SATLANTIC

Radiometric Data Processing

October 6, 2008

Barga, Italy

Scott McLean
Chief Technology Officer and
Vice President, Research and Development
scott@satlantic.com

SATLANTIC

Course Outline

- AOP basics
- SORTIE Project – latest advances in radiometry
- Multicast technique
- SatView Update
- Protocol changes
- ProSoft 8.0
- Data processing examples / discussion

SATLANTIC

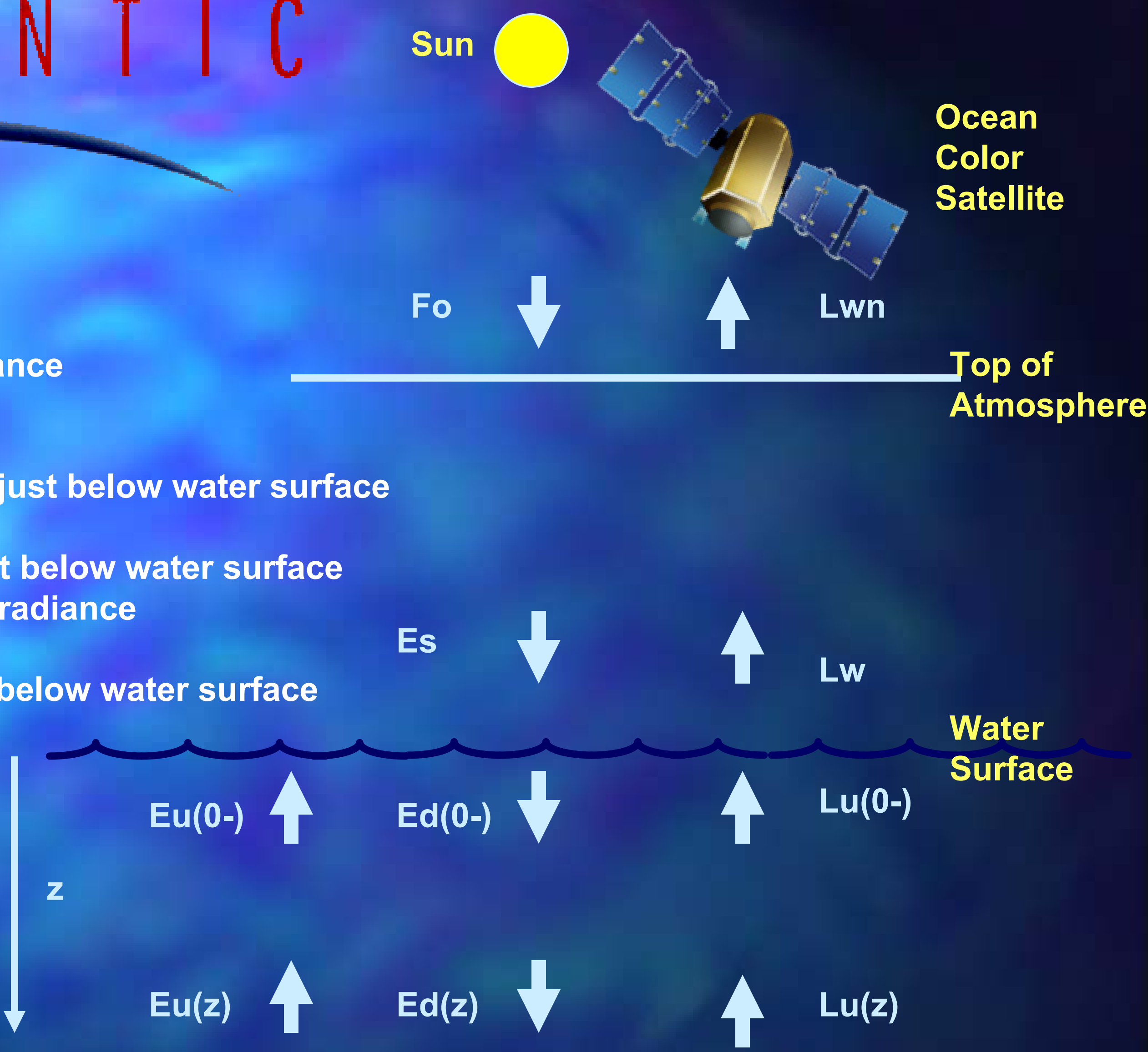
AOP Basics

- Apparent optical properties (AOPs)
- Apparent because depend on solar illumination
- Why measure AOPs?
  - Based on absolute standards
  - Satellite cal/val
  - Algorithm development
  - Input to biological processes
  - Detection of changes
  - Measure of biological processes

SATLANTIC

AOP Basic Terms

Fo = mean extraterrestrial irradiance
Es(0+) = total irradiance
Ed(z) = downwelling irradiance
Ed(0-) = downwelling irradiance just below water surface
Eu(z) = upwelling irradiance
Eu(0-) = upwelling irradiance just below water surface
Lwn = normalized water leaving radiance
Lw = water leaving radiance
Lu(0-) = upwelling radiance just below water surface
Lu(z) = upwelling radiance



AOP Basic Equations

Fo constant (either Neckel&Labs or Thuillier)
Es(0+) measured

$$E_d(0^+,\lambda) = E_d(0^-,\lambda)/(1-\alpha)$$

α = fresnel reflection albedo

Ed(z) measured

$$E_d(z,\lambda) = E_d(0^-,\lambda)e^{-\int_0^z k_d(z',\lambda)dz'}$$

Kd = diffuse attenuation coefficient

Eu(z) measured

$$L_{wn} = L_w(\lambda)\frac{F_o(\lambda)}{E_s(\lambda)}$$

$$L_w(0^+,\lambda) = L_u(0^-,\lambda)\frac{1-\rho(\lambda,\theta)}{\eta_w^2(\lambda)}$$

ρ = fresnel reflectance, η_w = index of refraction of water

$$L_u(z,\lambda) = L_u(0^-,\lambda)e^{-\int_0^z k_{Lu}(z',\lambda)dz'}$$

K_{Lu} = diffuse attenuation coefficient for upwelling radiance

Lu(z) measured

SATLANTIC

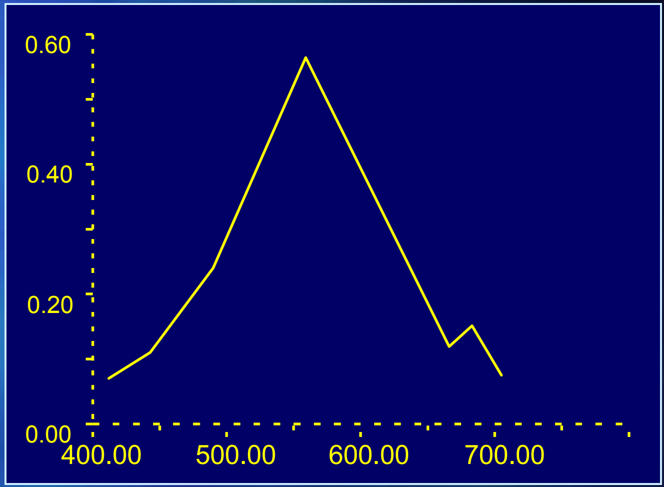
AOP Basics

- Typical AOP systems measure
  - Es, Ed(z), Lu(z), z
- Freefall most common technique
  - Avoids ship disturbances
  - Controlled descent
  - Instrument tilts <2deg (typ)
- Two basic classes
  - Multispectral
  - Hyperspectral

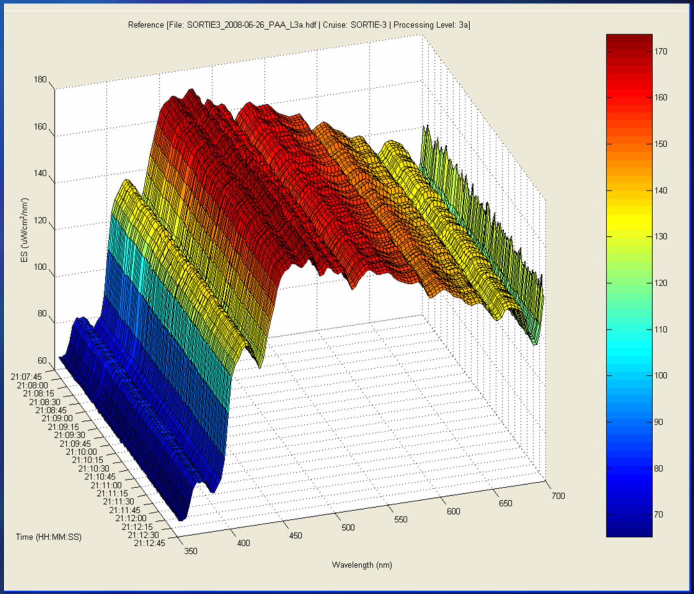
SATLANTIC

AOP Basics

- Multispectral systems
  - 4 - 14 discrete wavelengths
  - High sensitivity



- Hyperspectral systems
  - 128+ wavelength spectra
  - High spectral sampling
  - Very stable



SATLANTIC

AOP Basics

- Calibration and characterization
  - Calibration – transfer of absolute radiometric standard (see details in NASA TM-2002-206892, Vol 17)
  - Characterization – measurement of factors that affect instrument in situ
    - Typically only done on class of instruments
      - Immersion factor
      - Irradiance cosine response
      - Radiance field of view
      - Spectral response
      - Thermal response
      - Stray light (or out of band performance)

SATLANTIC

Spectral Ocean Radiance Transfer and Investigation Experiment (SORTIE)

- Overview
- Instrument characterization
  - Thermal responsivity
  - Stray light
- Recommended changes to radiometric protocols

