

Cruise data analysis for Rrs  
prediction  
using Semi-analytical and  
Hydrolight v4.2 models

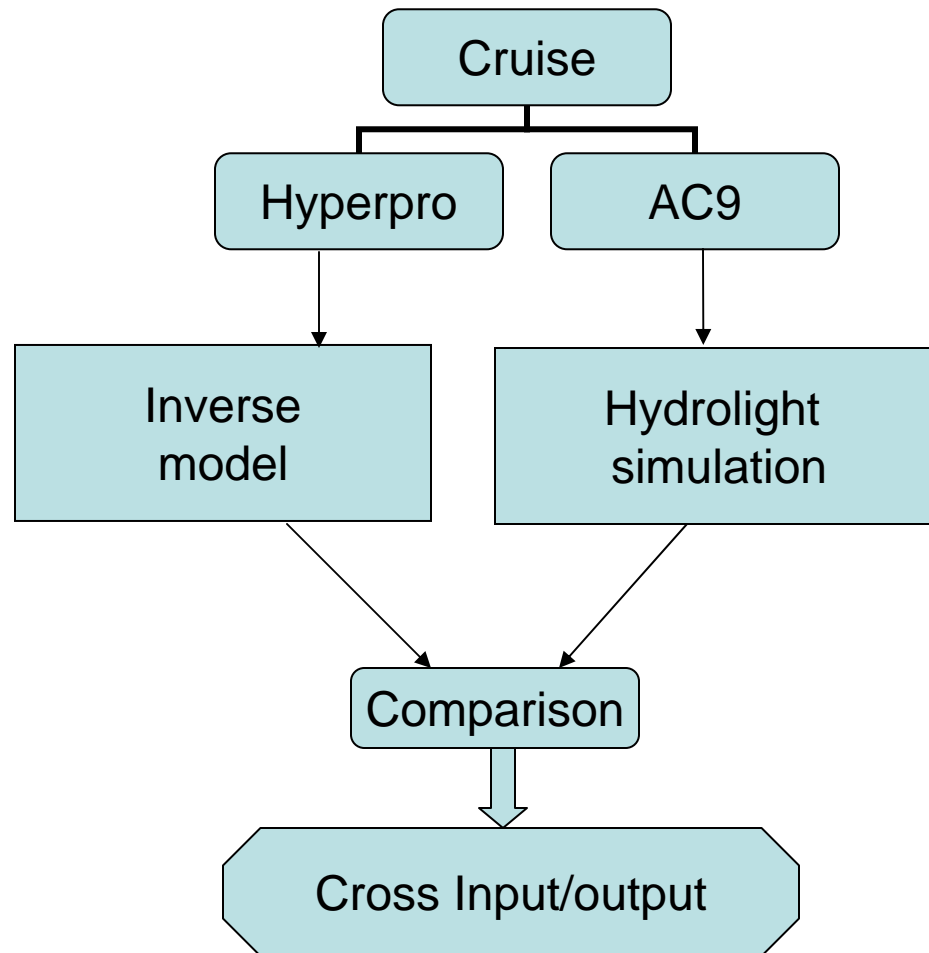
Alexander Dadashev

# Players

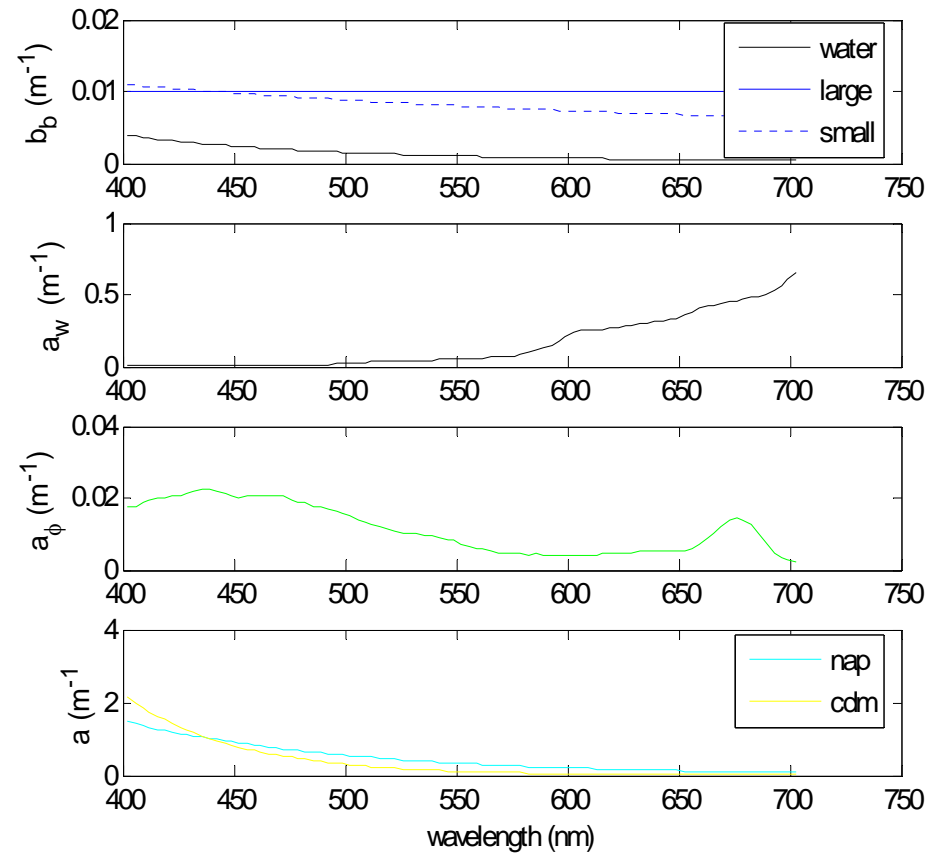
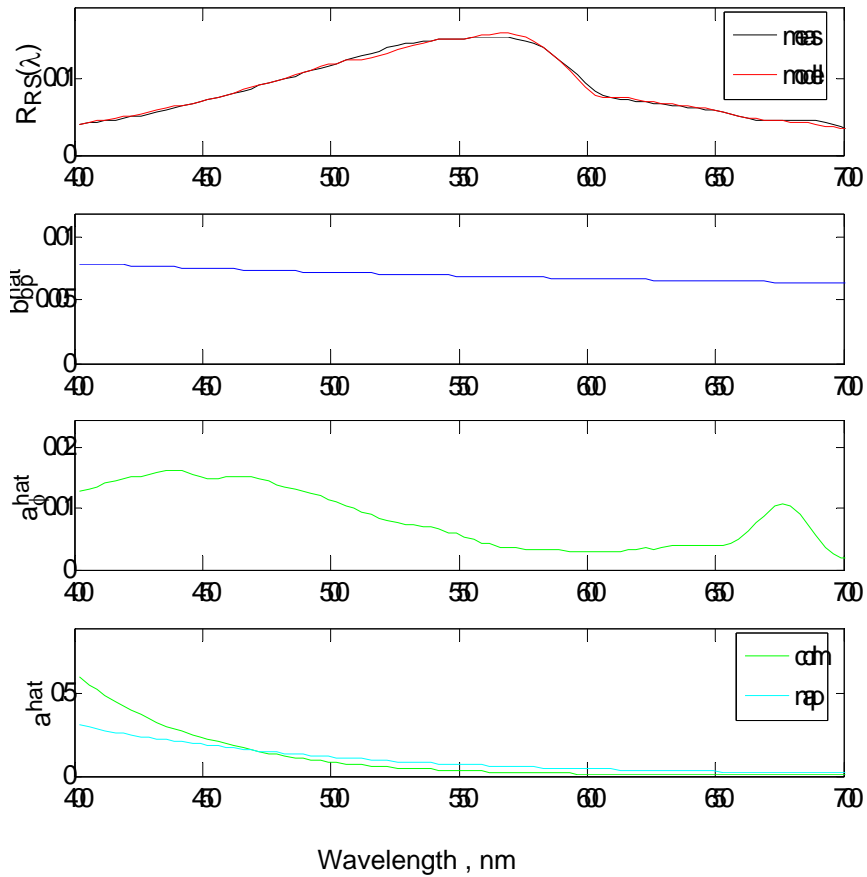
- Cruise 1, 7/22/2004
- Hyperpro data (Rrs)
- $Rrs = Lu/Es$ ; Lu measure at ~2.5m above surface
- Ac 9 data (IOPs)
- Hydrolight 4.2 (Curt Mobley)
- Inputs: depths - 0, 3, 5, 10, 15 m ;  $bb/b = 0.01$
- Semi-analytical model (Roesler & Perry, 1995)
- Mat lab 7.0
- Excel



