

Correction and quality control of hyperspectral measurements performed from a Ferrybox platform

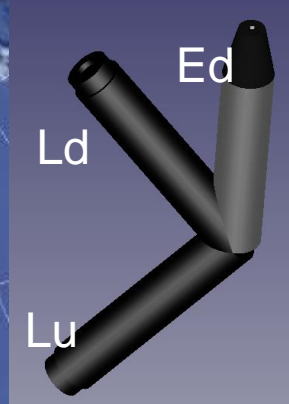
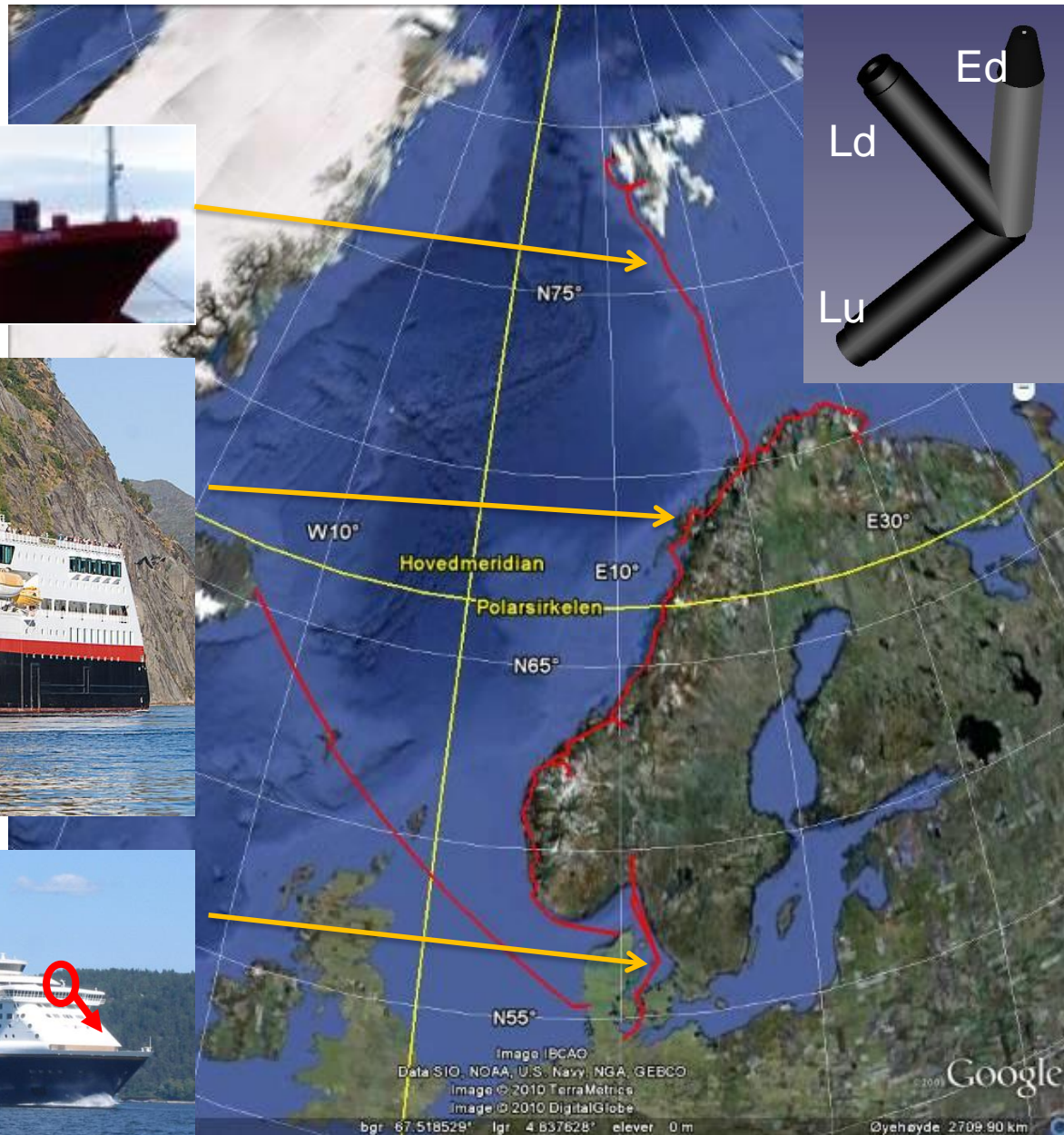
Pierre Jaccard, Kai Sørensen, Anna-Birgitta Ledang, Andrew King

Francis Zagolsky, Richard Santer

Christophe Lerebourg

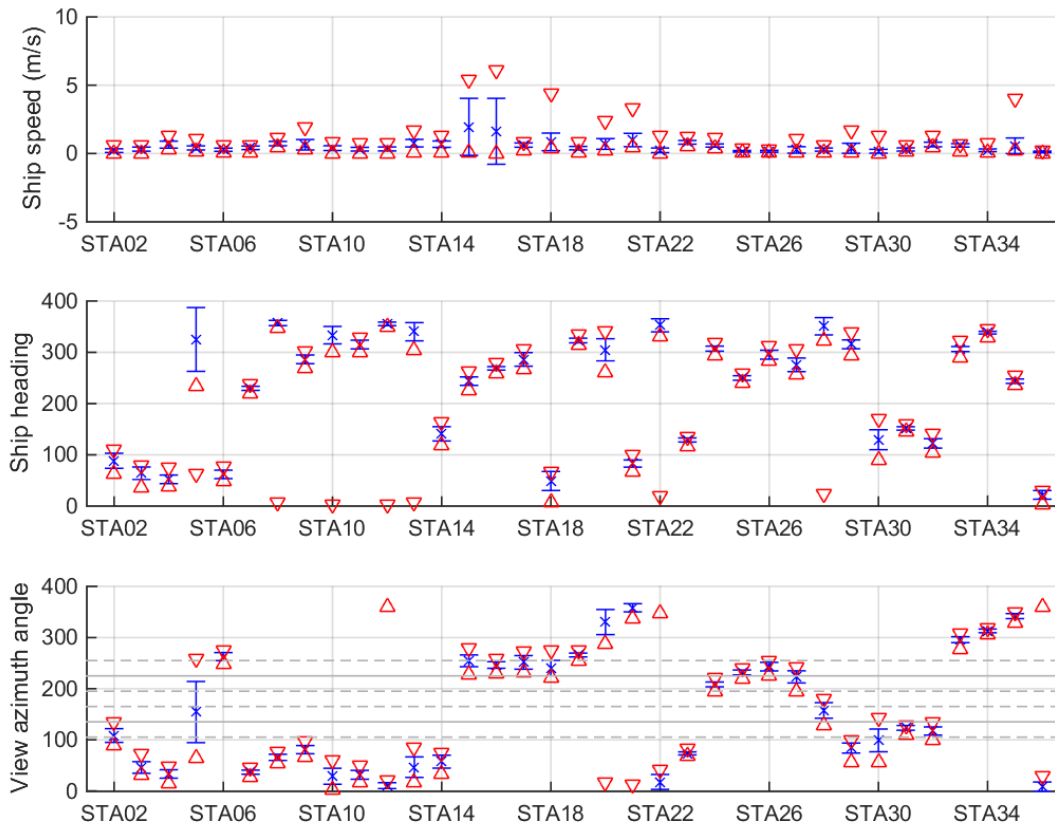
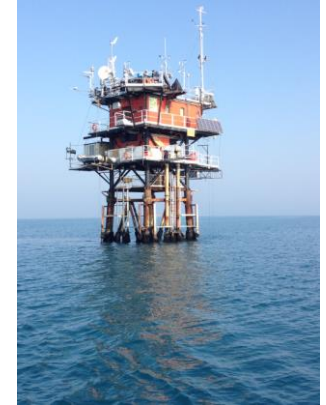
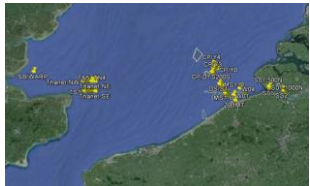
NIVA, ParBleu, AdriLoire, ACRI

