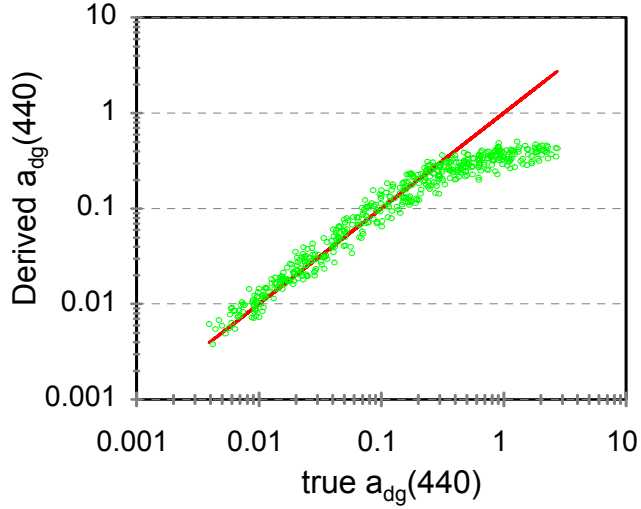


# G. Lee [1999] model-based algorithm

**Approach**: Rrs→a&$b_b$ {optimization}

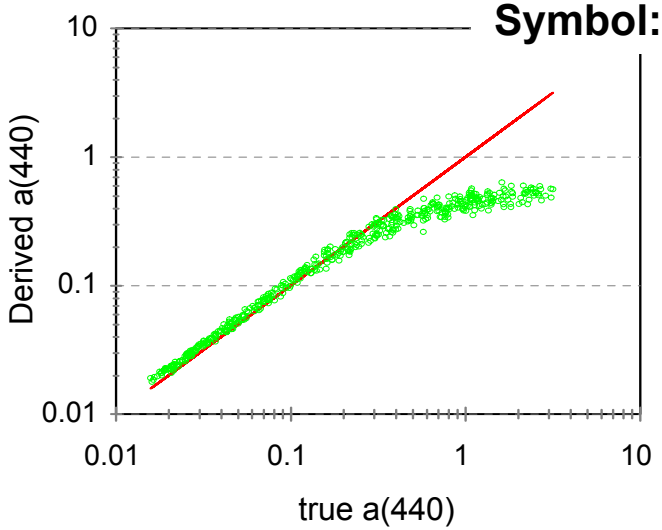
**Input**: Rrs(410, 440, 490, 510, 555)