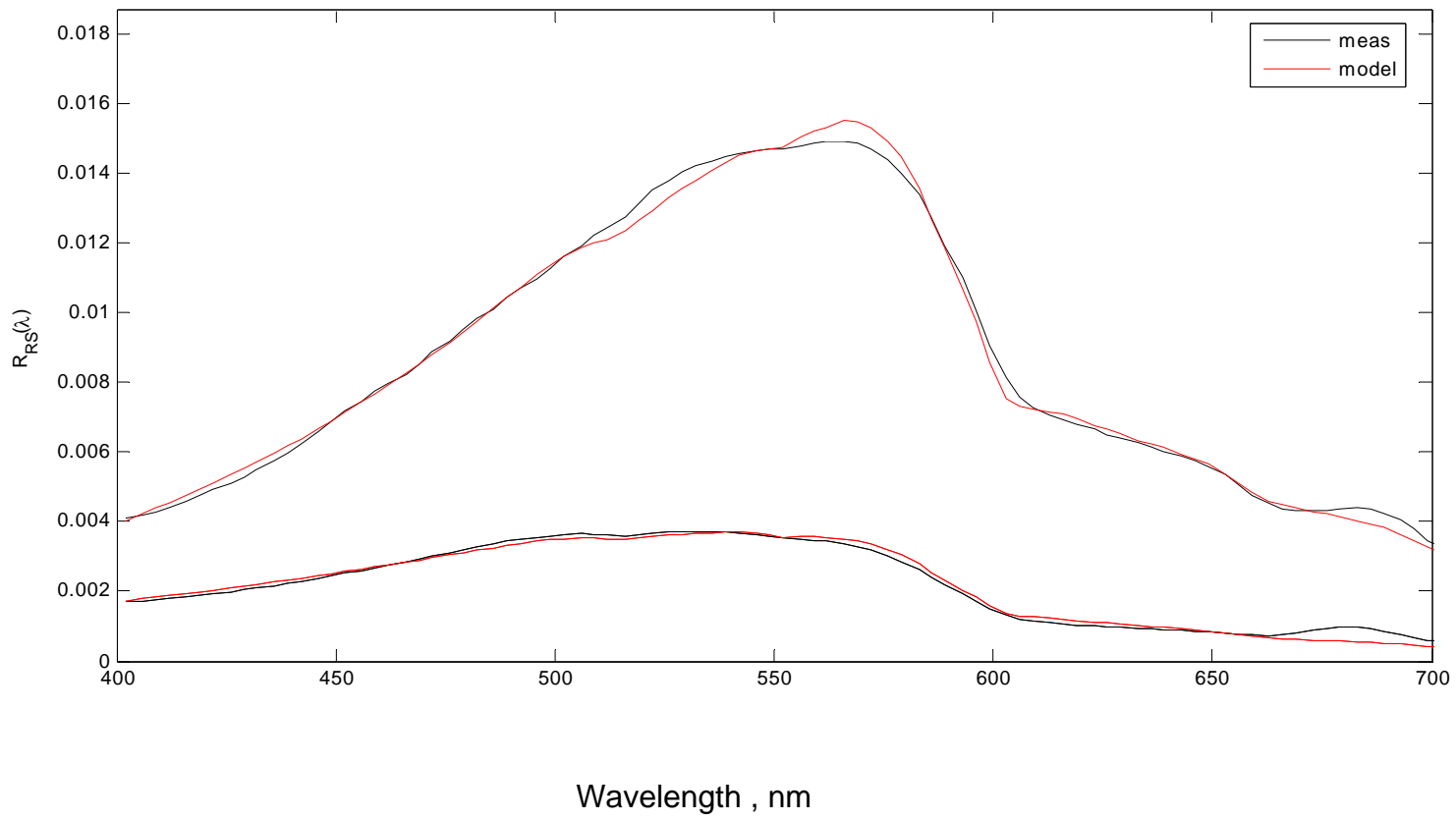
# Approach



# Semi-analytical model, cruise 1

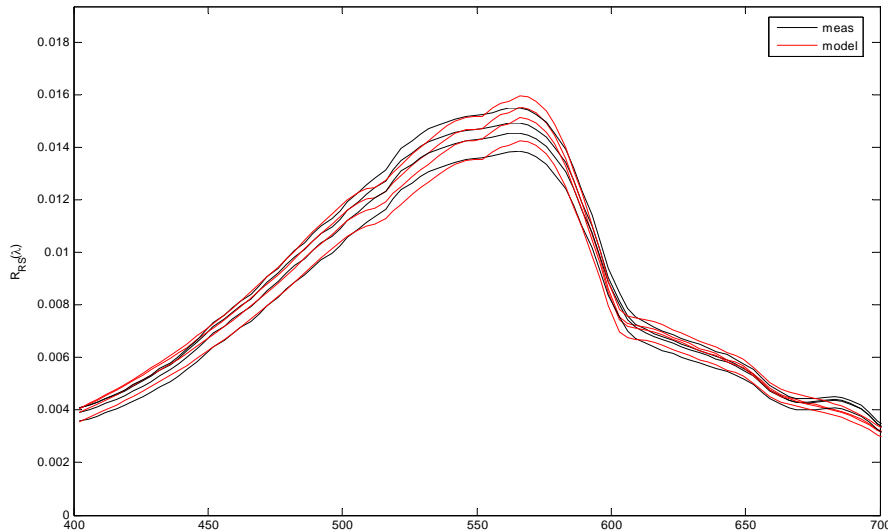


# Rrs comparison between Station1 and Station2 and Station2



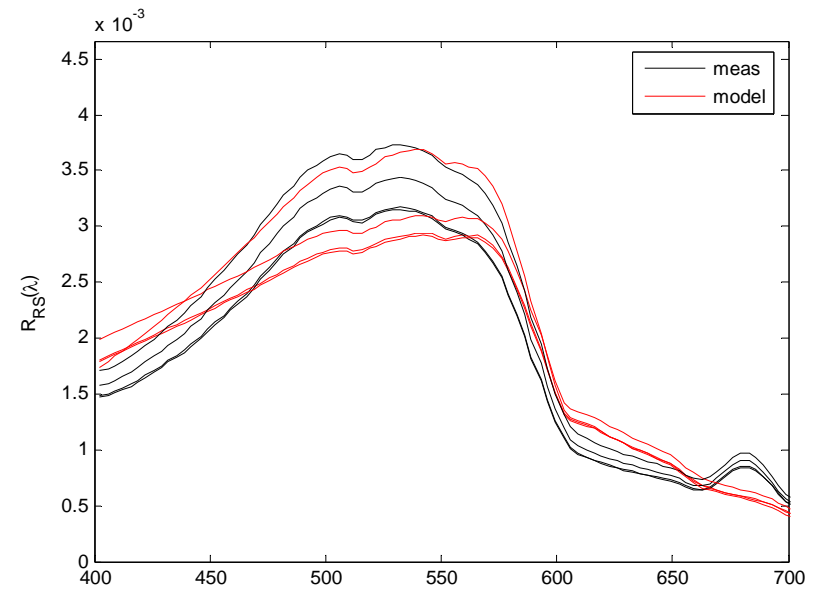