Ed
Ld, Lu



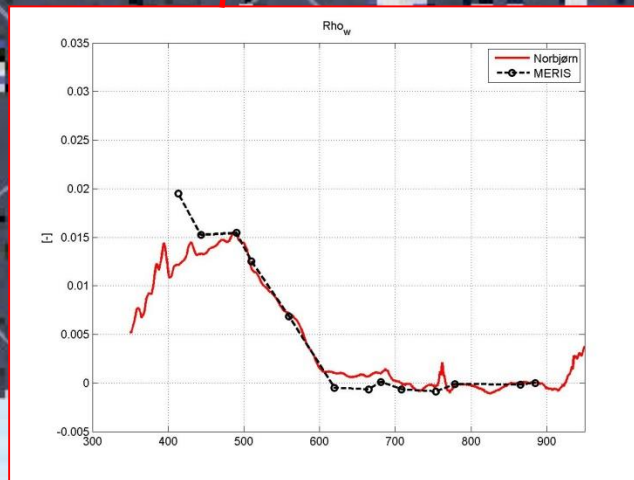
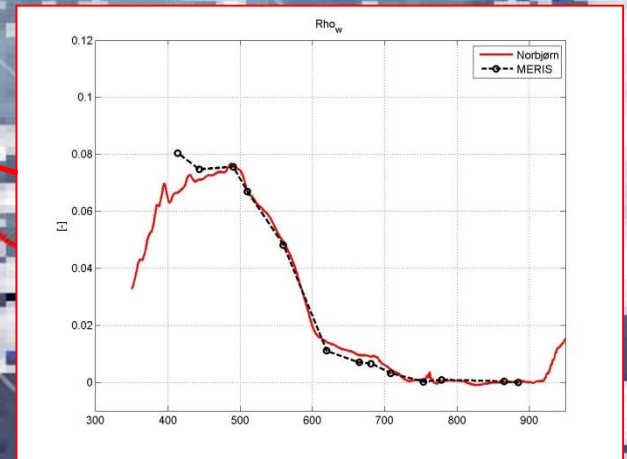
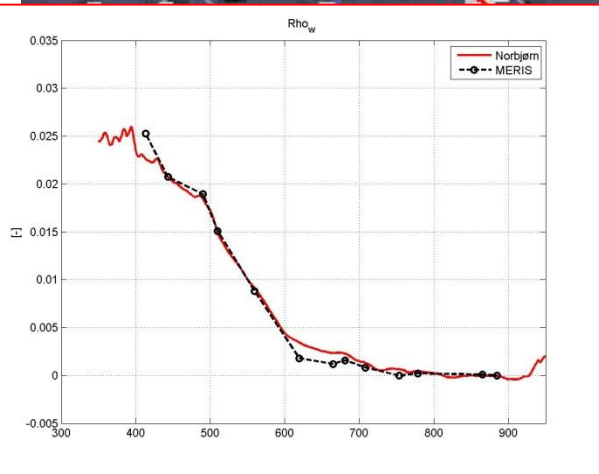
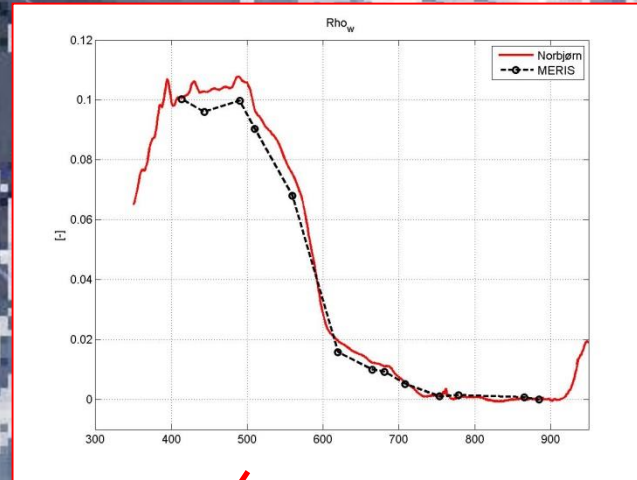
Moving Platform?

HighROC
Cruise 2014/04



Satellite and ship measured reflectance

MERIS RR L2 RGB
11 August 2011
Acq. Time 11:29UTC





Ed
Ld, Lu

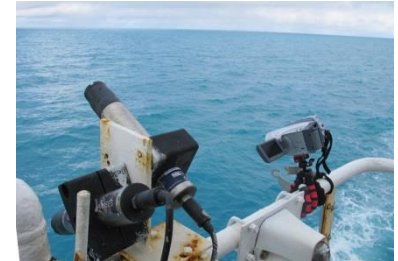


Installations issues

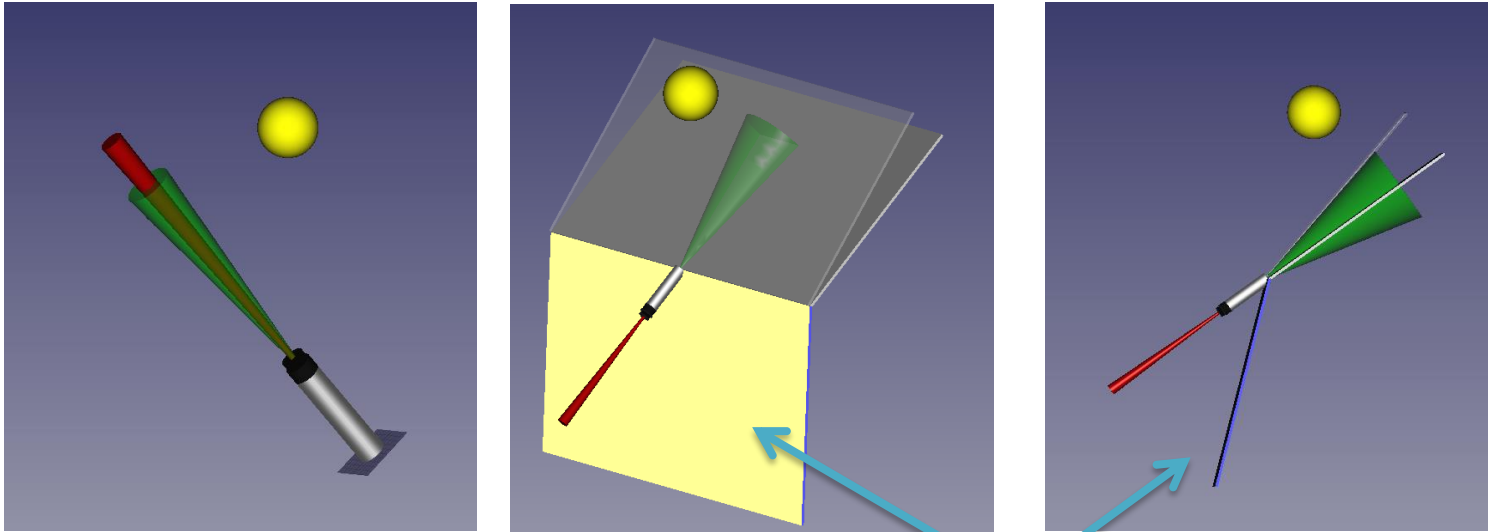
Conflicts with surrounding structures

Asymmetry
Ships heading

Data volume



Geometric QC



Ship Side

Ship Speed > threshold
Direct Glint
Ship Shadow
Sun Zenith < 75

Sky dome Corrections

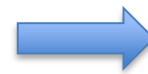
- Standard Protocol: Fresnel reflection coefficient at sea surface

$$\sim \alpha_0 + \alpha_1 w + \alpha_2 w^2 \sim 0.02 - 0.05 (\theta_s = 40^\circ)$$

- Polarized nature of
 - atmospheric scattering
 - *Fresnel* reflection at sea surface

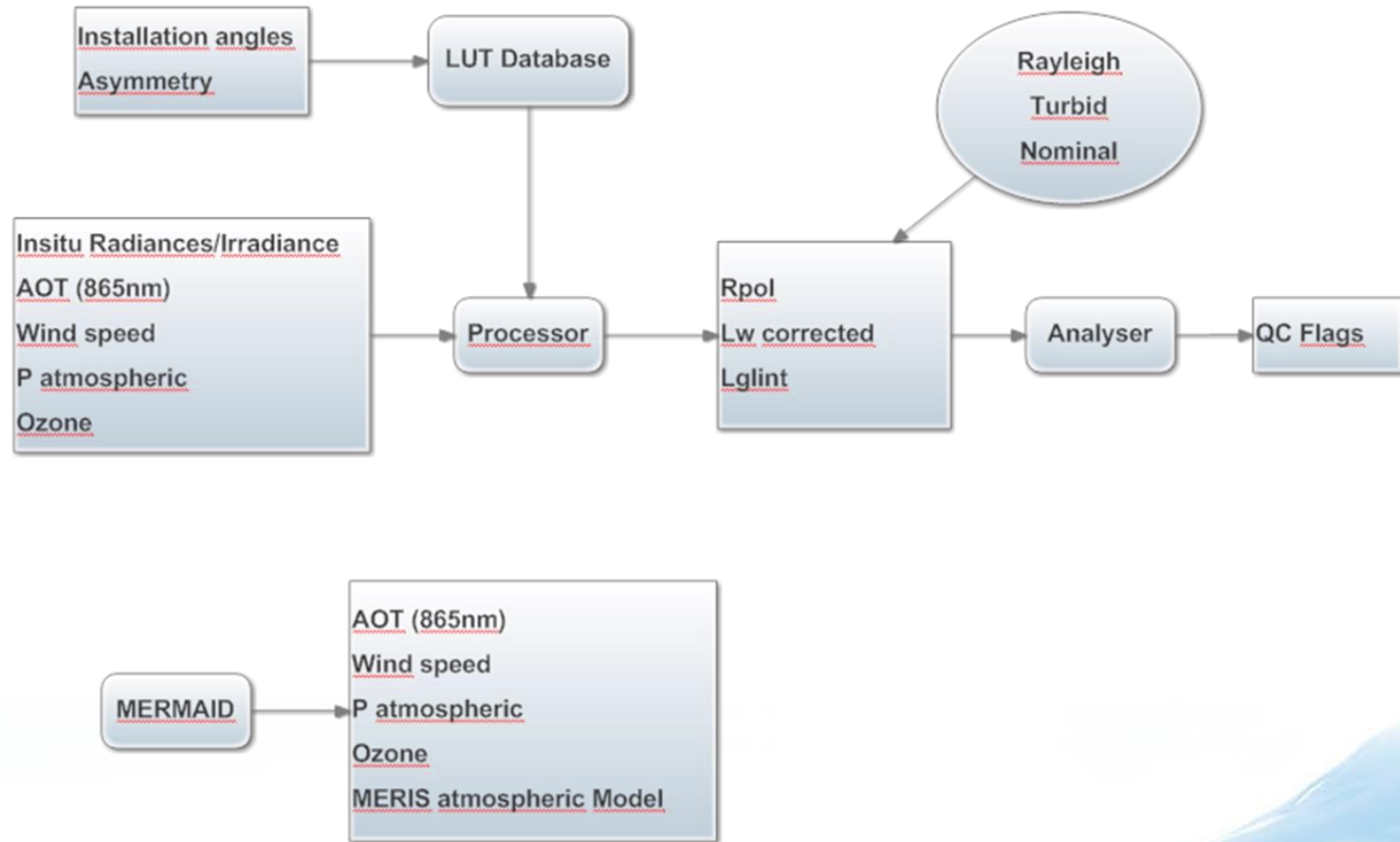
NIVA RAMSES Processor

- Estimation of L_d at BOA
- Modelling of sea surface
- Glint correction
- R_{pol} : reflection coefficient