SATLANTIC

SORTIE Project Team

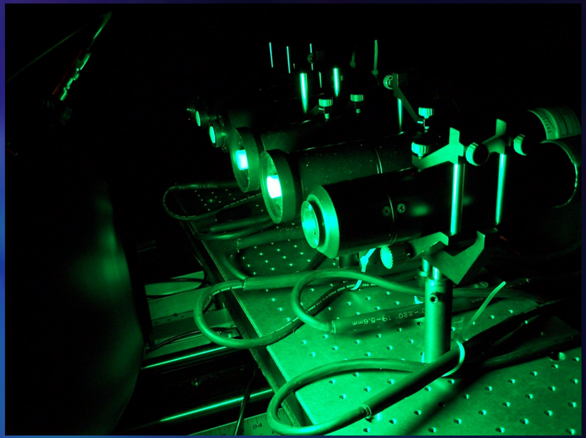
Chuck Trees, Susanne Craig, Jim Mueller, CHORS / NURC
Ken Voss, Howard Gordon, U Miami
Mike Twardowski, Ron Zaneveld, Andrew Barnard, WET Labs
Marlon Lewis, Scott McLean, WETSAT
Carol Johnson, Yuqin Zong, Steve Brown, Keith Lykke, NIST
Stephanie Flora, Mike Feinholz, MLML
Richard Stoner, Marina Ampolo-Rella, NURC
Giuseppe Zibordi, JRC

SORTIE Project Objectives

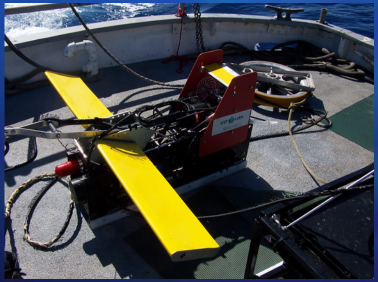
- Test radiometric methods to augment current vicarious calibration methods
- Test process of using measurements of inherent optical properties (IOPs) to extend radiometric measurements (apparent optical properties – AOPs) and determine subpixel variation
- Determine ability to perform vicarious calibration in coastal waters

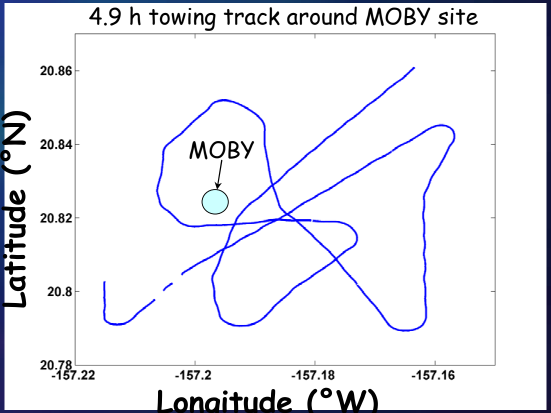
SATLANTIC

SORTIE Project Methods



- Start with very well characterized radiometers
- Collect suite of AOP measurements during overpass time to retrieve best possible Lwn measurements (2-3 simultaneous hyperspectral systems)
- Collect simultaneous IOPs and use a towed IOP platform to map the pixels around measurement site ($9km^2$)





SATLANTIC

SORTIE Experiments

- SORTIE-1: test techniques next to MOBY – 162 casts, 2 MOBY matchups
- SORTIE-2: test techniques in coastal zone – 154 casts, 80 casts within MODIS pass

- SORTIE-3: revisit MOBY to improve matchups – 105 casts, 2 MOBY matchups
- SORTIE-4: refine techniques in coastal zone, matchups with BOUSSOLE

SATLANTIC

SORTIE AOP Measurements

- Lowest uncertainty AOP measurements possible with commercial radiometers

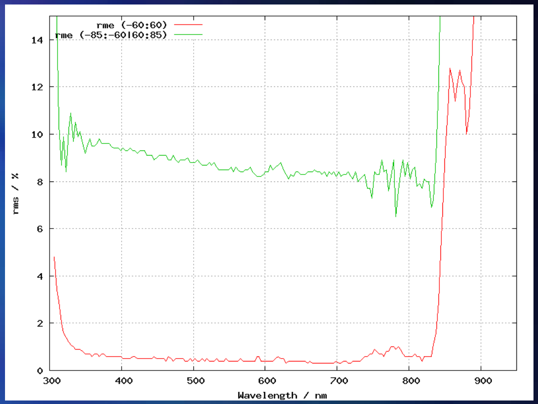
- Highly characterized radiometers
- Calibration with NIST lamps
- Develop methodologies to improve Lwn retrievals
  - Deployment techniques
  - Data processing

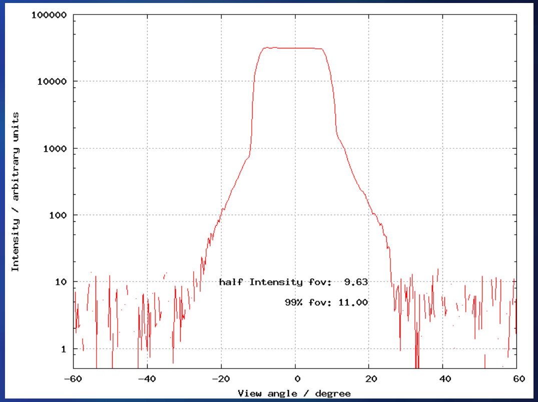
SORTIE Radiometer Calibration

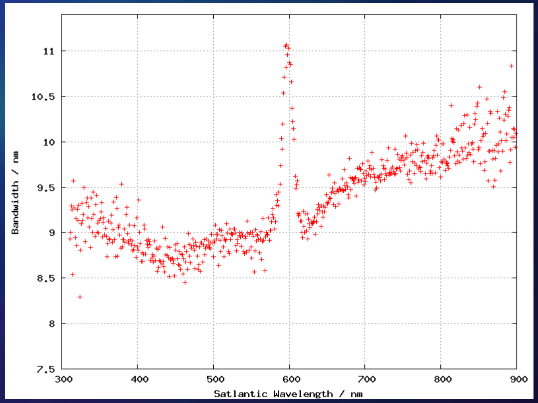
- SORTIE radiometers calibrated directly with NIST lamp
- Procedure, uncertainty documented in SIRREX-7
  - NASA TM-2002-206892, Vol 17
- Radiance Uncertainty 2.7%
- Irradiance Uncertainty 2.3%
- MOBY lab matchups 1-2%

SORTIE Characterization

- Immersion factor
- Spectral characterization
- Field of view
- Thermal responsivity
- Stray Light



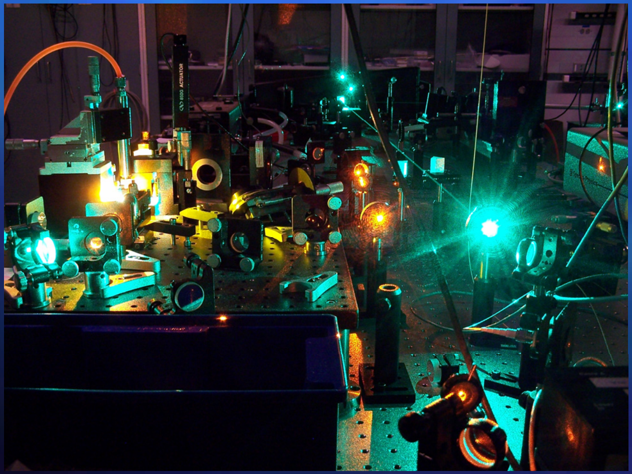




SATLANTIC

SORTIE Project – Stray Light Correction (SLC)

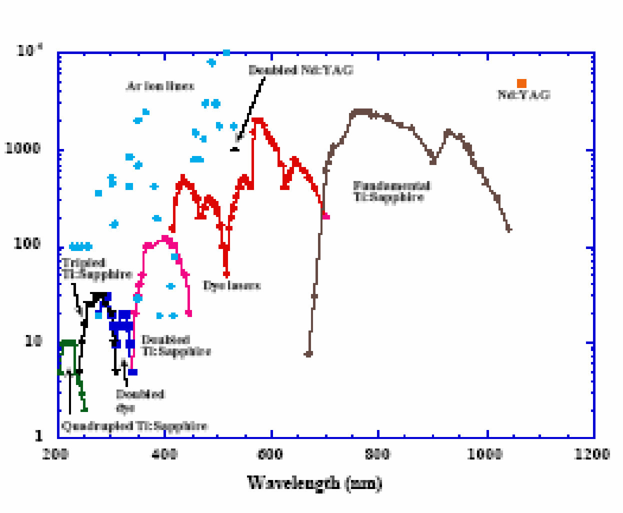
- Light from input wavelength scattering to other measurement channels in detector
- ALL instruments have stray light
- Until NIST developed SIRCUS facility very hard to measure and correct

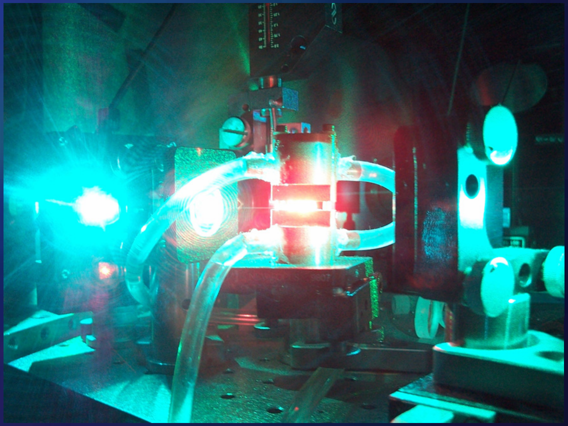


S A T L A N T I C

SORTIE Project – Stray Light Correction

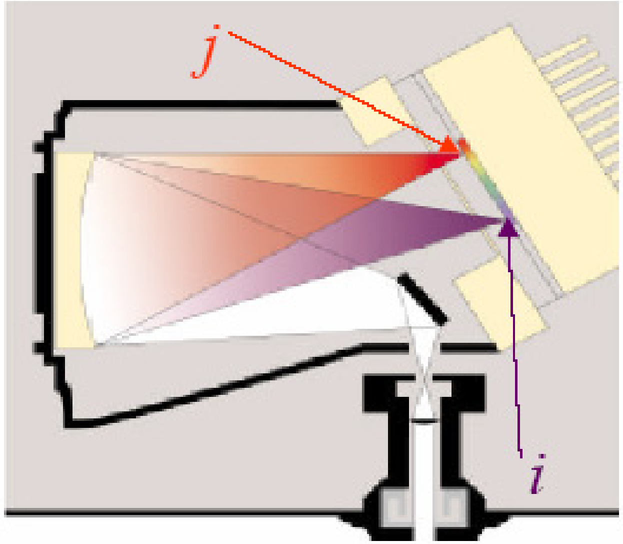
- SIRCUS (Spectral Irradiance and Radiance responsivity Calibration with Uniform Sources) – high power lasers covering 300-1000nm
- First in situ system characterized for stray light was MOBY





New Method

Idea: A relationship function between the stray light signal at pixel "*i*" and the signal at pixel "*j*" can be easily determined by measuring a monochromatic light (eg. lasers) at pixel "*j*".