# Model sensitivity to time series

- Cruise 1 – station 1  
(43.56.3N;69.35.0W)-  
02:07pm



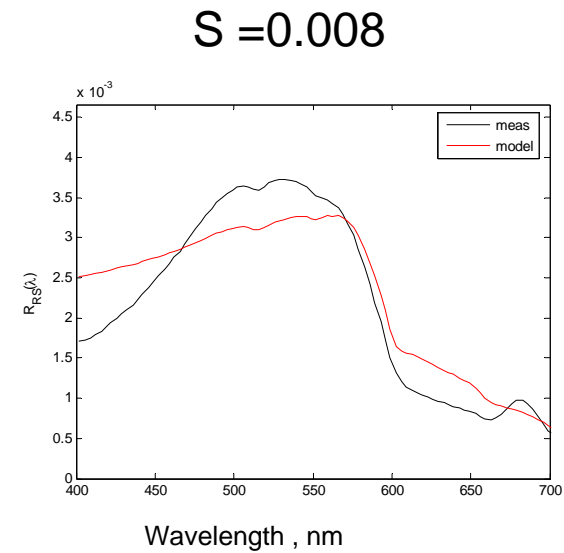
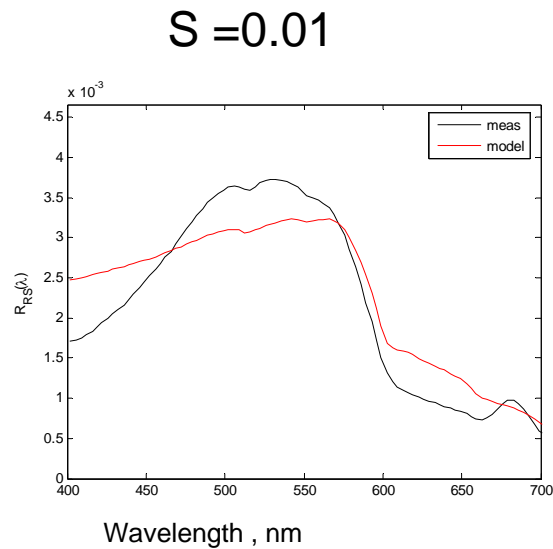
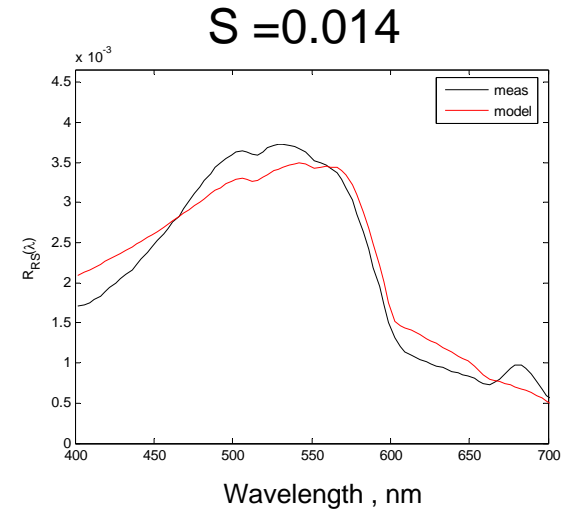
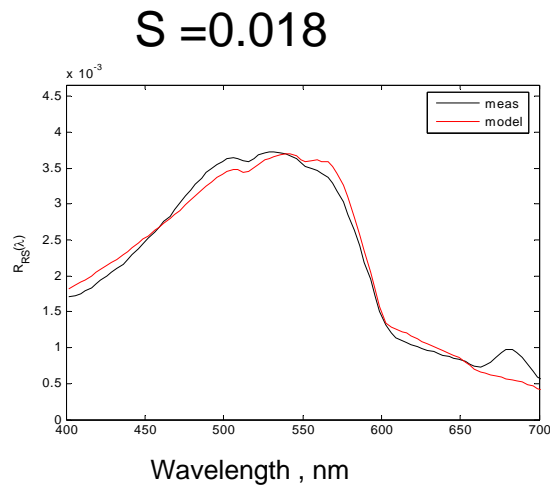
Wavelength , nm