NIVA
RAMSES
Processor

NIVA RAMSES Processor



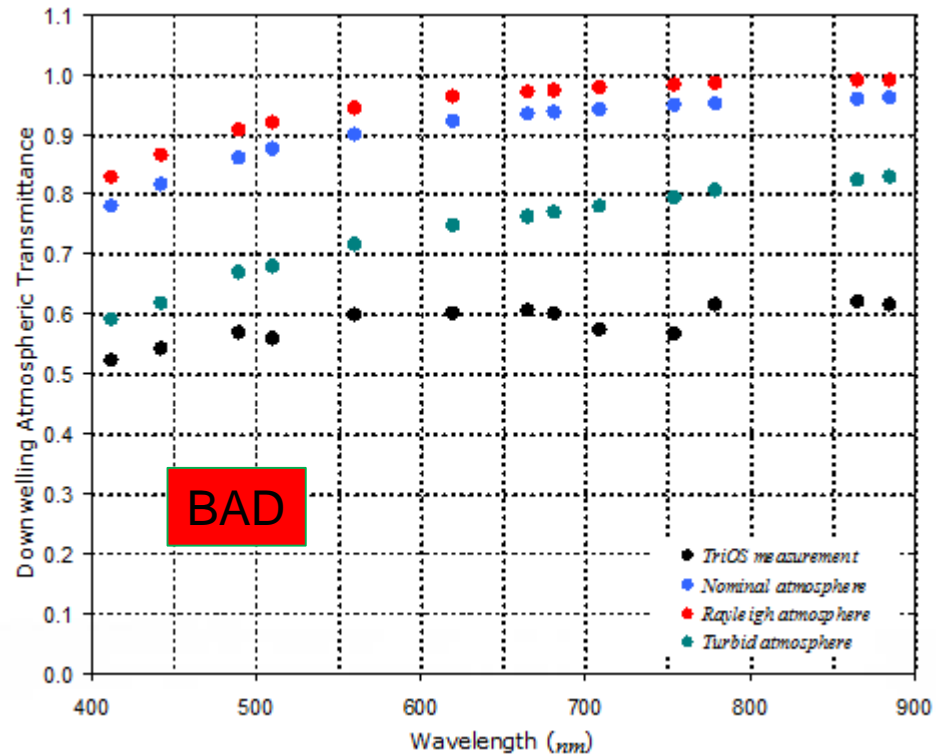
QC Flags

Flag name	Notation	Flag setting	
High Glint	FHG	$L_{\text{glint}} / (R_{\text{pol}} \cdot L_{\text{sky}}) > 0.5$	Glint
High Transmittance	FHT	$T_{\text{dw,meas}} > T_{\text{dw,Rayleigh}}$	Cloud
Low Transmittance	FLT	$T_{\text{dw,meas}} < T_{\text{dw,Turbid}}$	Turbid
High atmospheric Radiance	FHR	$L_{\text{sky,meas}} > L_{\text{dw,Turbid}}$	Turbid
Low atmospheric Radiance	FLR	$L_{\text{sky,meas}} < L_{\text{dw,Rayleigh}}$	Turbid
Water-leaving Radiance	FWR	$L_{\text{w,meas}} < 0$	Shadow

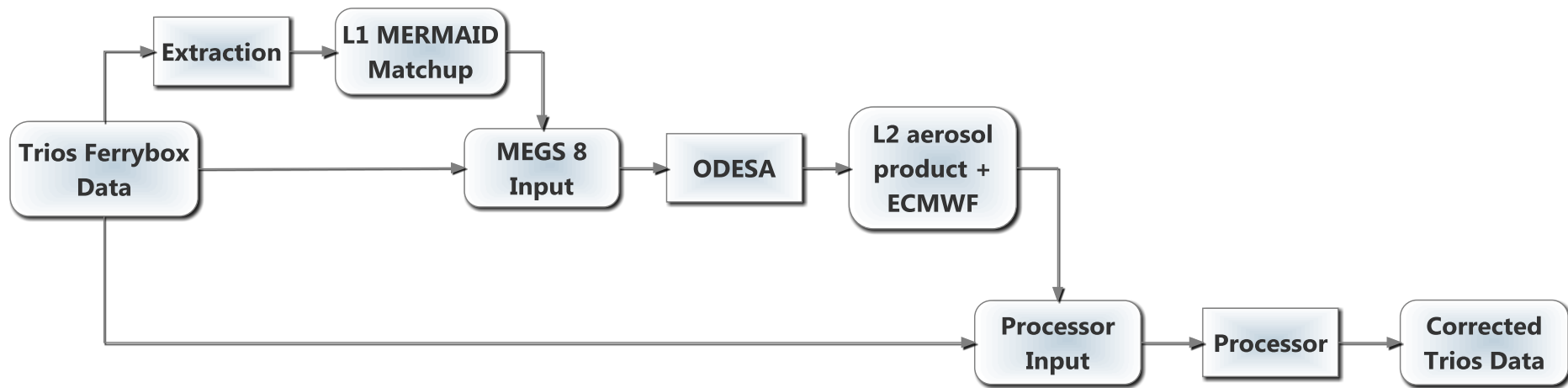
Cal

FLT/Cloud

Trios
Nominal
Rayleigh
Turbid

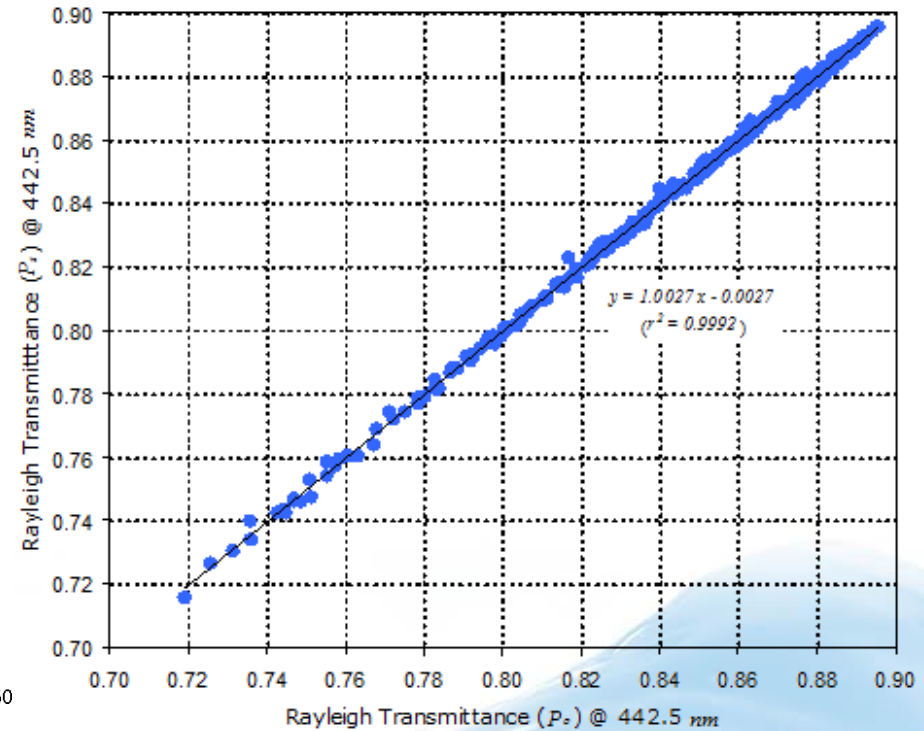
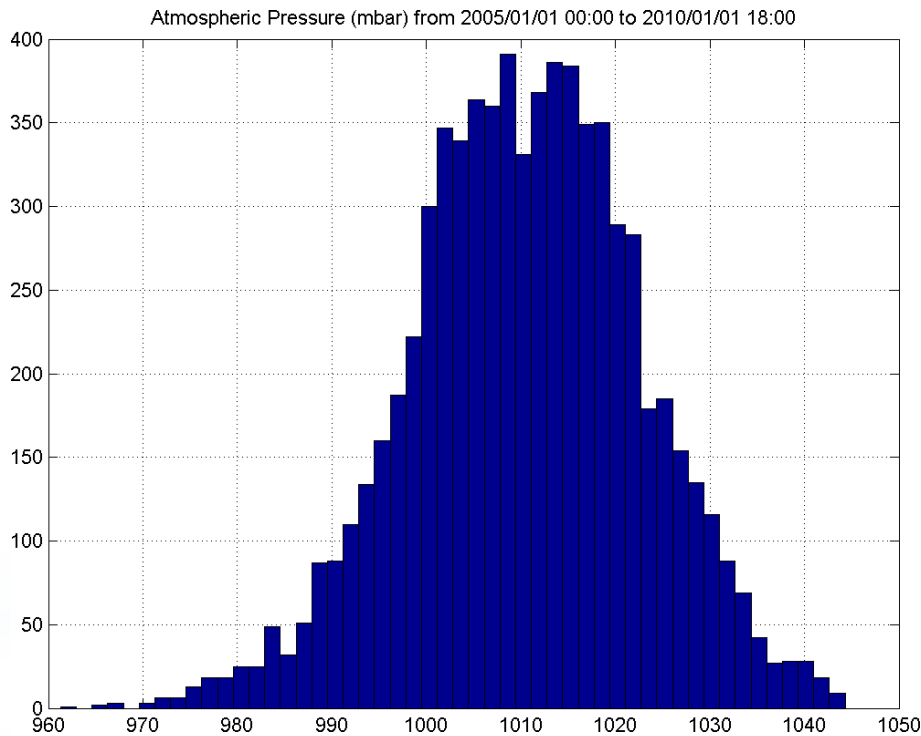