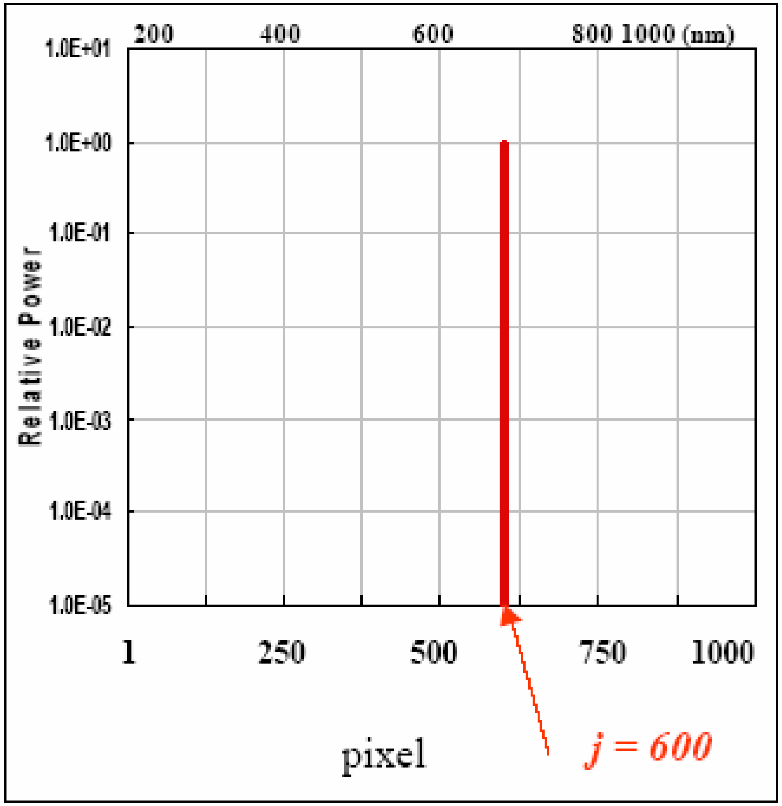


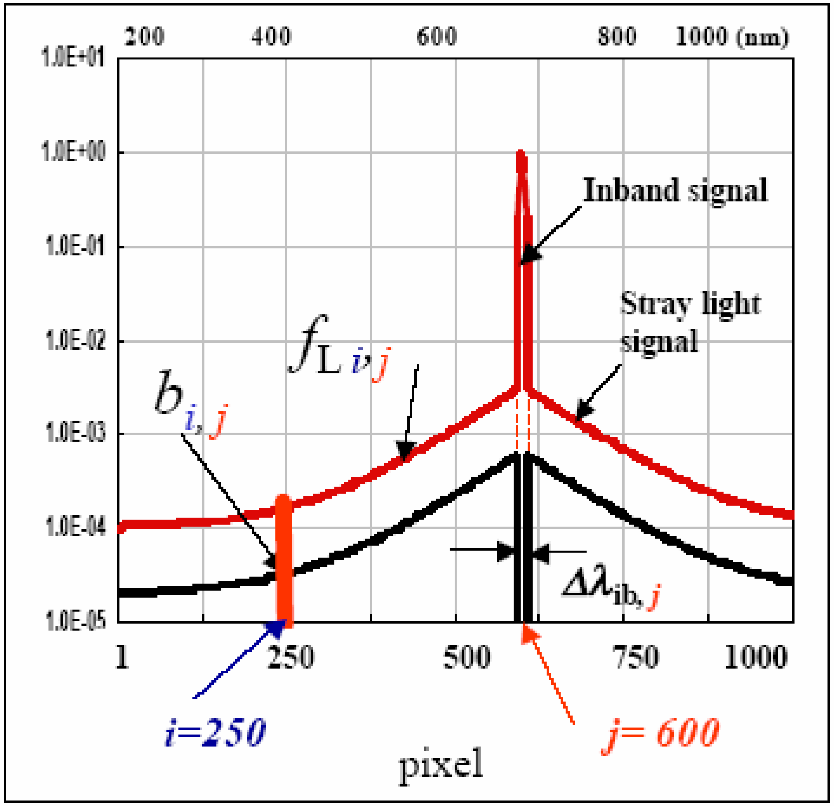
With a set of relationship functions, the stray light at pixel "*i*" when measuring a broadband source can be determined by algorithms.

Charaterization of Instruments

- **Spectrum Line Spread Function (LSF***)*, or laser spread function, $f_{L\ i,\ j}$: a relative output signal function between stray light signal at pixel "*i*" and signal at pixel "*j*" when measuring a single wavelength source at pixel "*j*".
- **Out-of-Band Signal Function (OSF),** or stray light signal function, $b_{i,\ j}$: a ratio of an output signal at pixel "*i*" and the total signal inside bandpass at pixel "*j*".

$$b_{i,\ j} = f_{L\ i,\ j} / \sum_{j=ib} f_{L\ i,\ j}$$

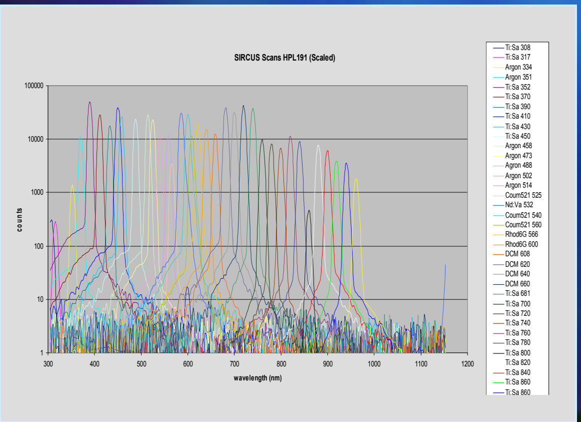


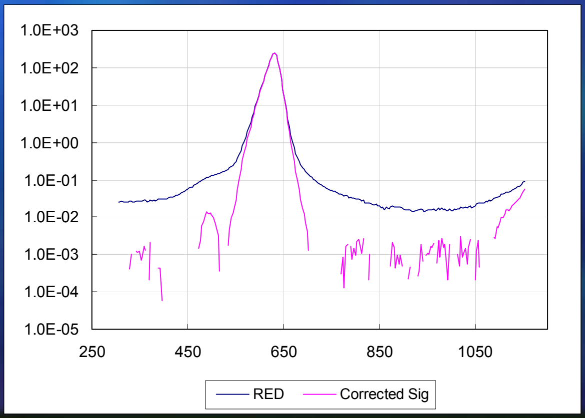


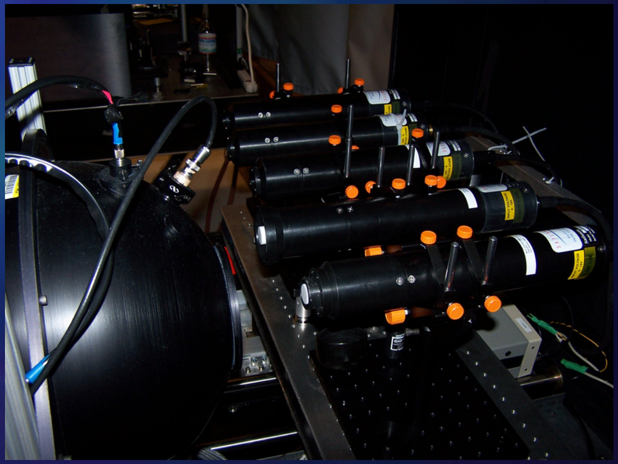
SATLANTIC

SORTIE Project – Stray Light Correction

- 13 HyperOCR systems were measured at NIST SIRCUS facility over 4 year period
- Up to 44 laser lines measured per radiometer
- SLC matrices generated for all 13 systems
- Results verified against know sources
- 1-2 decade improvement in stray light

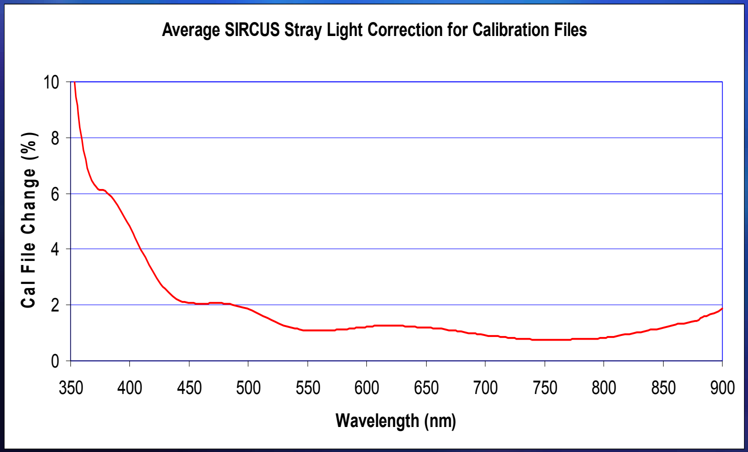


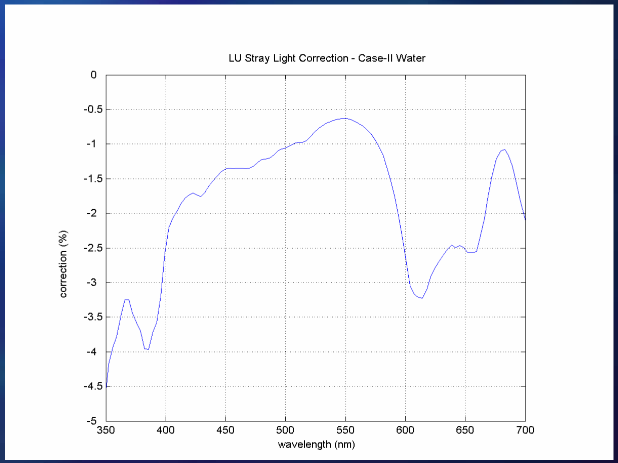




SORTIE Project – Stray Light Correction (Exact corrections)