- Cruise 1 – station 2  
(43.47.9N;69.32.6W)-  
03:55pm



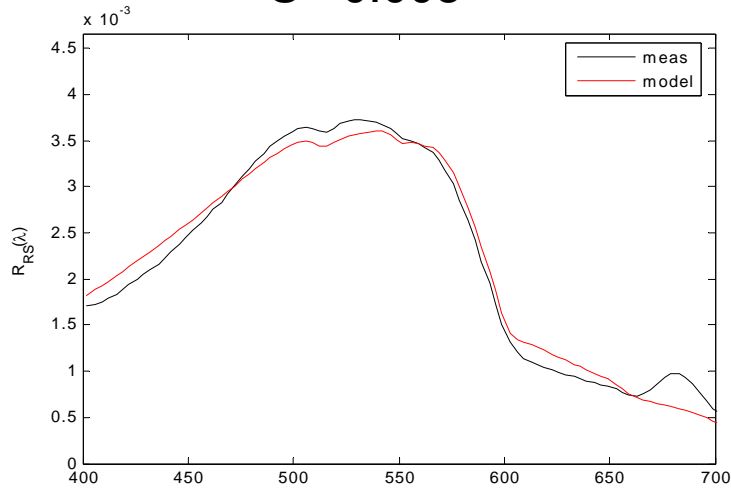
Wavelength , nm

# Rrs spectral shape sensitivity to $S - a_{\text{cdm}}$ (distribution, composition dependence)

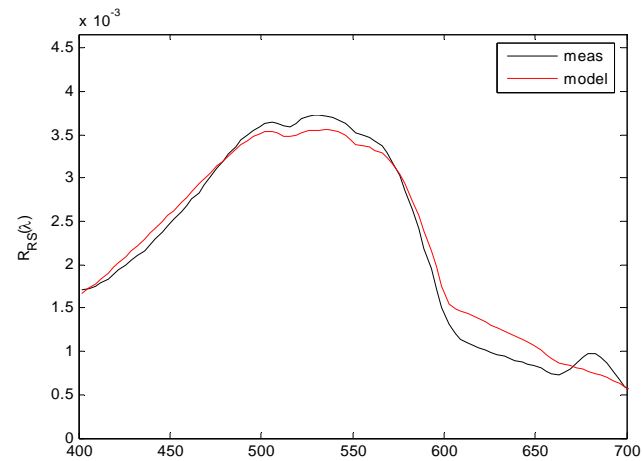


# Rrs shape sensitivity to $S$ for a $a_{\text{nap}}$

$S = 0.008$



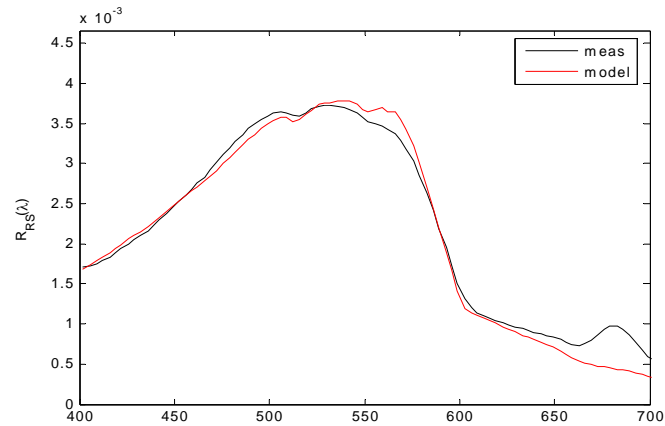
$S = 0.001$



Wavelength , nm

Wavelength , nm

$S = 0.02$



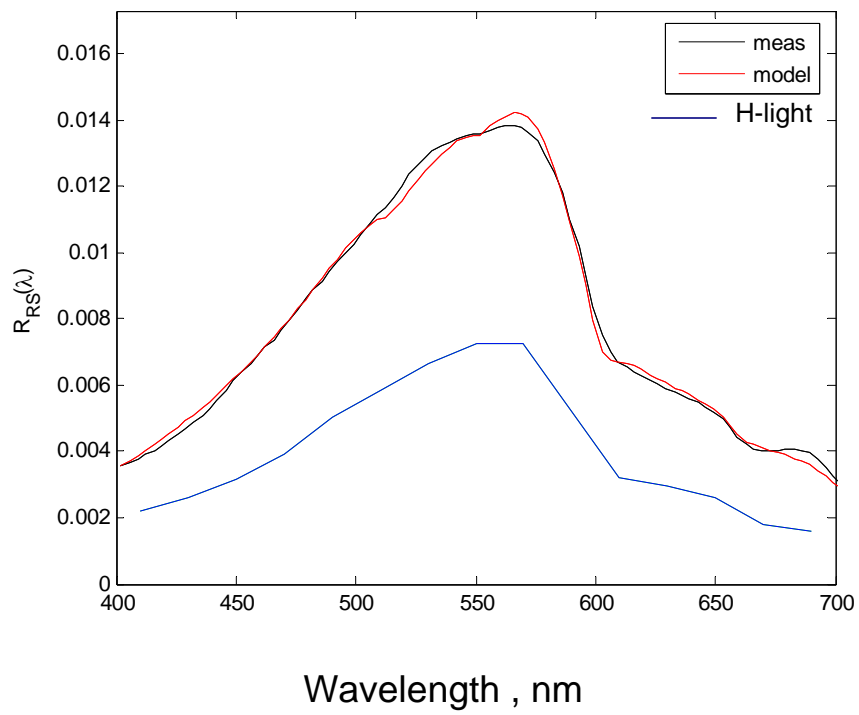
Wavelength , nm



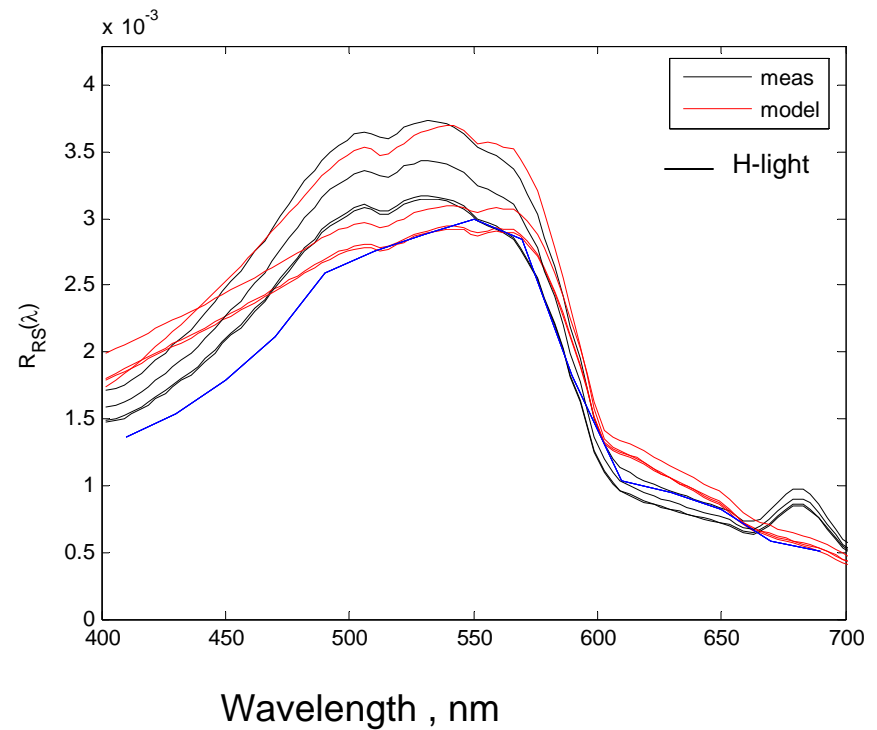
# Hydrolight $\leftrightarrow$ Inverse models