Processing Data Flow



Effect of P Atmospheric

Rayleigh Transmittance (443nm) 1030 vs 1013 bar



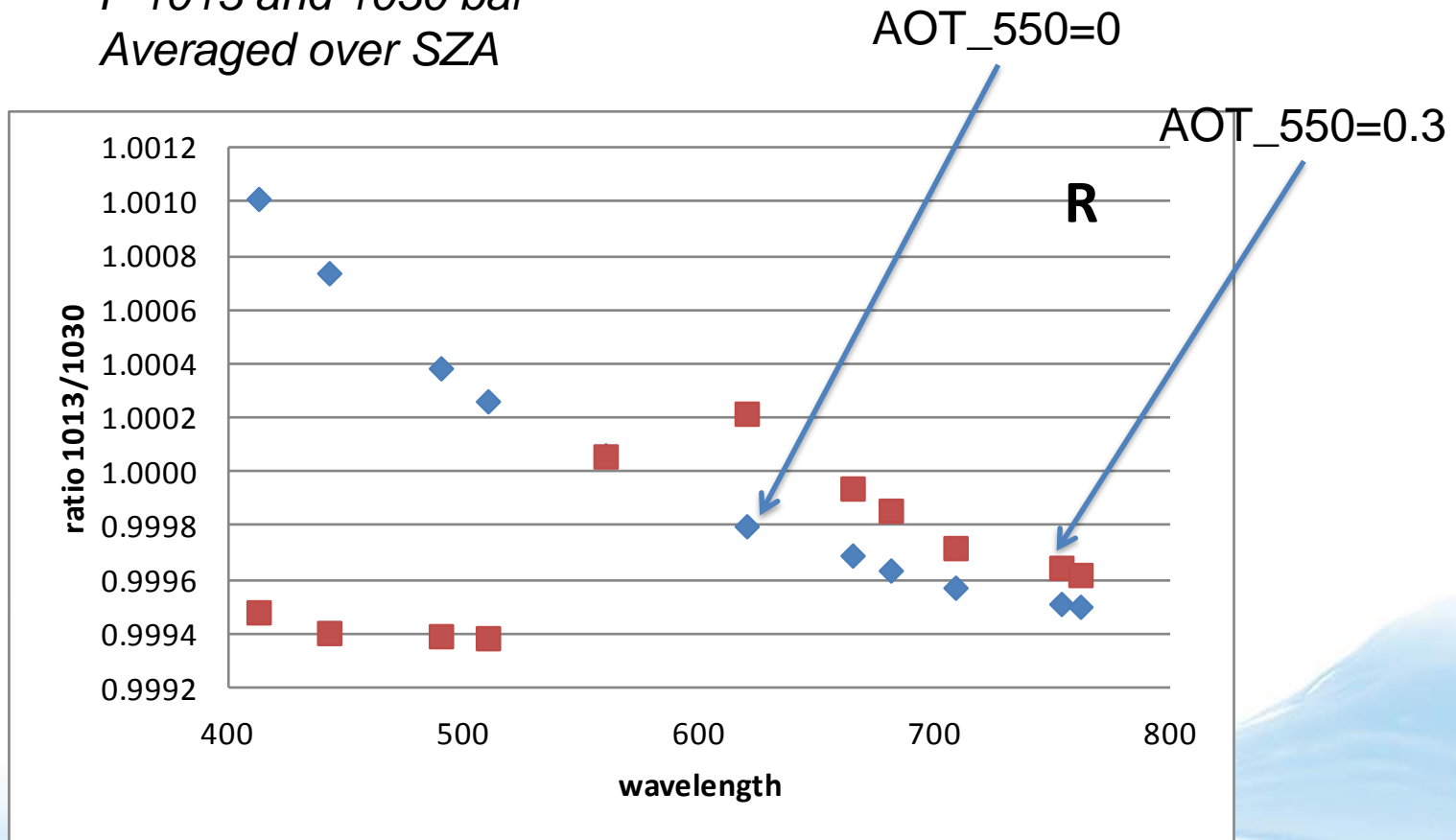
Effect of P-atm/AOT on R

Reflection coefficient

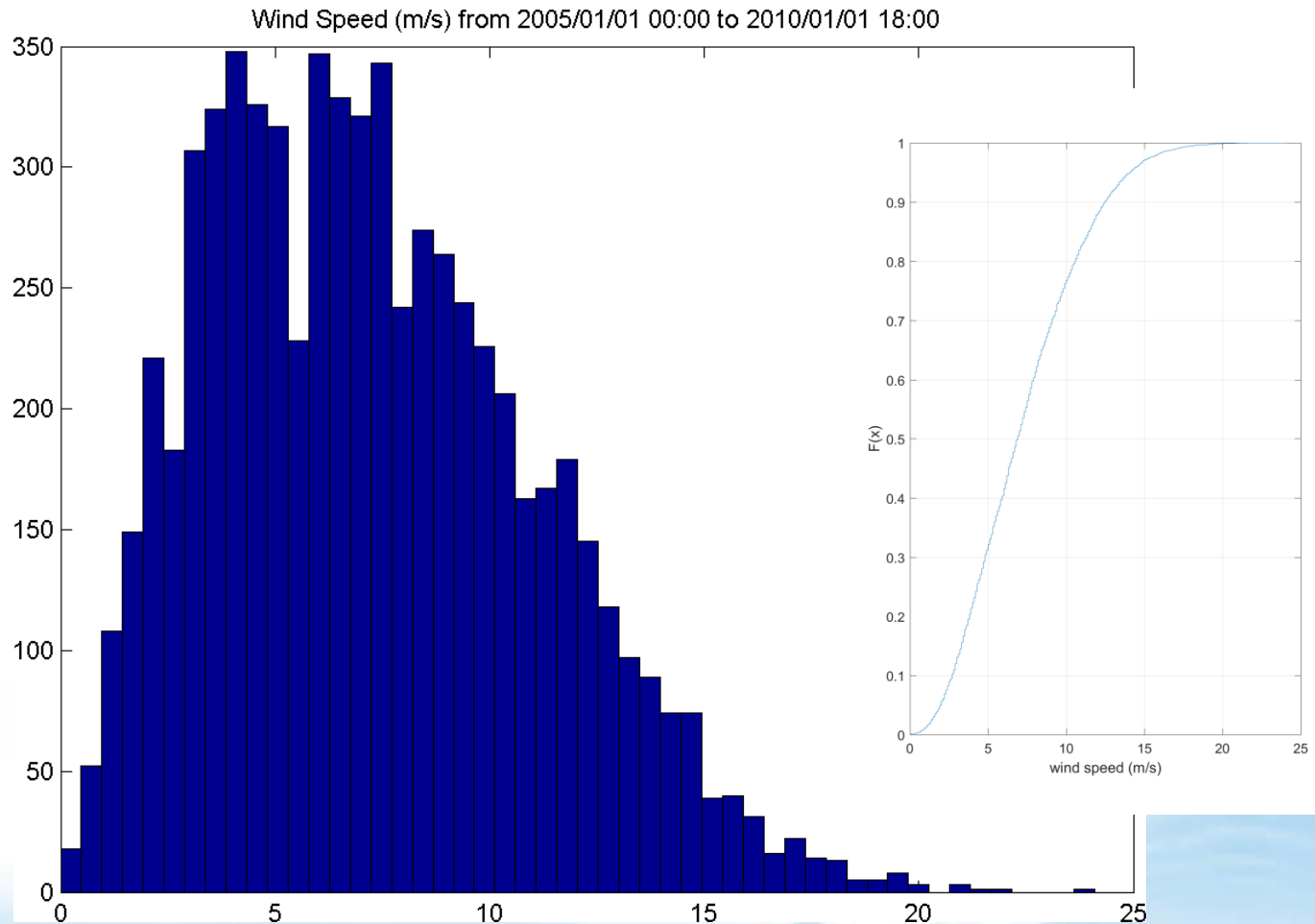
SZA 0-70 deg

P 1013 and 1030 bar

Averaged over SZA



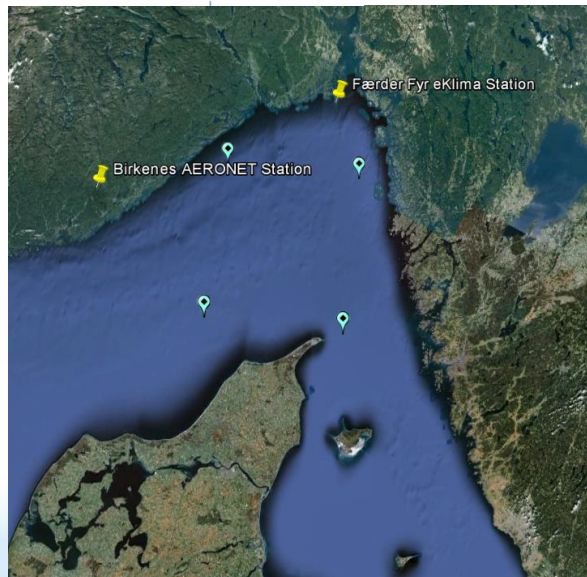
Wind in Skagerrak



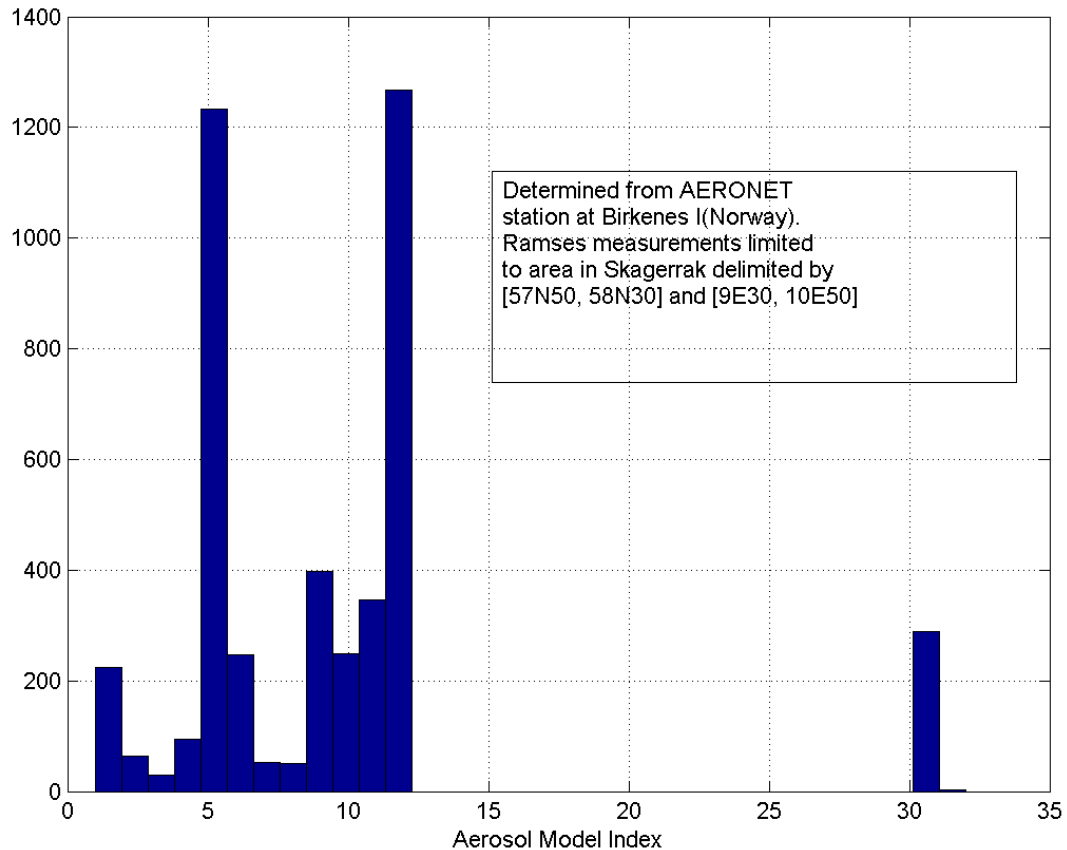
NIVA Test Data I

- Fantasy 2009

Longitude min	9E30
Longitude max	10E50