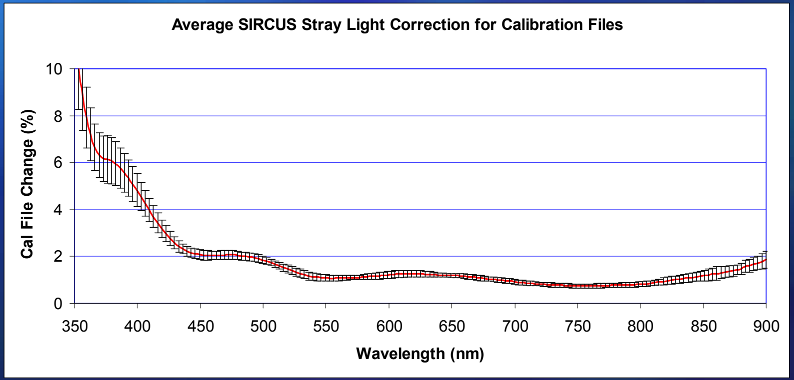
- Corrections must be made to both calibration file and field data
- Calibration file and field data corrections have opposite sign
- Correction significant <450nm





SORTIE Project – Stray Light Correction (Generic Corrections)

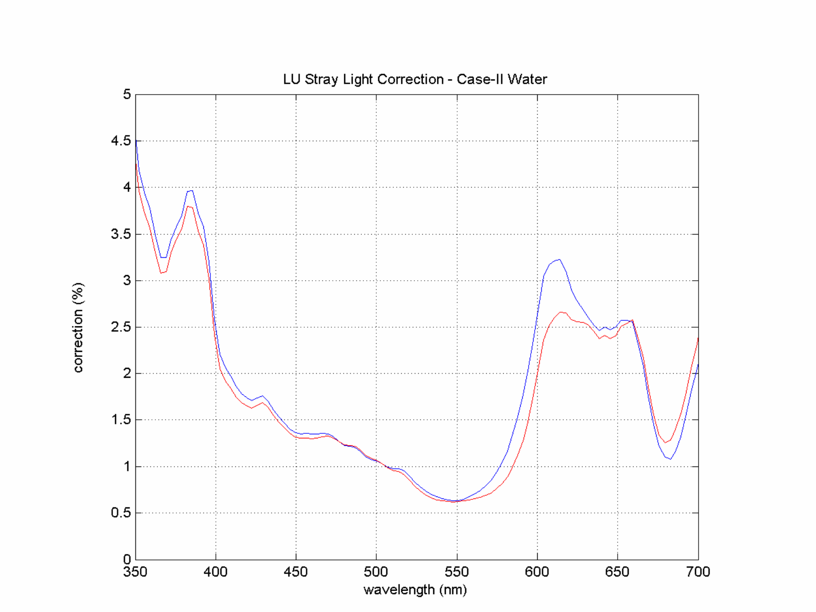
- Great for SORTIE. So what about everyone else?
- Class based correction, generic SLC matrix applied to all 13 radiometers with exact correction
- Does it work? You bet! <0.2% 450-800nm, <2% 350-450
- What do you need to do?
  - Contact support@satlantic.com, get cal file updated
  - Reprocess data with new cal file and ProSoft 8.0



SATLANTIC

SORTIE Project – Stray Light Correction

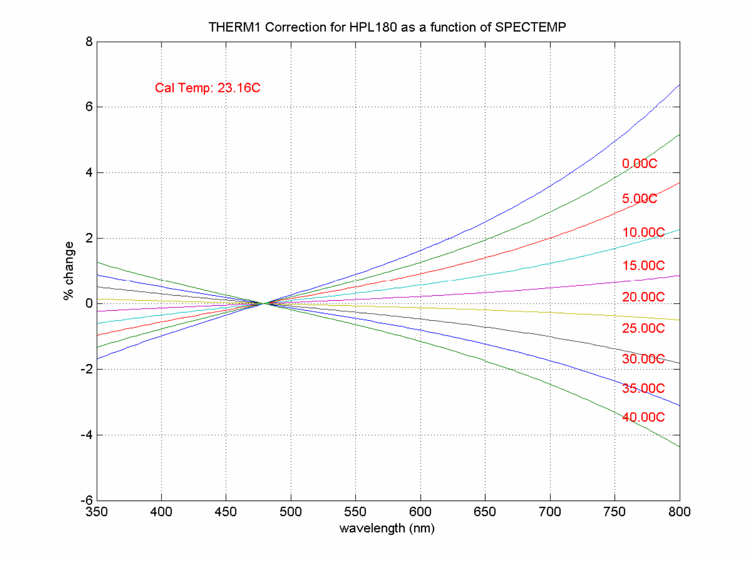
- SORTIE uses full output 305-1150nm (ie all 255 pixels)
- What about 350-800nm output? (typical system)
- Error between exact and generic with reduced wavelength range on field data <0.5% 350-700nm



SATLANTIC

SORTIE Project – Thermal Responsivity Correction

- Thermal darks compensated by shutters in HyperOCR
- 10 radiometers tested for thermal responsivity
- Property of Si in diode array – very highly controlled
- Highest in NIR 6% at 800nm for ±15 C from cal temp
- Not surprisingly very repeatable <0.18%
  - ±15 C, 350-800nm
- What do you need to do?
  - Get thermistor installed
  - Get cal file updated
- Built into ProSoft 8.0



SATLANTIC

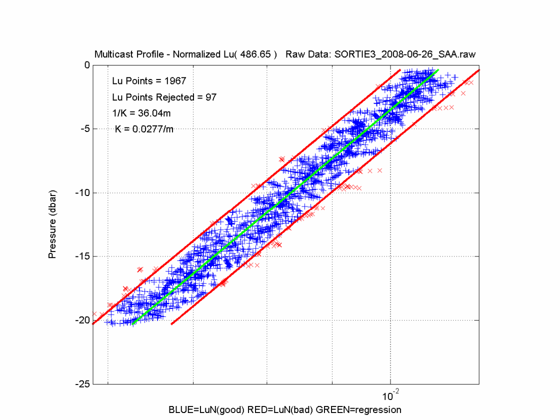
SORTIE Project – Protocol Changes

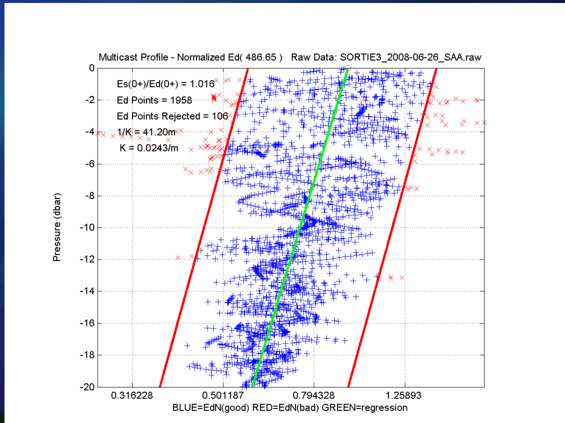
- How to achieve highest accuracy in Lwn?
  - N is your friend
    - New multicast technique
  - Reduce pressure offset errors
    - Only do "deck" tares
  - Standardize radiometer positions and integrate into processing
    - Updated protocols (ProII Manual on CD)
    - Processing automatically determines context and distances

SATLANTIC

SORTIE Project – Multicast Technique

- Pioneered by Giuseppe Zibordi (JRC) – built into SeaProc
- Concentrate measurements near surface for best Lwn
- Make multiple, relatively shallow casts all in one .RAW file
- Improve Lwn retrievals, particularly Case-II
- Huge improvement in Kd, particularly Case-I
- Even with hyperspectal instruments at 0.3m/sec
  100 spectra/m possible!





SATLANTIC

SORTIE Project – Multicast Technique

- What do I do?
  - Pressure tare on deck
  - Case-II coastal waters – 5 casts to 10m (log to one file)
  - Case-I blue waters – 5 casts to 20m (log to one file)
  - Just instruct "cable person" to redeploy when system reaches surface
  - Ask them to bring it back to surface at target depth
  - Try both deep and multicast to compare
  - Recommend different file naming protocol to separate cast types
  - Use ProSoft 8.0 to process

SATLANTIC

Software Updates - SatView 2.9.2

- Allows COM10-16 to be used
- Updated cast card headers for SeaBASS compatibility
- Make sure you log position and correct time zone
  - Self-shading corrections coming
- Graph wavelength range settable
- SatCon 1.5.1 complies with SatView 2.9.2 updates
- SatView 2.9.2, SatCon 1.5.1 and Updated Pro-II Manual on course CD
- Updated Pro-II manual describes protocol for collecting multicast data and setting instrument distances

SATLANTIC

Software Updates – Instrument Distances

assembly. The table below lists the factory settings for the most popular configurations. **Note that systems delivered prior to September 2008 may not be set to the new default configurations and should be checked using Table C-2.**

Radiometer	Distance to Pressure	Distance to Irradiance
HyperOCR ICSW (as Ed)	0.786 m	0
HyperOCR ICSW (as Eu)	0.470 m	0
HyperOCR R08W	0.470 m	0.316 m
OCR 507 IR	0.796 m	0.287 m
OCR 507 ICSW	0.697 m	0
OCR 507 R10W	0.597 m	0.100 m

Table C-1: Factory standard sensor distance settings

Radiometer	Distance to Clamp	Sensor Reference	Clamp Reference	See Figure
HyperOCR ICSW (as Ed)	11.5 cm	Edge of diffuser baffle	Top	C-3
HyperOCR ICSW (as Eu in surface mode)	14.5 cm	Edge of diffuser baffle	Bottom	C-4
HyperOCR R08W	14.5 cm	Face of window	Bottom	C-3
OCR 507 IR	Fixed	Fixed	Fixed	C-6
OCR 507 ICSW	2.6 cm	Edge of diffuser baffle	Top	C-5
OCR 507 R10W	2.7 cm	Edge of sensor	Bottom	C-5