## Rrs shape comparison

### Station 1

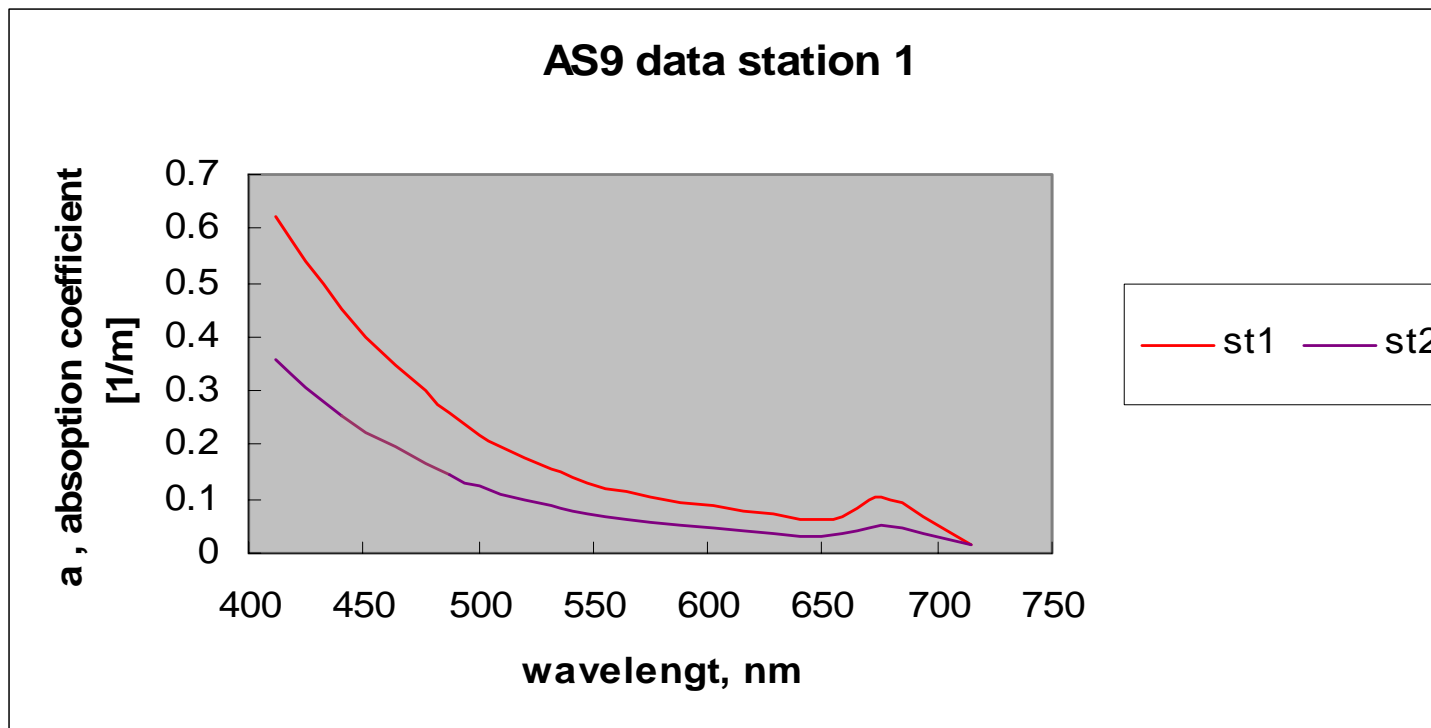


### Station 2



# Absorption coefficient from Ac9 data

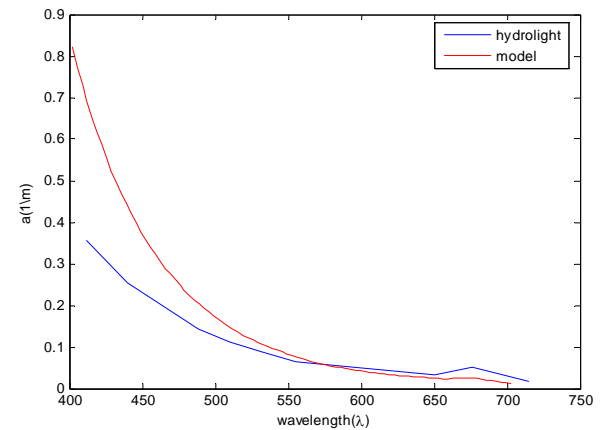
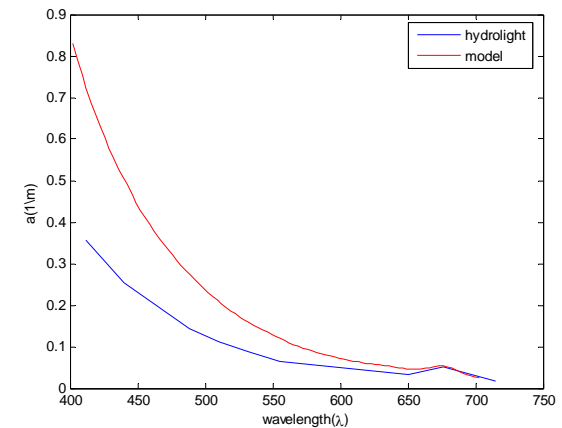
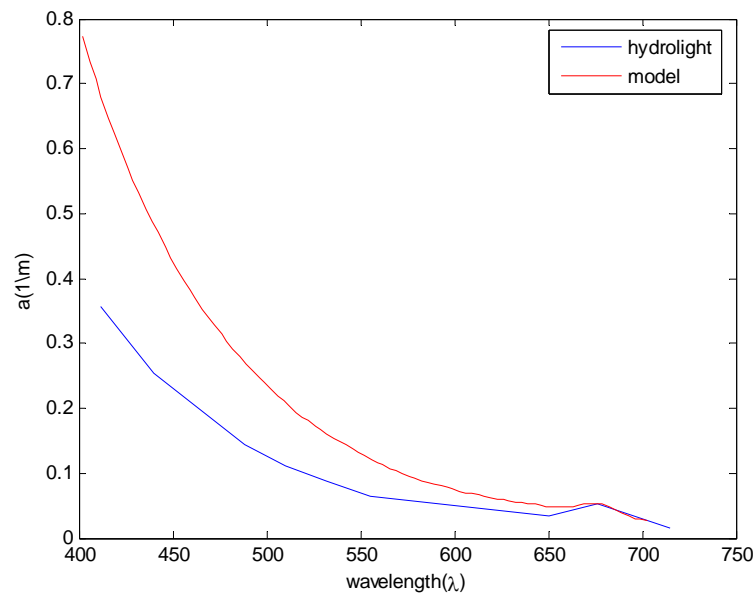
comparison for two station