Latitude min	57N50
Latitude max	58N40

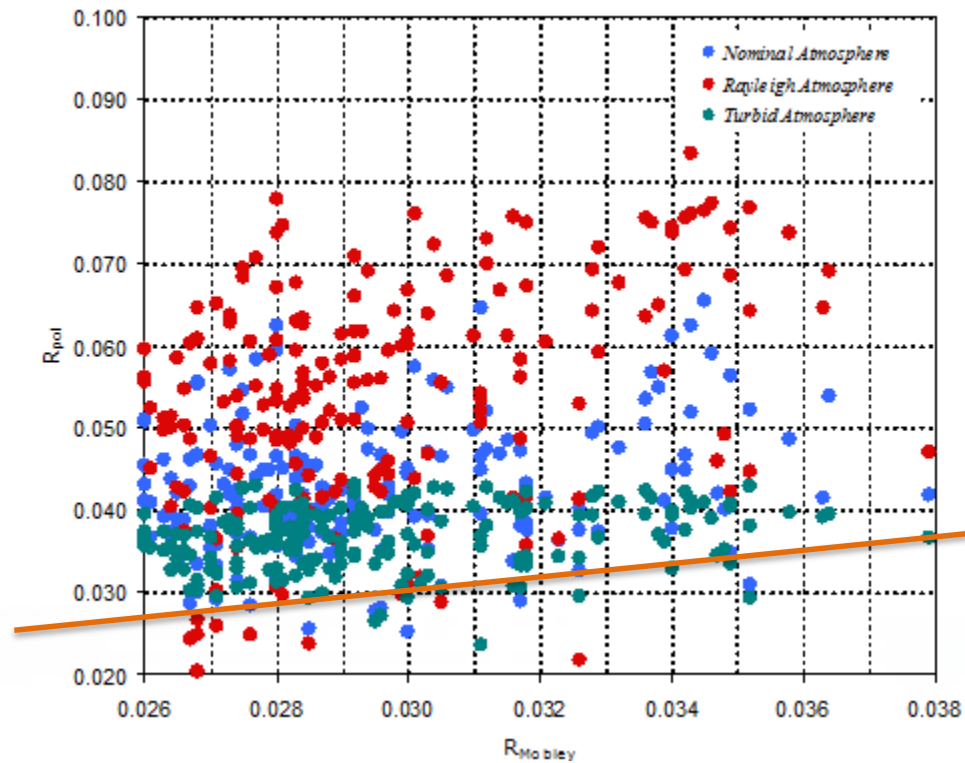


Occurrence of Aerosol Models for CF/FA 2005-2009

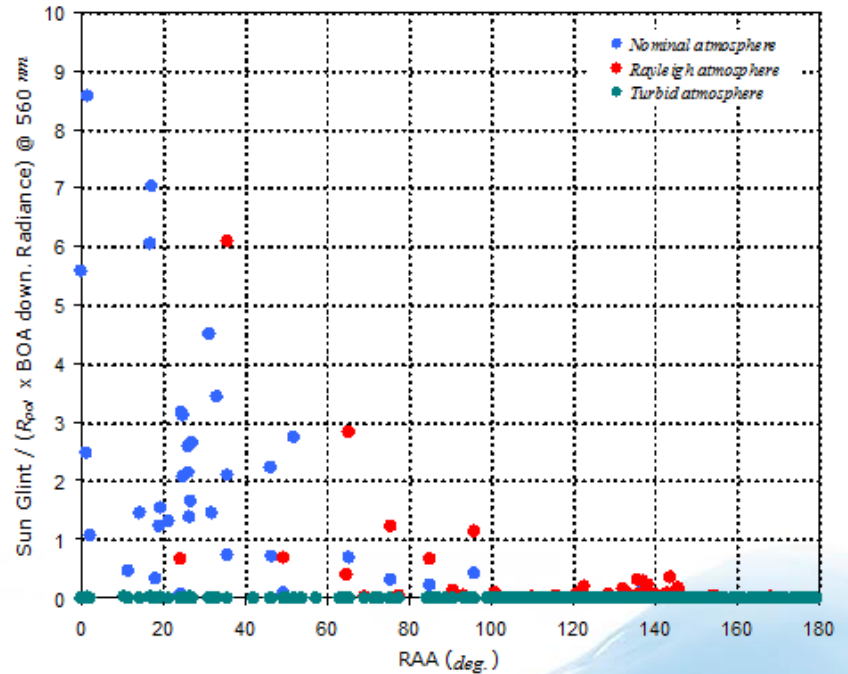
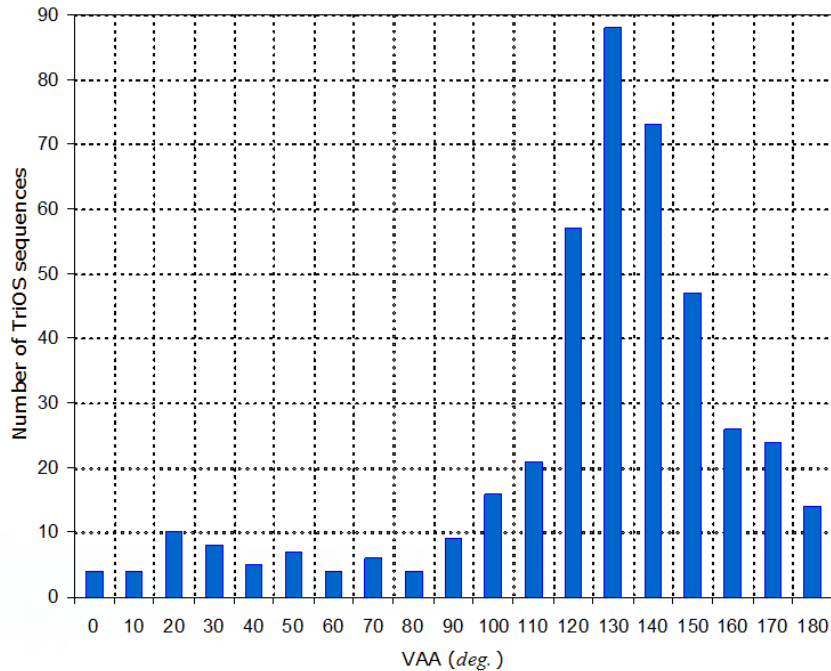


Model	iaer	alpha-nir
mar99	4	0.08
mar90	3	0.20
coa99	8	0.22
coa90	7	0.40
mar70	2	0.41
mar50	1	0.51
coa70	6	0.66
coa50	5	0.78
rur99	12	1.30
rur90	11	1.51
rur70	10	1.60
rur50	9	1.67
blu-IOP1	31	1.95
blu-IOP2	32	2.10
blu-IOP3	33	2.25