Table C-2: Distances to check factory settings

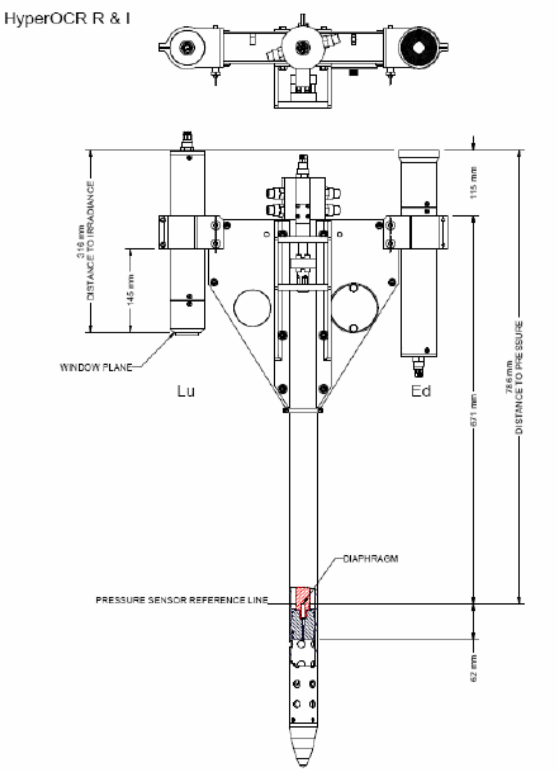


Figure C-3: Sensor Position Measurements: Profiler II with HyperOCRs

SATLANTIC

ProSoft 8.0

- ProSoft originally developed in 1993 for SPMRs
- Follows processing steps in Ocean Optics Protocols for traditional “deep cast” or “single cast”
- Current manual equation references are to Ocean Optics Protocols Rev 1 (NASA TM-104566, Vol 25)
- Additional processing added for near surface floating systems (ie surface mode or TSRB mode)

SATLANTIC

ProSoft 8.0

- Significant update to take advantage of SORTIE experience
  - Multicast data processing with adaptive regression
  - Stray light correction (hyperspectral)
  - Thermal responsivity correction (hyperspectral)
  - Improved (and automated) ASCII output
  - SeaBASS compliant ASCII output
  - Automated sensor context and distance settings (hyperspectral)
  - Thuillier SOLSPEC9 extraterrestrial irradiance
  - Normalization of profiles for Es
  - Adaptive regression (multicast)

ProSoft 8.0 – Single Cast Processing

Classic deep (or single) cast (100m typical)

- Level1 - binary .RAW files from SatView
- Level1a - extraction of binary to ASCII digital counts based on .CAL file information
- Level1b - Level1a file converted into engineering units based on .CAL file information

SATLANTIC

ProSoft 8.0 – Single Cast Processing

Classic deep (or single) cast (100m typical)

- Level 2 - Tilt editing, pressure tare, shutter dark corrections, stray light and thermal corrections
  Level 2 ASCII output automated
- Level 2s – Level 2 data interpolated onto common coordinates (ie depth or time), sensor depth offsets applied
  Level 2s ASCII output automated, SeaBASS optional

ProSoft 8.0 – Single Cast Processing

Classic deep (or single) cast (100m typical)

- Level 2 - Tilt editing, pressure tare, shutter dark corrections, stray light and thermal corrections
  Level 2 ASCII output automated
- Level 2s – Level 2 data interpolated onto common coordinates (ie depth or time), sensor depth offsets applied
  Level 2s ASCII output automated, SeaBASS optional

SATLANTIC

ProSoft 8.0 – Single Cast Processing

Classic deep (or single) cast (100m typical)

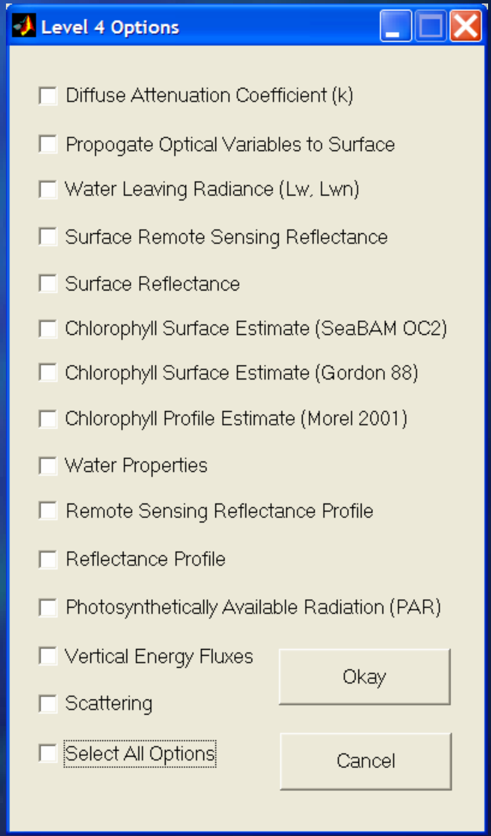
- Level 3 - Level 2s file binned as per processing parameters
  Level 3 ASCII output automated, SeaBASS optional

SATLANTIC

ProSoft 8.0 – Single Cast Processing

Classic deep (or single) cast (100m typical)

- Level 4
  - Data products
  - output files
    - Surface products
    - All products



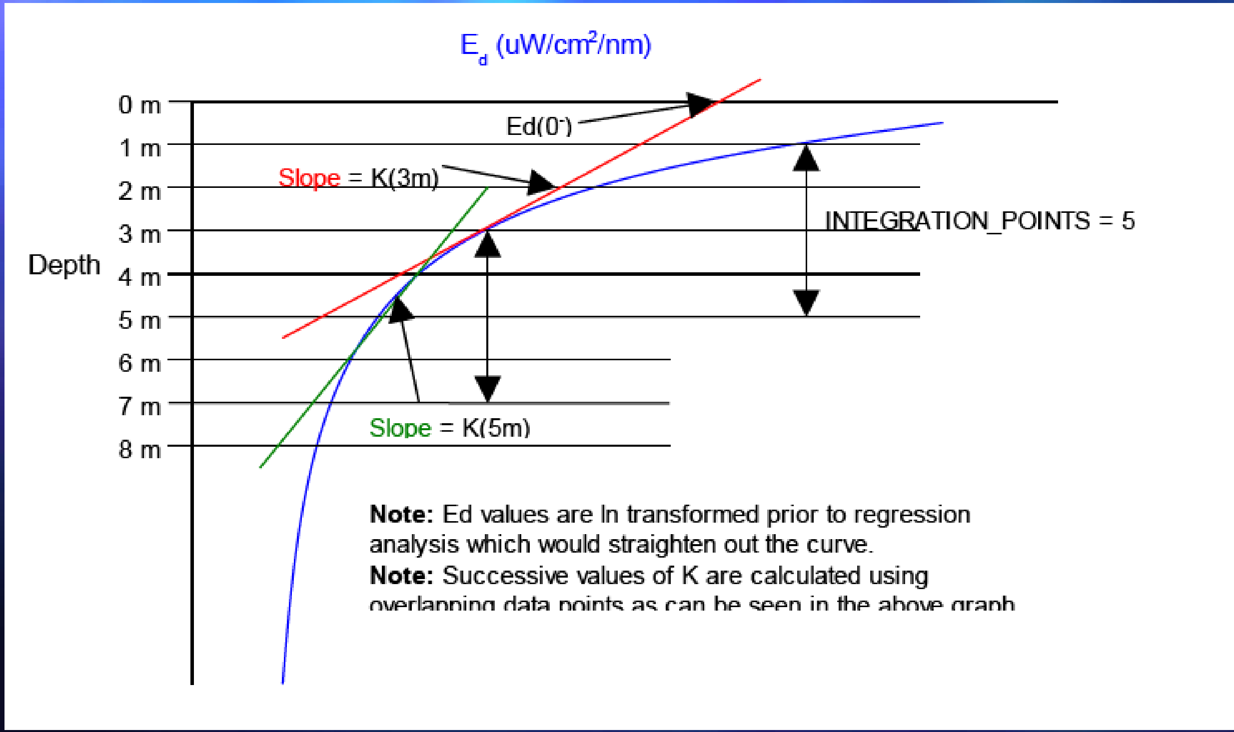
SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– Diffuse Attenuation Coefficient (k) – Single Cast, Deep Profile

- Classical Smith and Baker regression

$$\ln(E_d(z)) \cong \ln(E_d(0^-)) - (z - z_m)k(z_m)$$



Outputs:
Klu
Ked

SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– Diffuse Attenuation Coefficient (k) – Single Cast, Surface Mode

- Lewis algorithm for surface buoys
  - Use Austin Petzold 1981 model to get K490,K520
  - Use Morel 2001 model (inverted) to get pigment conc.
  - Use Morel 2001 model to generate Kls(λ)

  - Morel 2001 Kw, χ, ε from tables

Outputs:
Kls
Kev

SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– Propagate to Surface – Single Cast/Multicast

- Classical Smith and Baker regression

$$\ln(E_d(z)) \cong \ln(E_d(0^-)) - (z - z_m)k(z_m)$$

- Solve for zero depth intercept
  (Ed(0-), Eu(0-), Ev(0-), Lu(0-), Ls(0-))
- Propagate through surface

$$E_d(0^+,\lambda) = E_d(0^-,\lambda)/(1-\alpha)$$

$$L_w(0^+,\lambda) = L_u(0^-,\lambda)\frac{1-\rho(\lambda,\theta)}{\eta_w^2(\lambda)}$$

Outputs:

Ed(0-)	Ed(0+)
Eu(0-)	Eu(0+)
Ev(0-)	Ev(0+)
Lu(0-)	Lu(0+) (Lw)
Ls(0-)	Ls(0+)
Es(0-)	Es(0+) (Es)

Q = Eu(0-)/Lu(0-)

SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– Surface Reflectance, Pigments – Single Cast/Multicast

- Remote Sensing Reflectance

  RRS = Lw / Es

- Reflectance

  RFL = Eu(0+) / Ed(0+)

  if no Eu present

  Eu(0+) = Lw * Q , where Q is 4.5

- Chlorophyll pigments using SeaBAM OC2

  (uses RRS(490), RRS(555))