# Comparing a coefficient predicted by model and from ac9

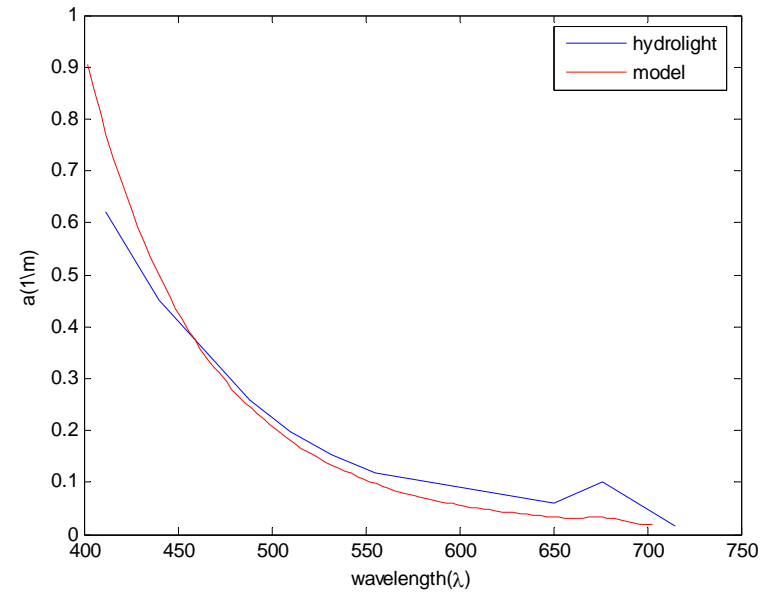
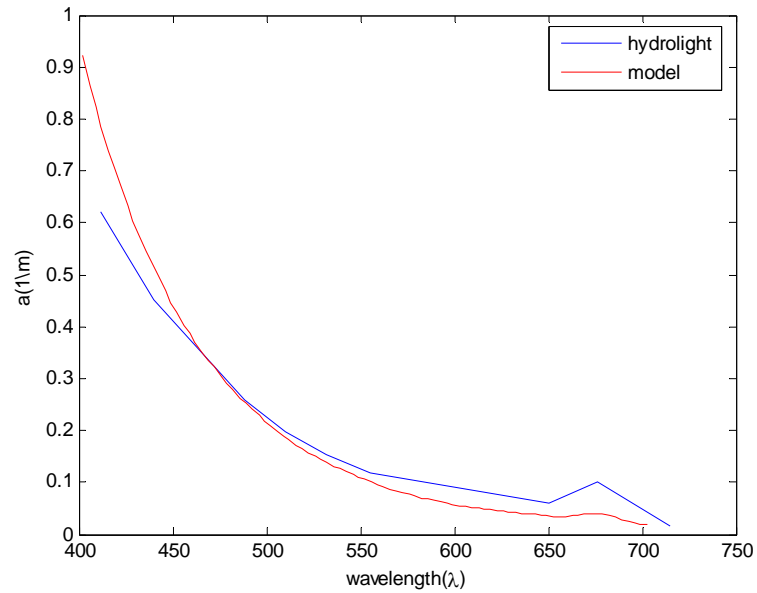
$$\underline{a_{Tmw\_hat} = a_{cdm\_hat} + a_{p\_hat}}$$

