

# Multi-Sensor Level-1 to Level-2 Software

Bryan Franz

SIMBIOS Science Team Meeting

13 September 1999

# M<sub>ulti</sub>S<sub>ensor</sub>L<sub>evel</sub> 1 to 2

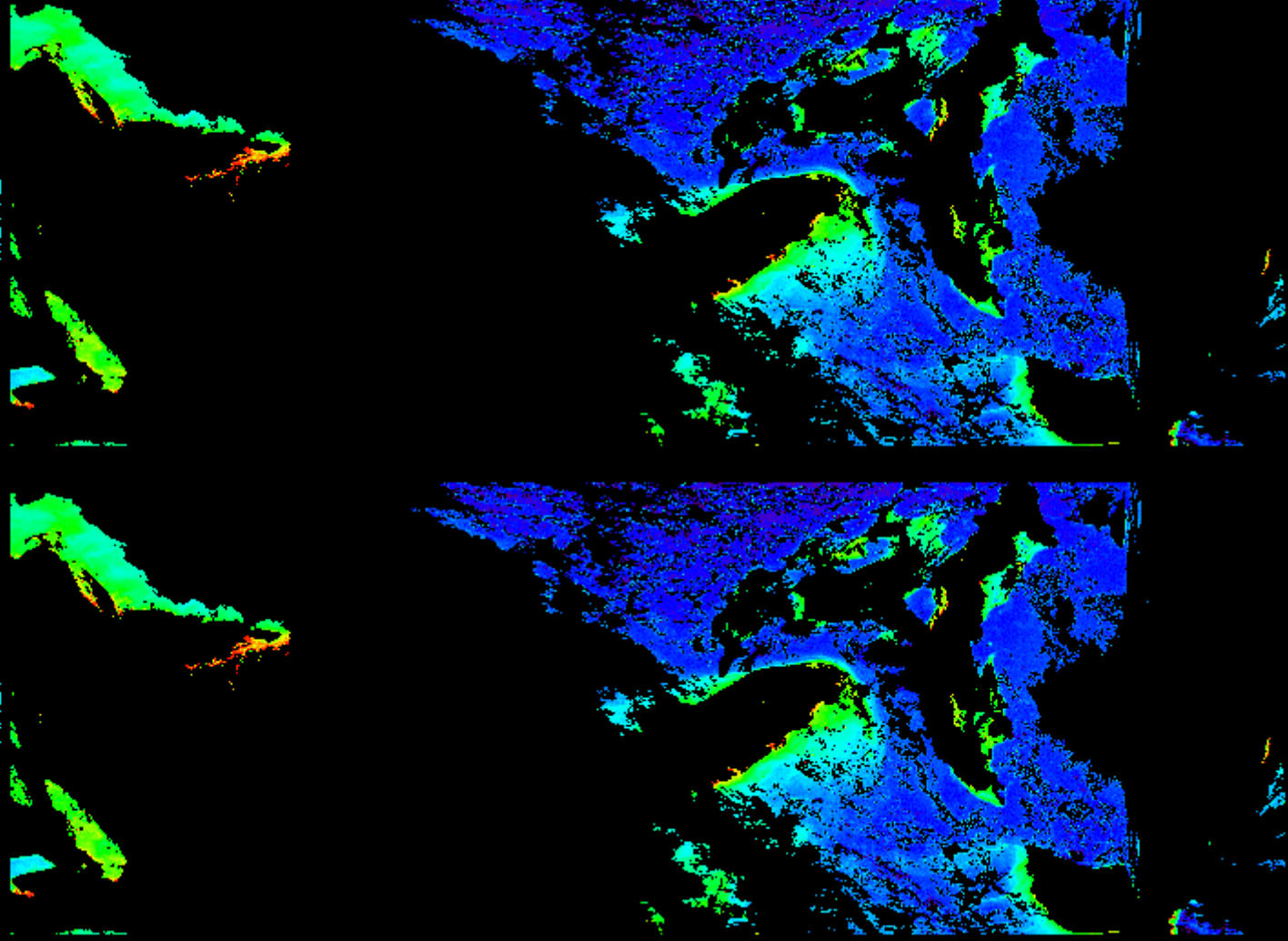
- Level-1 to Level-2 processing software for SeaWiFS, MOS, OCTS, and Polder.
- Gordon-Wang atmospheric correction.  
Wang, M. (1999) A Sensitivity Study of the SeaWiFS Atmospheric Correction Algorithm: Effects of Spectral Band Variations. *Remote Sens. Environ.*, 67:348-359.
- Expected to replace ANLY in next SeaWiFS reprocessing.
- Validated against ANLY for SeaWiFS.