- Chlorophyll pigments using Gordon 88

  (uses Lwn(443), Lwn(500), Lwn(560))

Outputs:
RRS
RFL
Chl

ProSoft 8.0 – Level 4 Data Products
– Reflectance Profiles – Single Cast

- Remote Sensing Reflectance Profile

  RRS(z) = Lu(z) / Ed(z)

- Reflectance Profile

  RFL(z) = Eu(z) / Ed(z)

  if no Eu present

  Eu(z) = Lu(z) * Q , where Q is 4.5

Outputs:
RRS(z)
RFL(z)

ProSoft 8.0 – Level 4 Data Products

– Surface Reflectance, Pigment Profile – Single Cast

- Computes pigment profile using Morel 2001
  uses Ked(490,z)

SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– Surface Reflectance, Water Properties – Single Cast

- If CT present:
  - Temperature
  - Salinity
  - Density
  - Sigma-T
  - Conductivity
  - Conductivity Ratio
- If only Tw present
  - Temperature
- If fluorometer present
  - Chl fluorescence

ProSoft 8.0 – Level 4 Data Products

– Surface Reflectance, Water Properties – Single Cast

- If CT present:
    - Temperature
    - Salinity
    - Density
    - Sigma-T
    - Conductivity
    - Conductivity Ratio
- If only Tw present
    - Temperature
- If fluorometer present
    - Chl fluorescence

SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– PAR – Single Cast

- PAR computed by integrating Es, Ed(z) spectra

$$PAR = \int_{400nm}^{700nm} \frac{\lambda}{hc} E_s(\lambda) d\lambda$$

- % PAR (light levels):

$$\%PAR = \frac{PAR(z)}{PAR(0^+)}$$

SATLANTIC

ProSoft 8.0 – Level 4 Data Products

– Enegry Fluxes – Single Cast

- Energy flux computed by integrating Ed(z), Eu(z) spectra
  - if no Eu, Eu = Lu*4.5

$$F = 100\int_{400}^{700} Ed(\lambda)\,d\lambda$$ W/m^2

SATLANTIC

ProSoft 8.0 – Single Cast Processing

Output file naming – HDF files

RRR_Lnn.hdf

RRR = Root file name (everything before .RAW)
nn = processing level (ie 1a, 1b, 2a, 2s, 3a, 4)

- intermediate binary storage for ProSoft
- allows user to reprocess levels without repeating all steps
- fast to read and write
- hierarchical format used for ProSoft data viewer

SATLANTIC

ProSoft 8.0 – Single Cast Processing

Output file naming – ASCII files

RRR(_SB)(_SRF)_oo_Lnn.dat

RRR = Root file name (everything before .RAW)
_SB = SeaBASS compliant comma delimited ASCII file
(otherwise tab delimited ASCII file)
_SRF = special L4 ASCII file with only surface parameters
oo = optical sensor (Es, Lu ,Ed, etc for levels 1..3)
nn = processing level (ie 1a, 1b, 2a, 2s, 3a, 4)

ProSoft 8.0 – Optical Sensor Naming

- Es = surface irradiance
- Ed = downwelling irradiance (profile, depth based)
- Eu = upwelling irradiance (profile, depth based)
- Ev = upwelling irradiance (fixed depth, time based)
- Lu = upwelling radiance (profile, depth based)
- Ls = upwelling radiance (fixed depth, time based)
- Lt = total upwelling radiance (above water, time based)
- Li = diffuse sky radiance (above water, time based)

SATLANTIC

ProSoft 8.0 – Multicast Processing

(same as Single Cast)

- Level1 - binary .RAW files from SatView
- Level1a - extraction of binary to ASCII digital counts based on .CAL file information
- Level1b - Level1a file converted into engineering units based on .CAL file information

ProSoft 8.0 – Multicast Processing

- Level 2 - Tilt editing
  - Depth edit to max depth specified in configuration
  - Separation into separate profiles based on tilt edit
  - pressure tare, shutter dark corrections,
    stray light and thermal corrections

  Level 2 HDF and ASCII files output for each profile

  Level 2s HDF and ASCII files output for each profile

  The Level2s files can be reprocessed in Single Cast

SATLANTIC

ProSoft 8.0 – Multicast Processing

- Level 4 - Only computes surface Level 4 products
  - Goal high accuracy Lwn
  - All Level 2s data regressed at once

No Level 4 HDF in Multicast

Only outputs ASCII and SeaBASS ASCII

SATLANTIC

ProSoft 8.0 – Multicast Regression

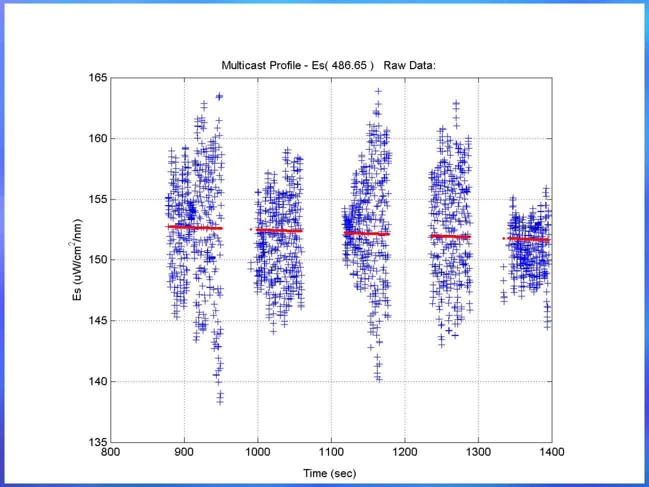
1. Process Es data, compute linear regression line
2. Normalized Ed(z,t), Lu(z,t) with Es(t) to correct for Es
3. Check for Ed(z), Lu(z) < 0, set to 1E-7
4. Log regress all data, output Ed(0-), Ked, Lu(0-), Klu
5. If Data Filtering ON
    - Filter data – setting 10 standard errors
    - Remove outliers
    - Rerun regression

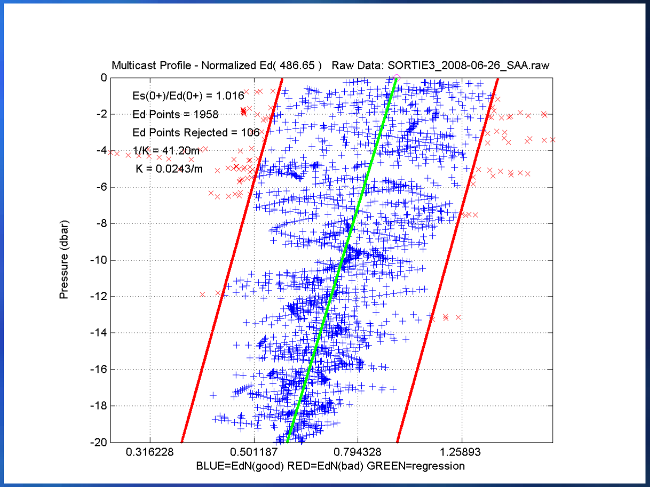
ProSoft 8.0 – Multicast Regression

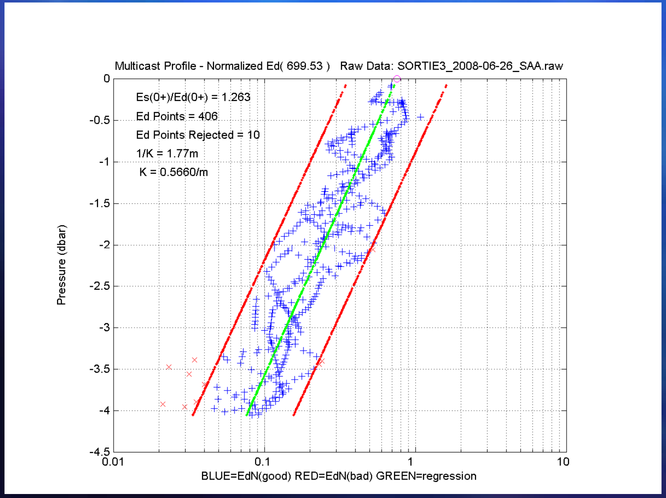
6. If Depth Extrapolation AUTO
   - Check for K<kw, if so set to Kw – 0.001
   - Compute regression depth based on Optical Depth Limit (typically 2.5)
   - If Optical Depth Limit > profile depth, set to Maximum Pressure (typically 10m Case-II, 20m Case-I)
   - Rerun regression
   - If Data Filtering ON, rerun filter
7. Un-normalize Ed(z) and Lu(z), typically to start of cast

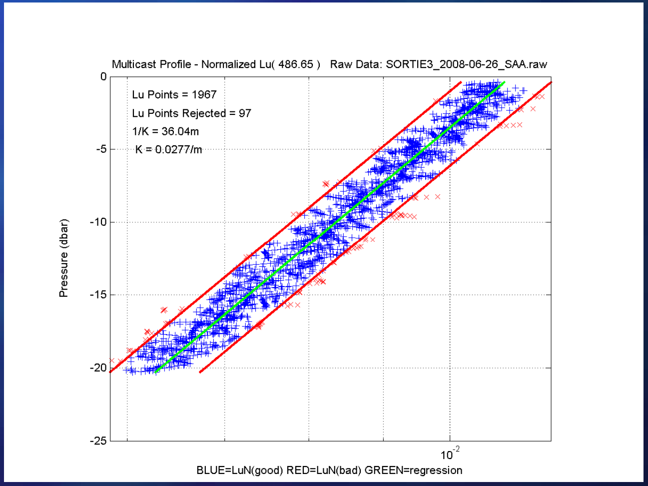
SATLANTIC

ProSoft 8.0 – Multicast Regression









SATLANTIC

ProSoft 8.0 – Multiast Processing

Output file naming – HDF files

RRR(_Pm)_Lnn.hdf

RRR = Root file name (everything before .RAW)
m = cast number (1…N) (Level 2, 2s only)
nn = processing level (ie 1a, 1b, 2a, 2s)