R_{pol} vs R_{mobley}

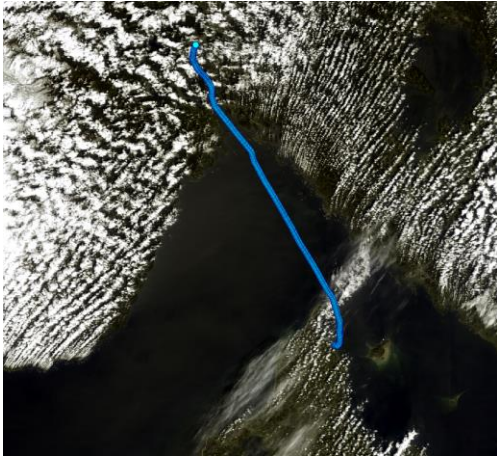


Sun Glint vs VAA

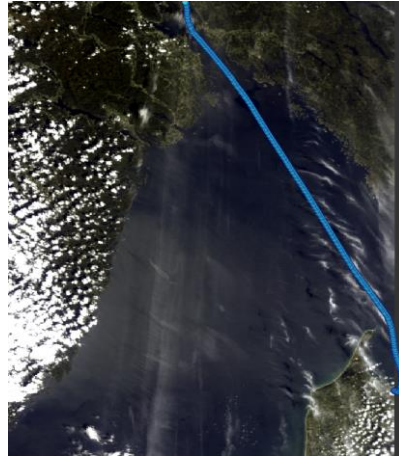


NIVA Test Data II

CF 2007-05-20



CF 2007-05-26



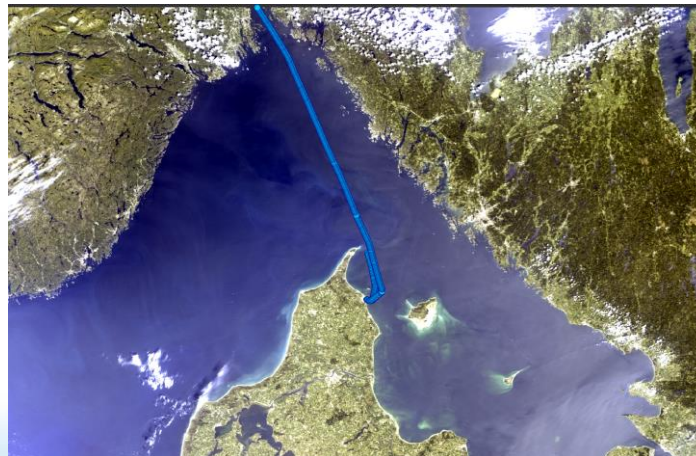
CF 2007-06-08



CF 2007-06-11



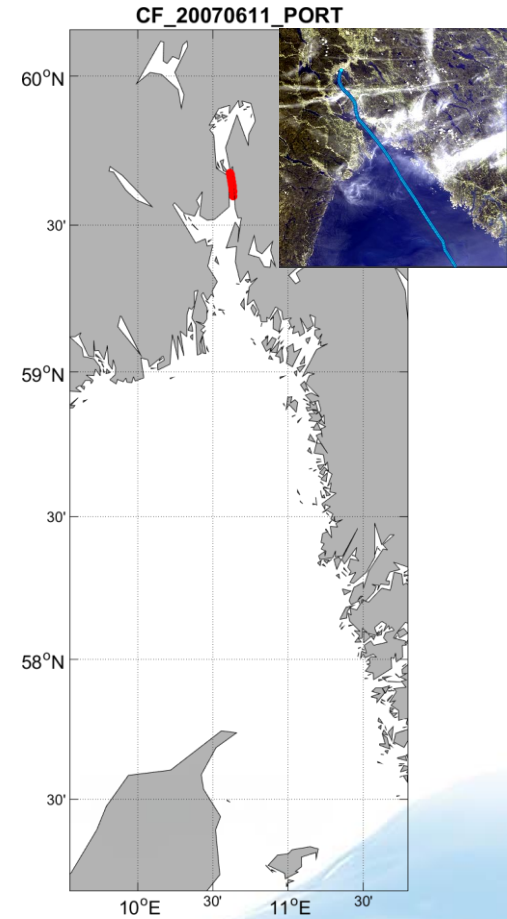
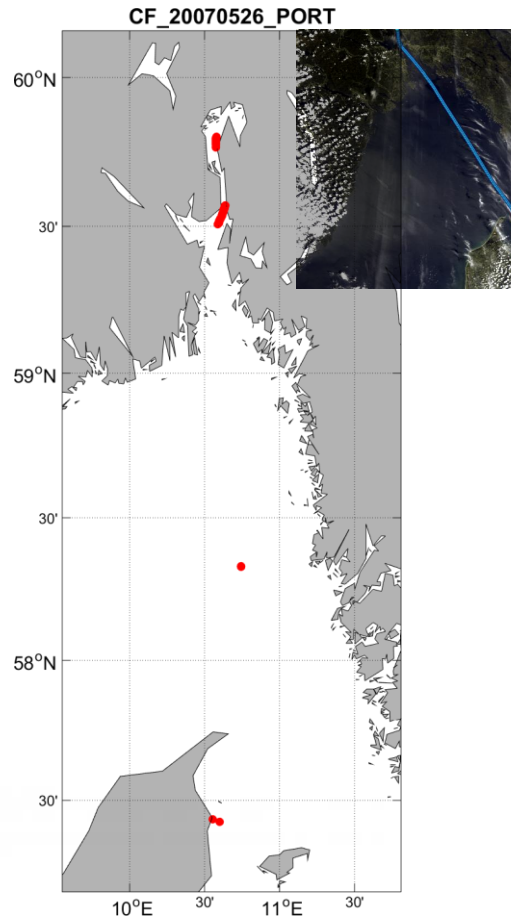
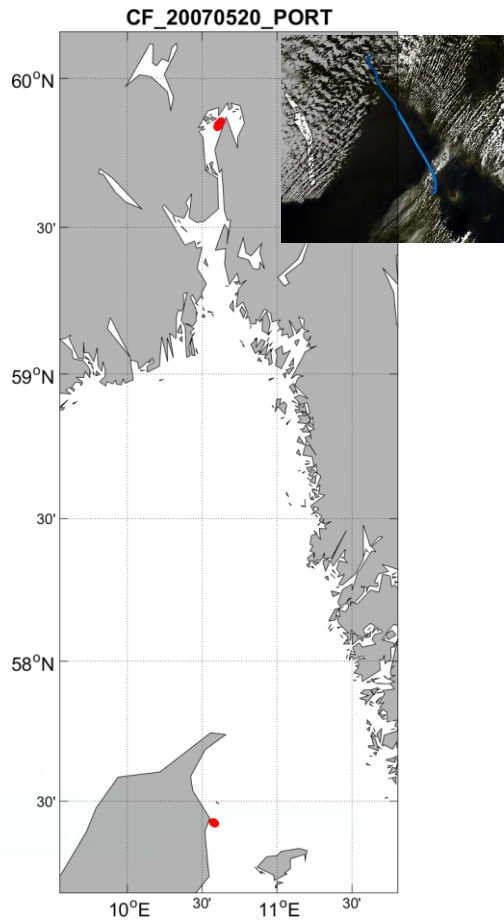
CF 2007-06-12