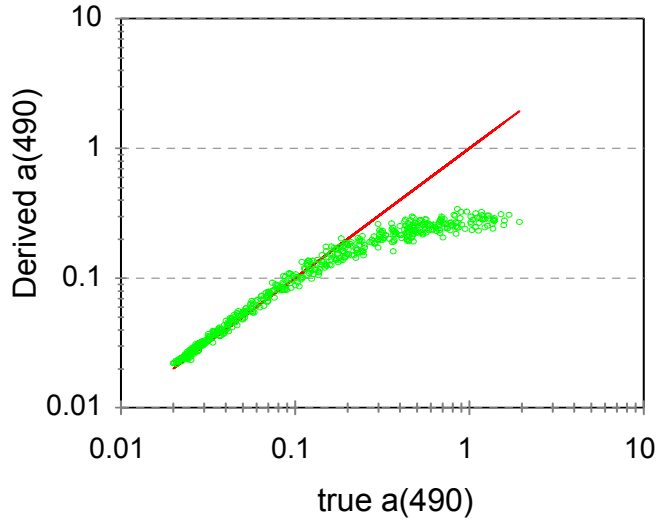



1:1

**Symbol: inversion**

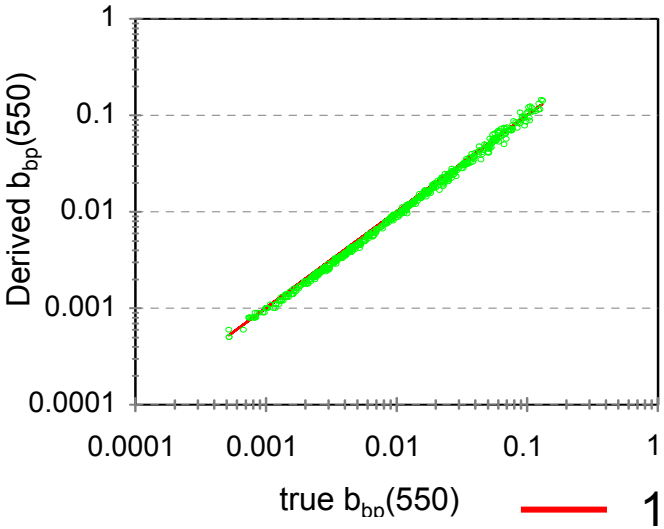


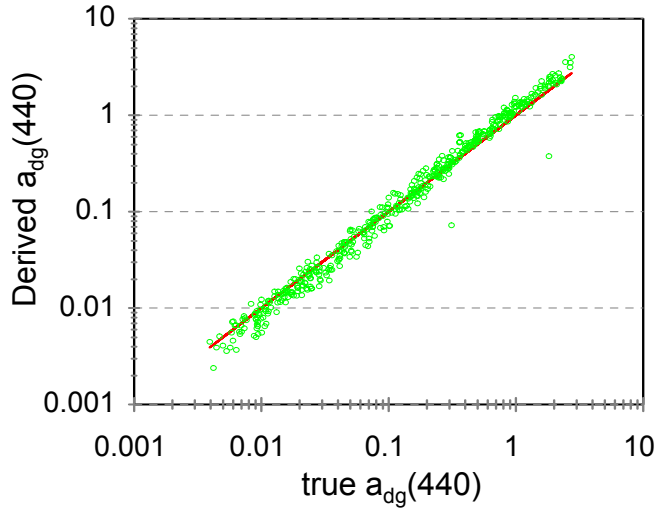



# H. Boss [2004] model-based algorithm

**Approach**: ?

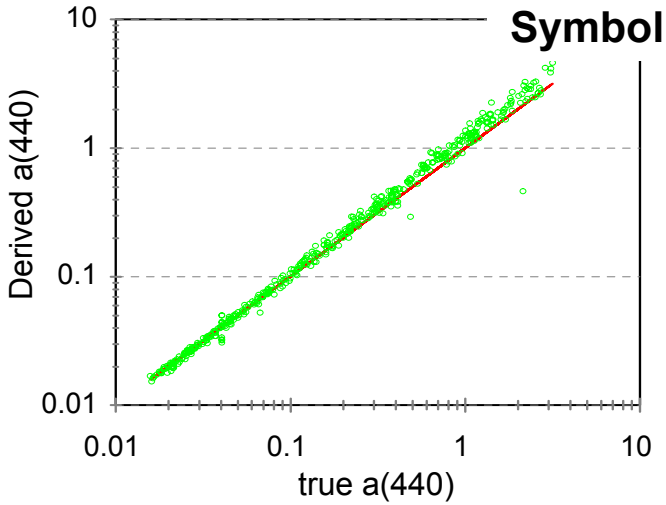
**Input**: Rrs(410:10:650)

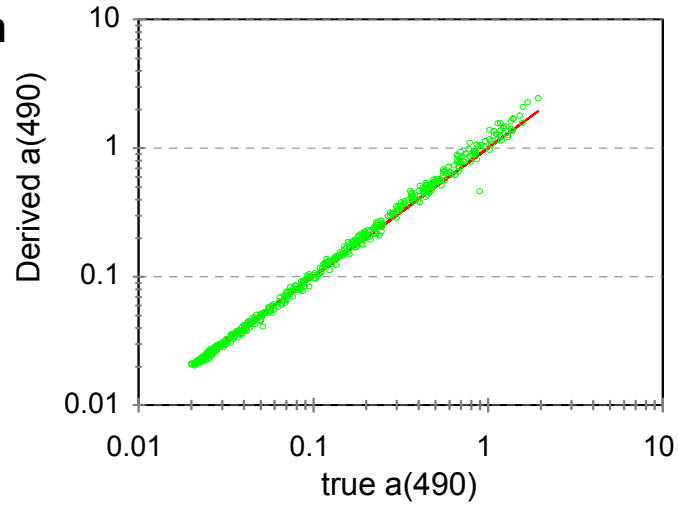



1:1

**Symbol: inversion**



# I. Doerffer Neural-Net algorithm

## 3. Next:

a. Introduce “noises” into the current dataset, and run the algorithms again.
b. Meeting in Feb. to discuss what/how to compare results.
c. A workshop to present/discuss inversion results.
d. Prepare reports regarding algorithm performances.