- intermediate binary storage for ProSoft
- allows user to reprocess levels without repeating all steps
- fast to read and write
- hierarchical format used for ProSoft data viewer

SATLANTIC

ProSoft 8.0 – Multicast Processing

Output file naming – ASCII files

RRR_MC(_SB)_L4.dat

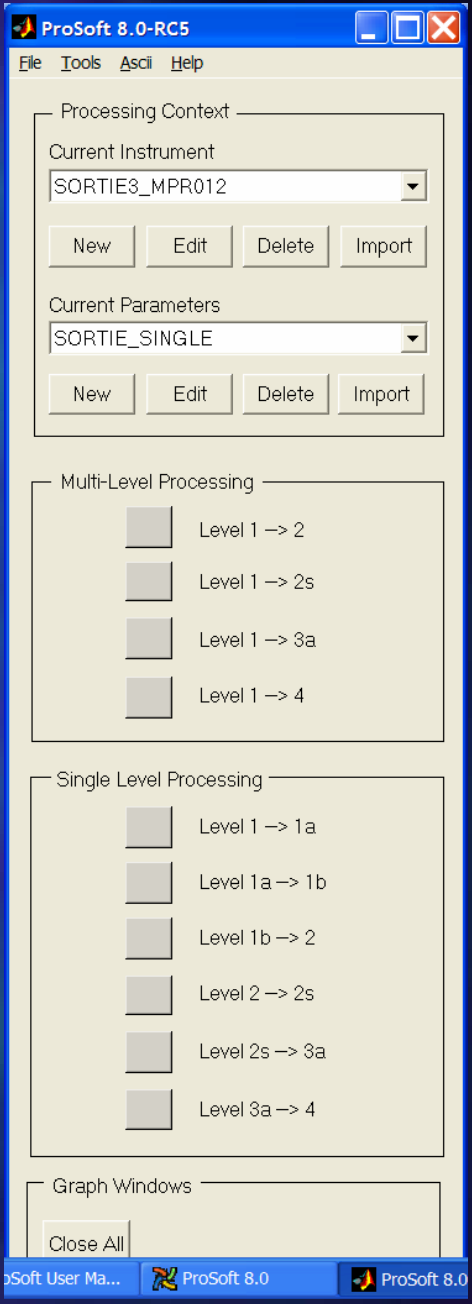
RRR = Root file name (everything before .RAW)
_SB = SeaBASS compliant comma delimited ASCII file
(otherwise tab delimited ASCII file)
_MC = special L4 ASCII file with only surface parameters

Multicast only outputs L4 ASCII

SATLANTIC

ProSoft 8.0 – Install demo

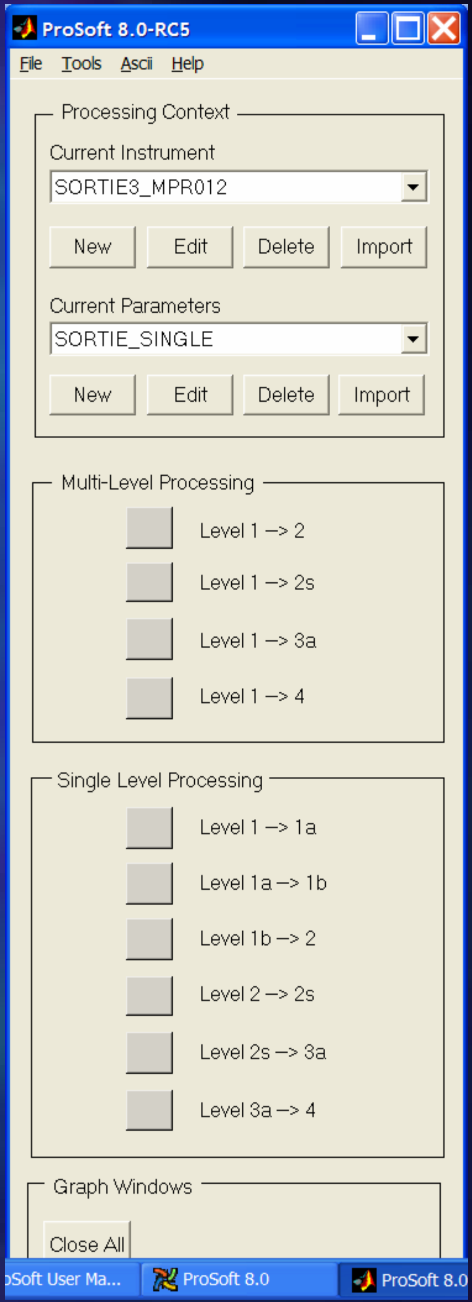
- Let's get started!!
  - 1. Copy CD onto hard drive
  - 2. Open ProSoft8.0_Setup.exe
  - 3. Run ProSoft
  - 4. Import "Current Parameters"
    - See folder you put CD in
    - \ProSoft Parameters
    - SORTIE2_MULTI
    - SORTIE3_MULTI
    - SORTIE_SINGLE
    - Import one at a time then SAVE



SATLANTIC

ProSoft 8.0 – Install demo

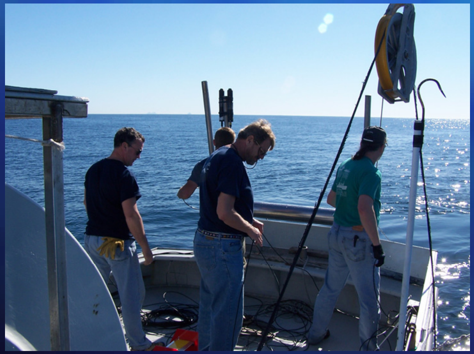
- Let's get started!!
  - 5. Import "Current Instrument"
    - See folder you put CD in
    - \ProSoft Parameters
    - SORTIE2_MPR012
    - SORTIE2_MPR012_Surface
    - SORTIE3_MPR012
    - Import one at a time then SAVE



SATLANTIC

ProSoft 8.0 – Install demo

- For reference – sample data:
  - See folder you put CD in \Field Data
  - SORTIE2_2008-01-13_SAA – Case II water multicast
  - SORTIE2_2008-01-13_PAA – Case II water deep cast
  - SORTIE2_2008-01-13_TAA – Case II water surface mode
  - SORTIE3_2008-06-26_SAA – Case I water multicast
  - SORTIE3_2008-06-26_PAA – Case I water deep cast



2008-01-13

2008-06-26

ProSoft 8.0 – Install demo

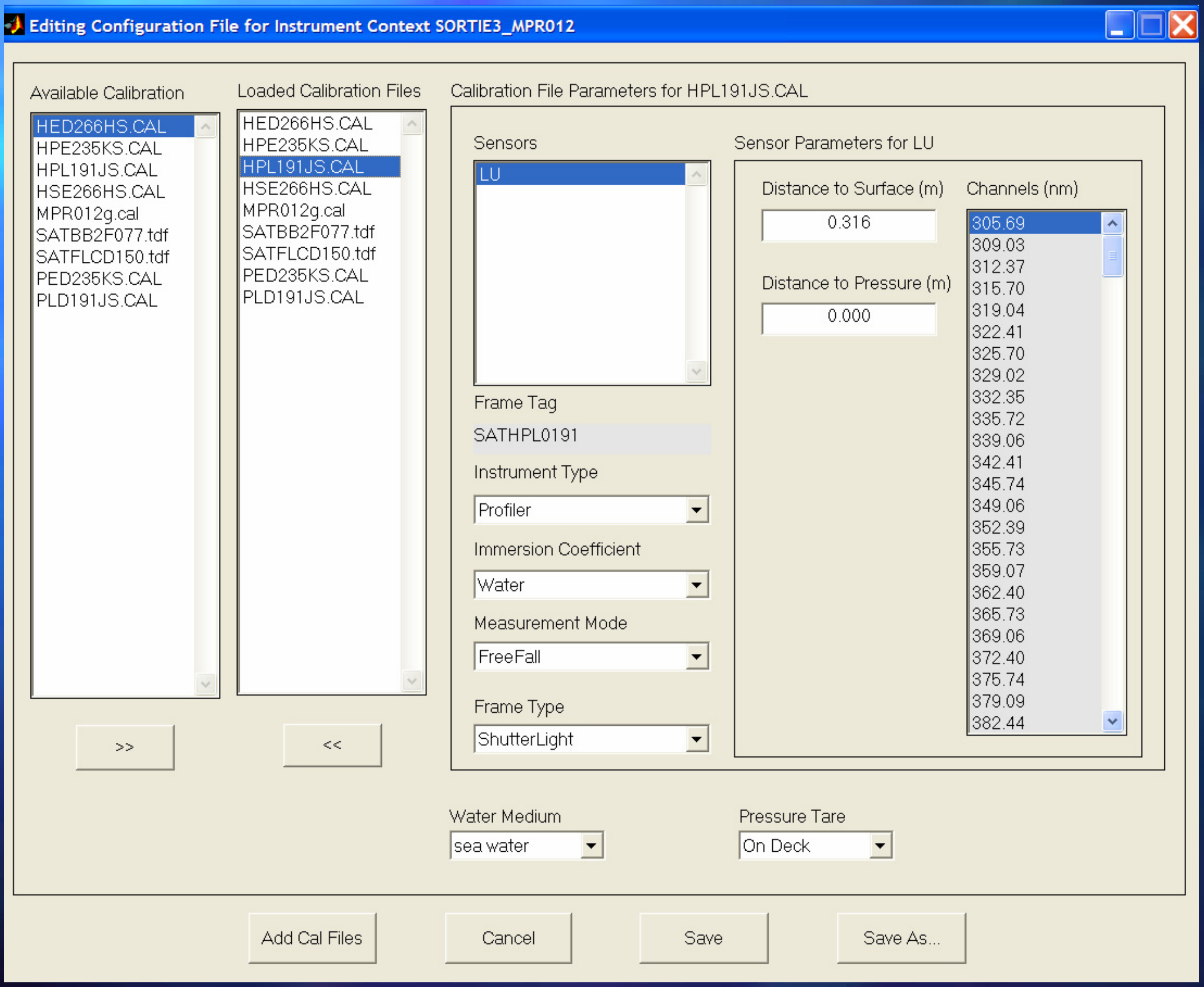
- For reference – sample data – Processing Context:
  - SORTIE2_2008-01-13_SAA – Case II water multicast
    - SORTIE2_MULTI
    - SORTIE2_MPR012
  - SORTIE2_2008-01-13_PAA – Case II water deep cast
    - SORTIE_SINGLE
    - SORTIE2_MPR012
  - SORTIE2_2008-01-13_TAA – Case II water surface mode
    - SORTIE_SINGLE
    - SORTIE2_MPR012_Surface