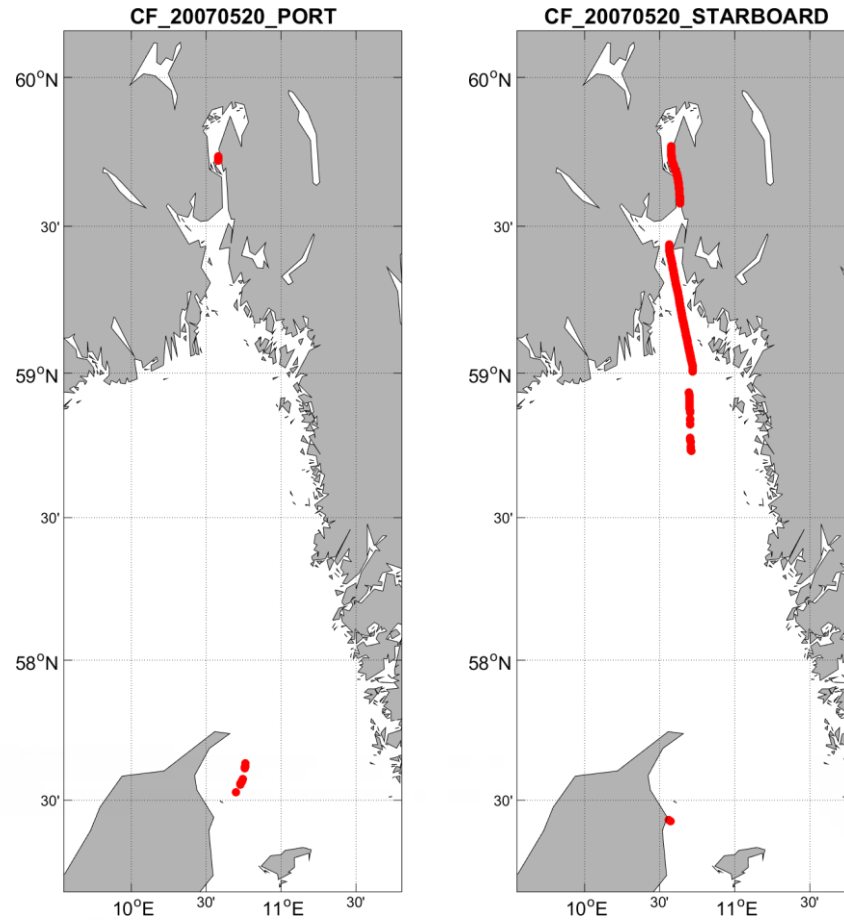
FA 2011-08-12



Cloud Flag

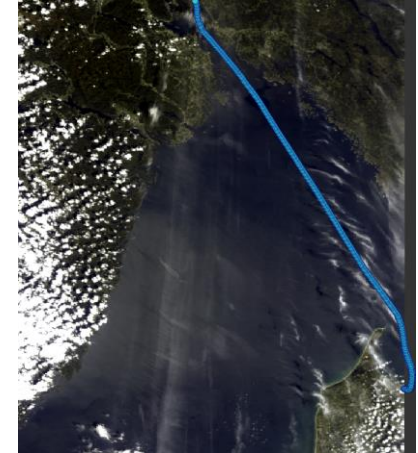
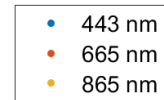
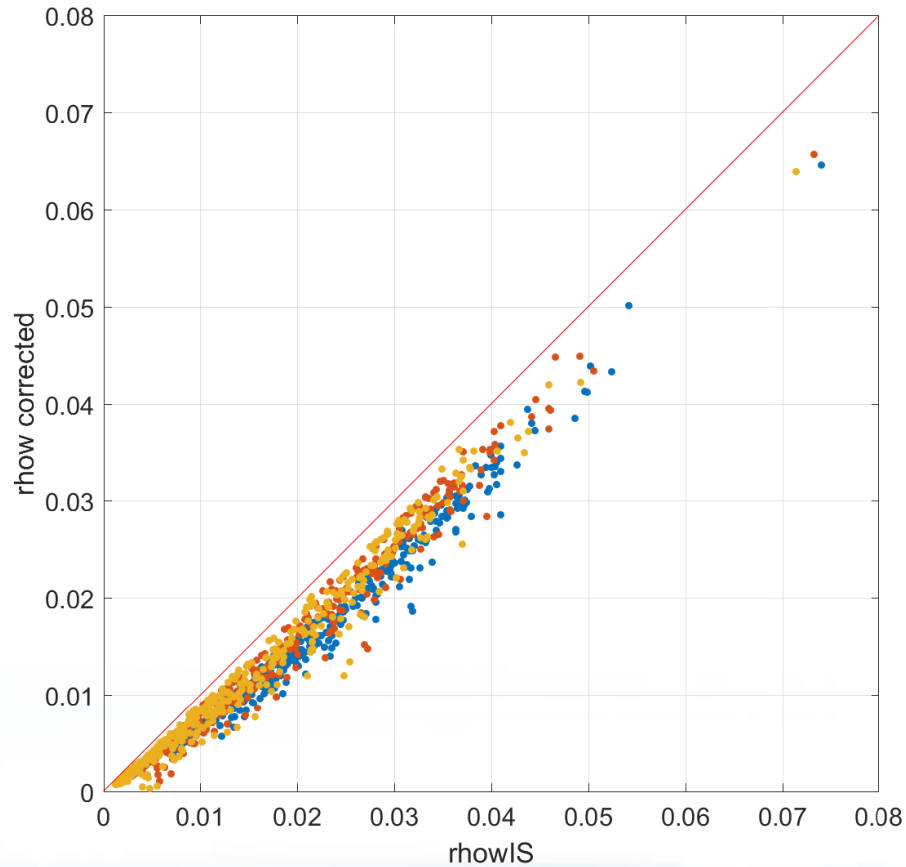


Shadow Flag

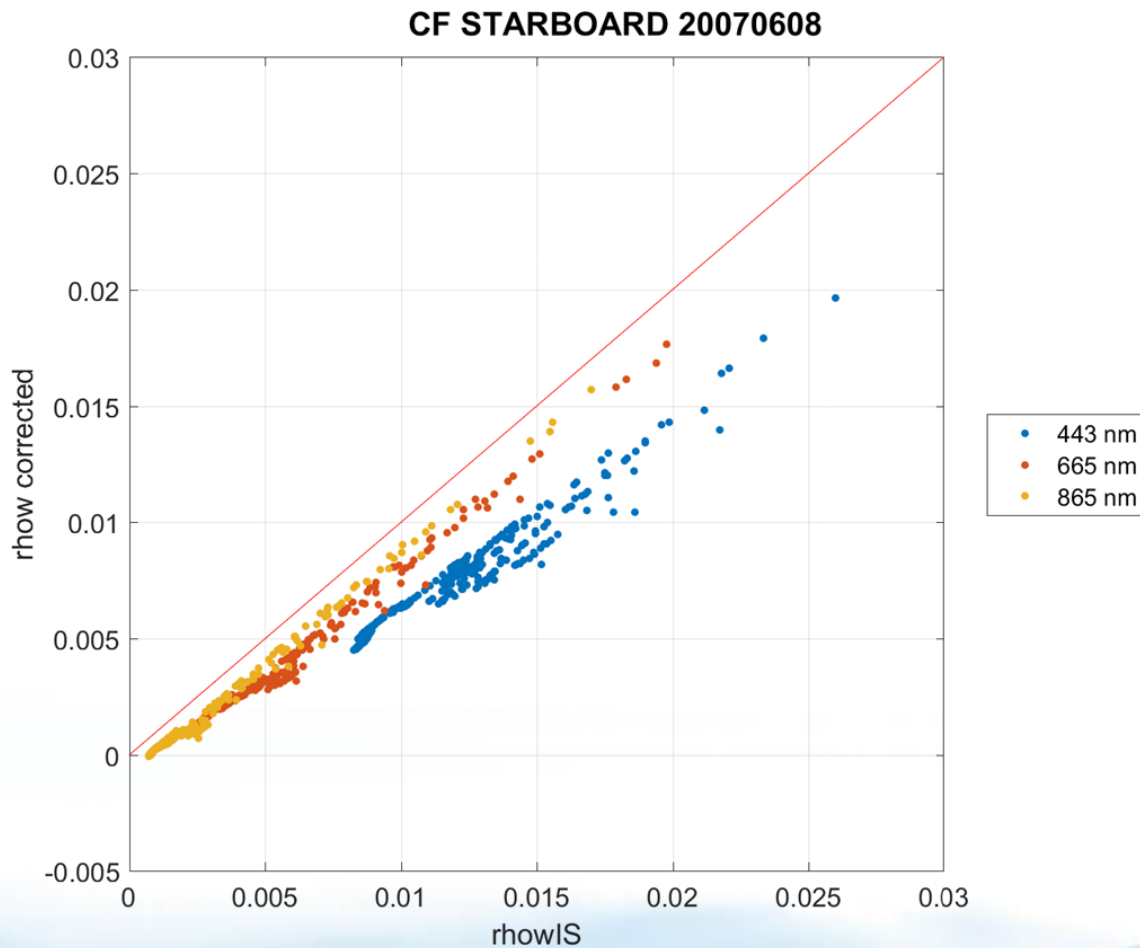


Corrected Reflectance CF 2007-05-26

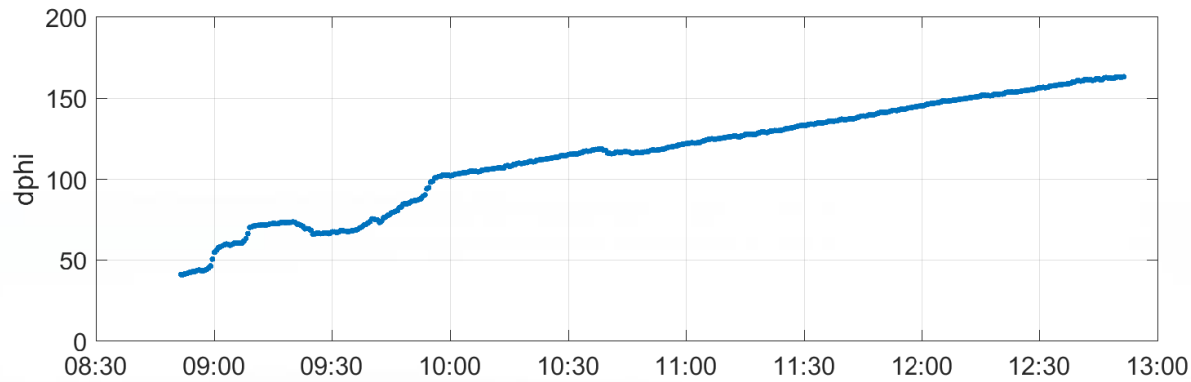
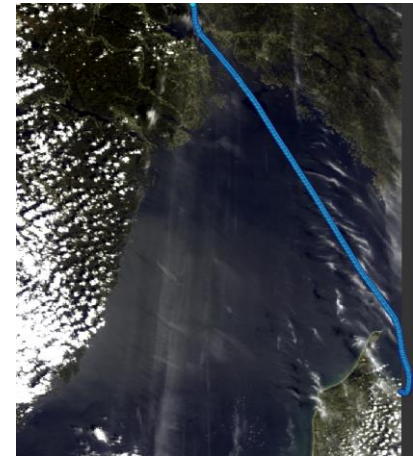
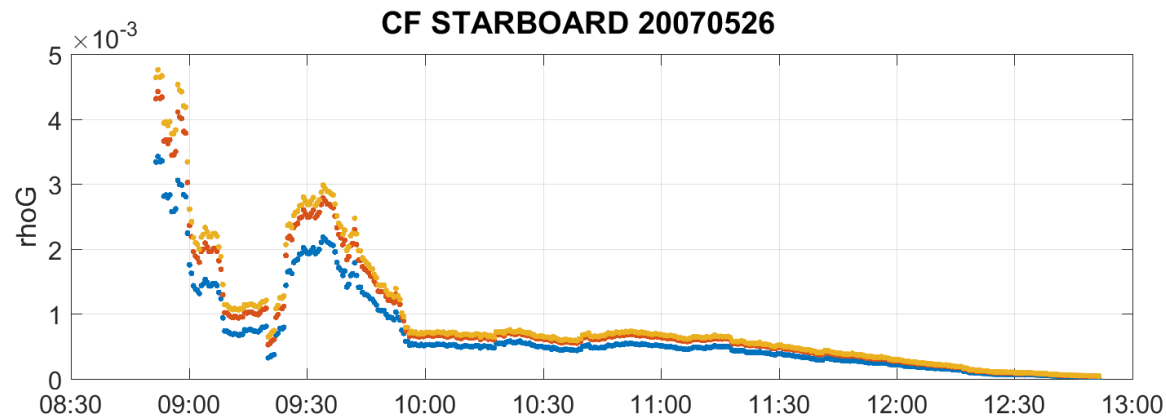
CF STARBOARD 20070526