## Station 2



# Absorption coefficient predicted by model and from ac9

## Station 1



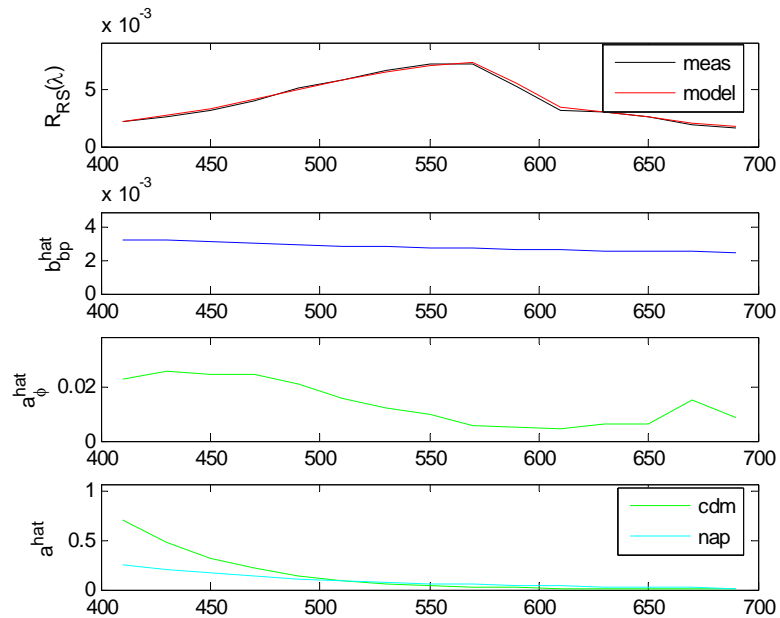
# Rrs prediction

## Hydrolight output

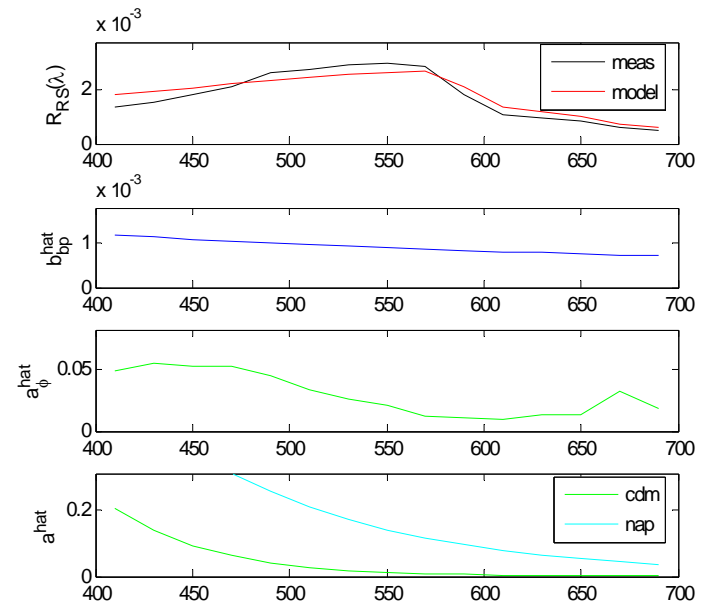
↓

## inversion model

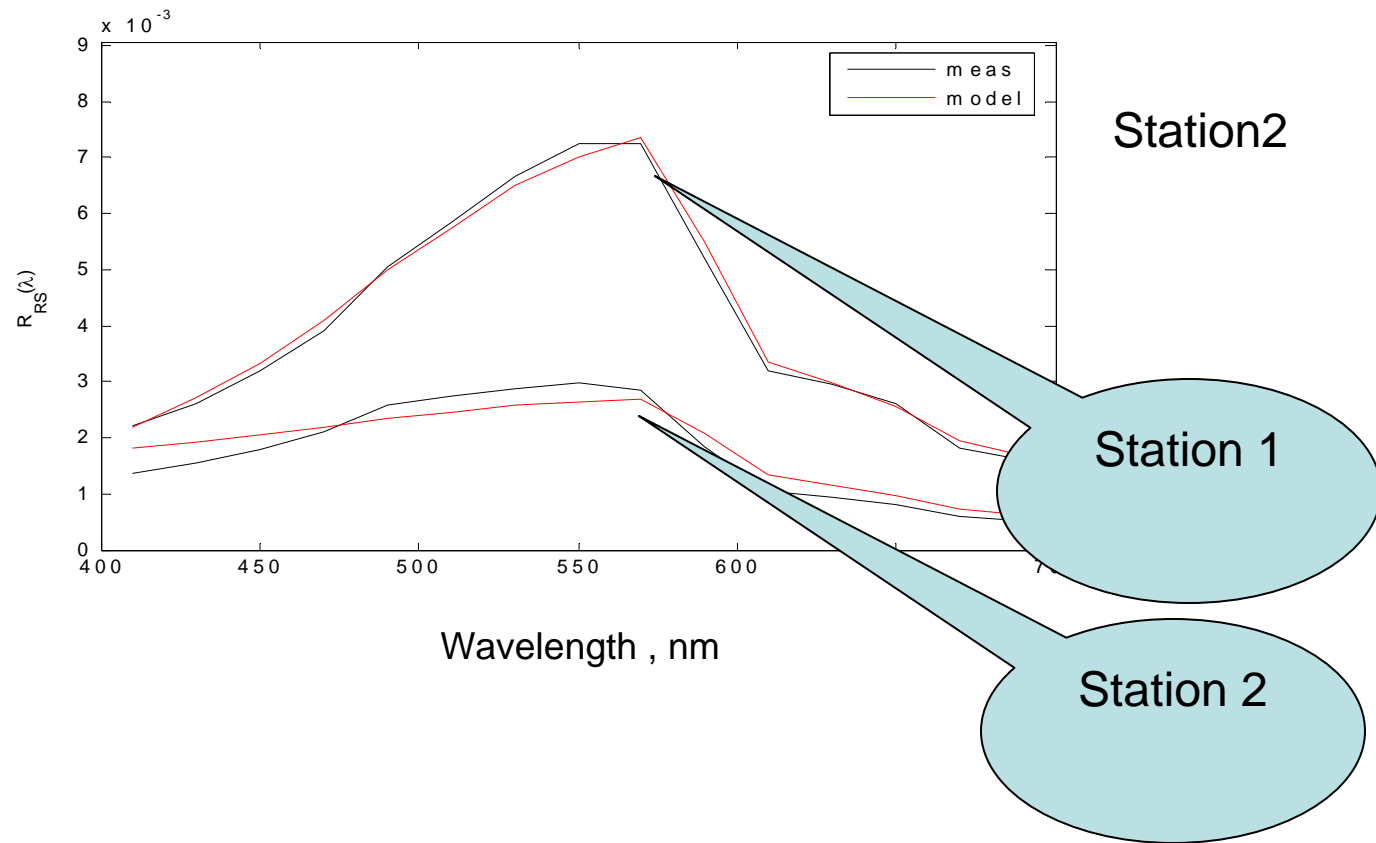
Station1



Station2



# Rrs shape prediction by Semi-analytical Model from Hydrolight input



# Thank you to the crew!