ProSoft 8.0 – Install demo

- For reference – sample data – Processing Context:
  - SORTIE3_2008-06-26_SAA – Case I water multicast
    - SORTIE3_MULTI
    - SORTIE3_MPR012
    - Note: takes 15min+ to process
  - SORTIE3_2008-06-26_PAA – Case I water deep cast
    - SORTIE_SINGLE
    - SORTIE3_MPR012

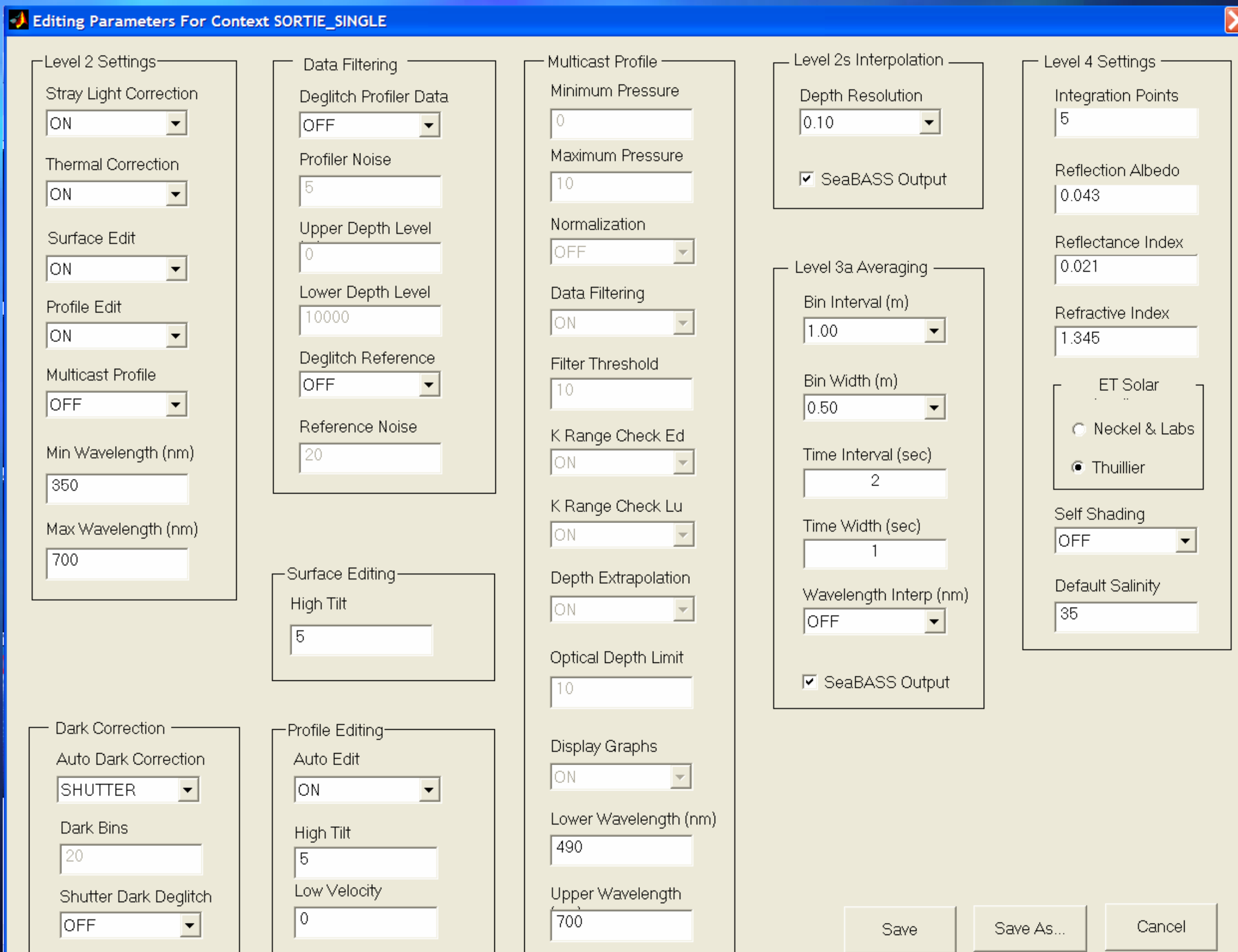
SATLANTIC

ProSoft 8.0 – Instrument Configuration



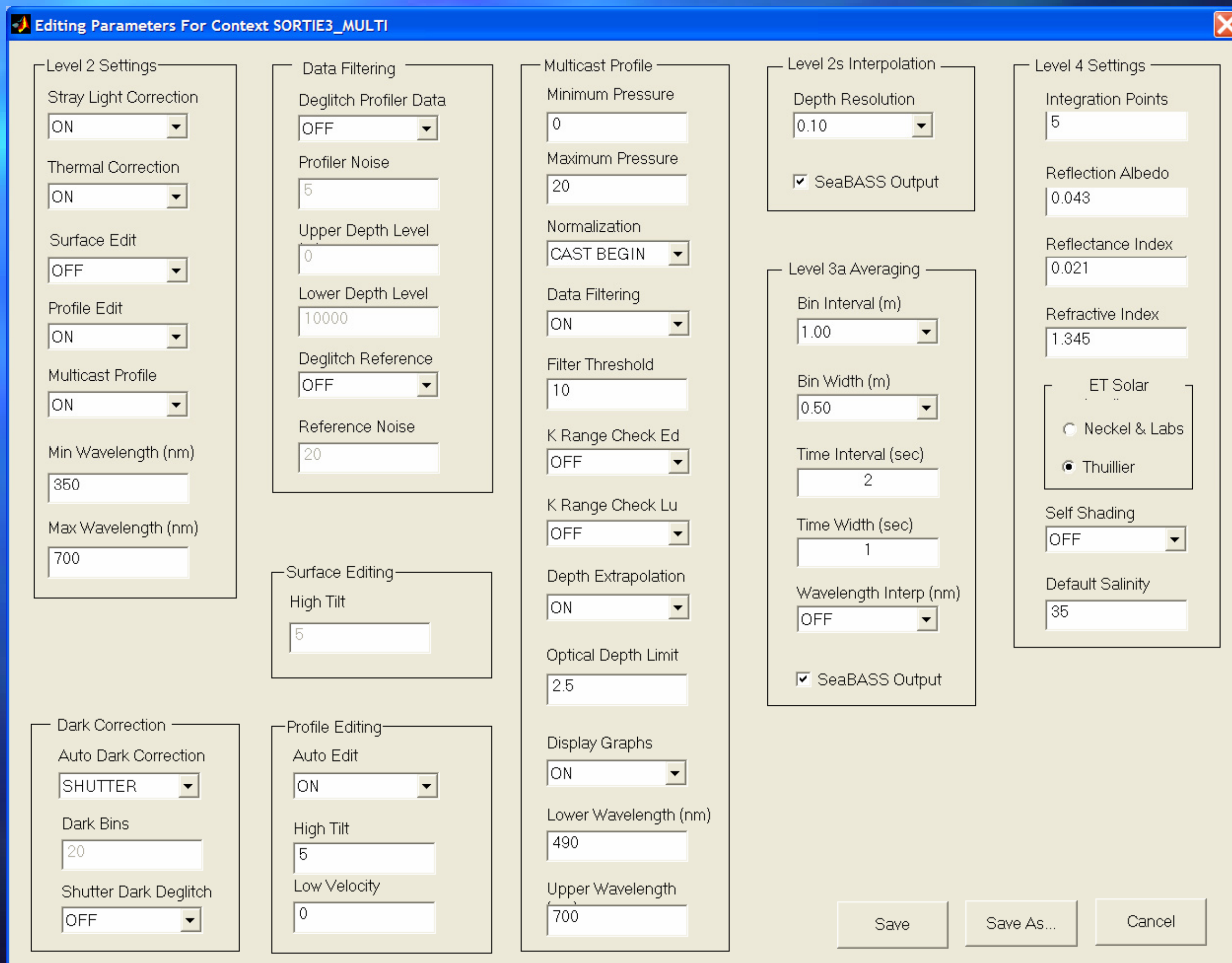
SATLANTIC

ProSoft 8.0 – Processing Parameters (Single Cast)



S A T L A N T I C

ProSoft 8.0 – Processing Parameters (Multi Cast)



SATLANTIC

ProSoft 8.0 – Processing (Multi Cast)

SORTIE2_2008-01-13_SAA – Case II water multicast

Using:

SORTIE2_MULTI

SORTIE2_MPR012

ProSoft 8.0 – Processing (Single Cast)

SORTIE2_2008-01-13_PAA – Case II water single cast

Using:

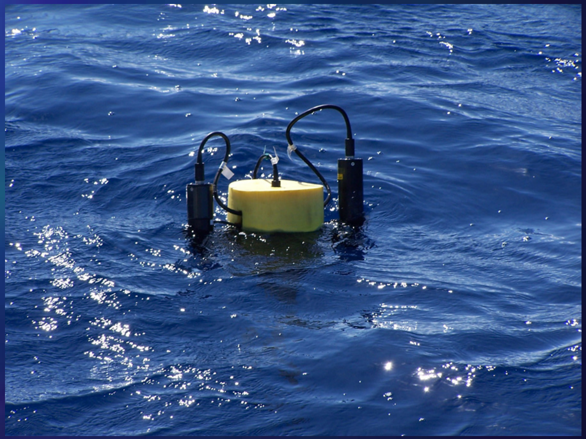
SORTIE2_SINGLE
SORTIE2_MPR012

ProSoft 8.0 – Processing (Single Cast - Surface Mode)

SORTIE2_2008-01-13_TAA – Case II water surface mode

Using:

SORTIE2_SINGLE
SORTIE2_MPR012




SATLANTIC
Thank You!