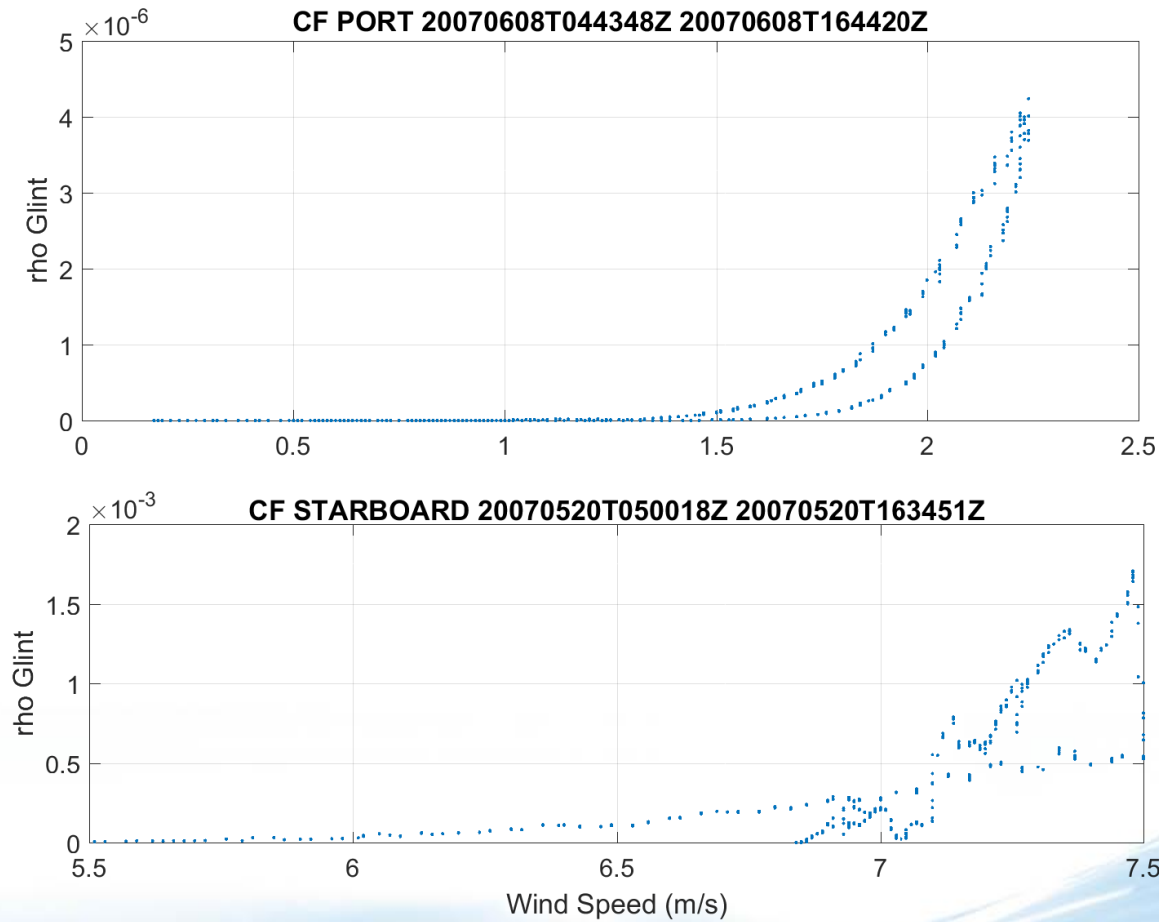
Corrected Reflectance CF 2007-06-08



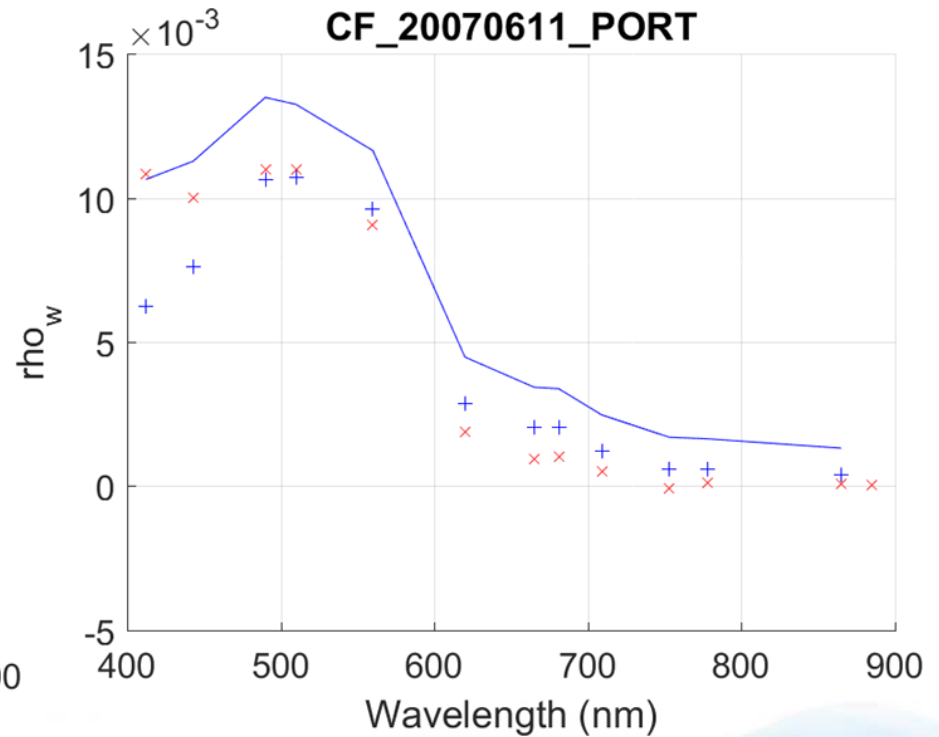
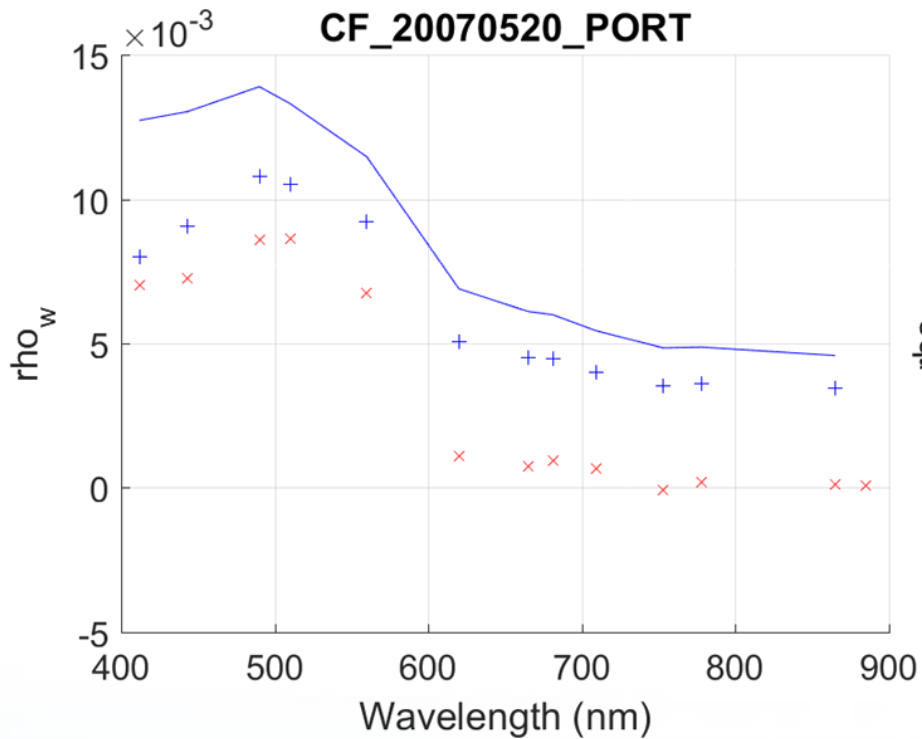
Sun Glint



Sun Glint and Wind



Spectrum Matchup



Rough efficiency of NIVA/Trios

- Color Fantasy
- 2009/07/03-2009/08/20
- 4218 measurements

STARBOARD	Total	FLR	FLT	FHR	FHT	FLG	FLW
Total flagged	3792	785	2539	292	2542	6	1958
% bad	90	19	60	7	60	0	46

PORT	Total	FLR	FLT	FHR	FHT	FLG	FLW
Total flagged	3724	762	2786	292	2542	0	1774
% bad	88	18	66	7	60	0	42



400-500 measurements left on each side for 50 days