0.01 - 64 mg/l

S1998199173926.L2\_GAC: Chl-a (OC2)

ANLY

MS112

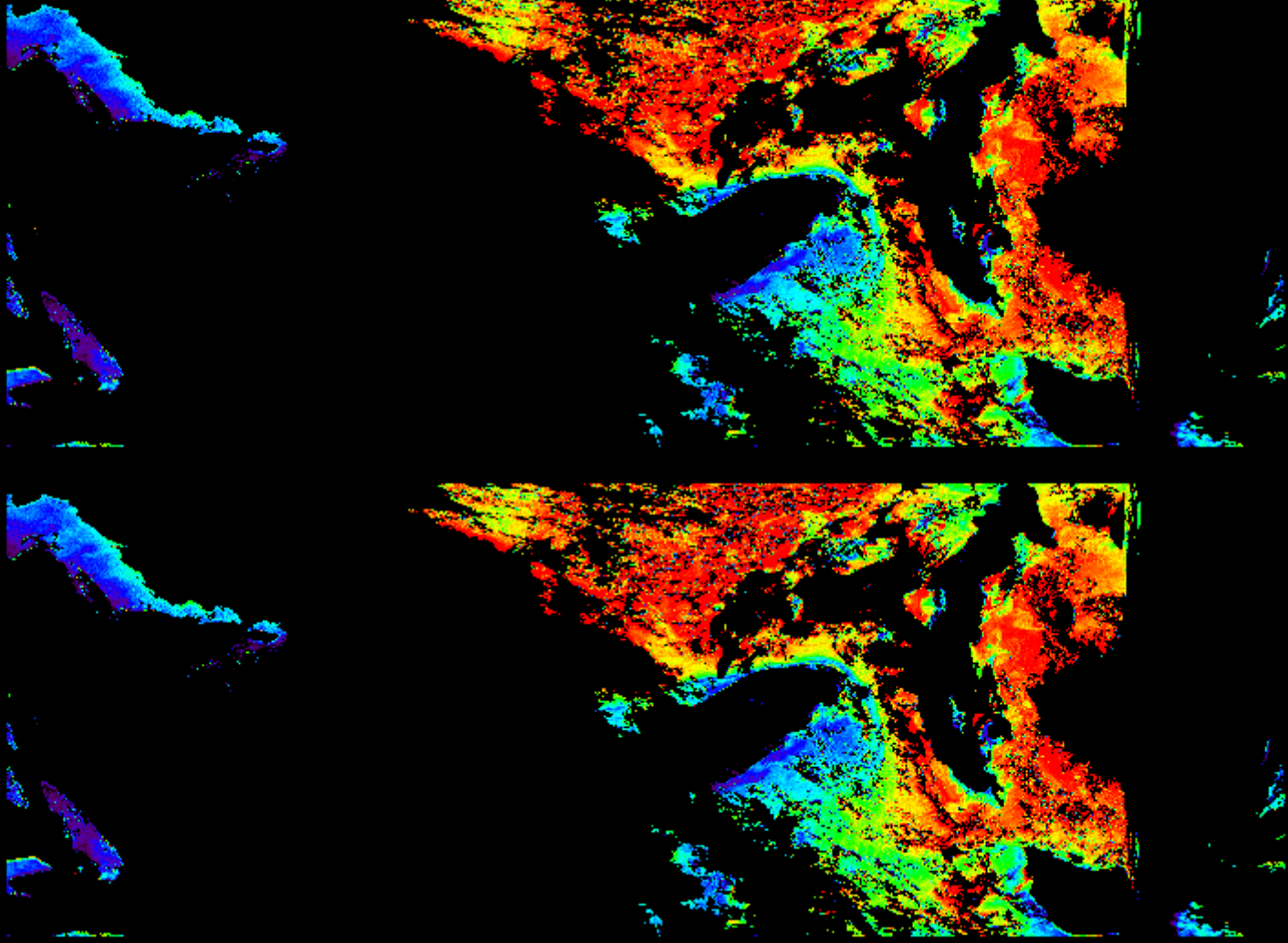


0 - 2 nW/cm<sup>2</sup>/um/sr

S1998199173926.L2\_GAC: nLw(443)

ANLY

MSI12



# MS112 vs ANLY

## S1998199173926.L2\_GAC

Product	Mean	St. Dev	Abs. Mean	Abs. Med	Max	Min
Lt_443	-1.669e-06	0.0005776	0.0005001	0.0005007	0.0009999	-0.001001
Lr_443	-0.0002594	0.0005771	0.0005334	0.0005002	0.0008268	-0.001302
La_765	0.006269	0.03654	0.02205	0.01089	0.2451	-0.2059
Lf_865	6.682e-05	0.0005170	0.0004103	0.0003705	0.001000	-0.001000
nLw_412	0.001857	0.02813	0.008579	0.000	0.4110	-0.4100
nLw_443	0.001612	0.02591	0.007968	0.000	0.3960	-0.3340
nLw_490	0.001061	0.02046	0.006424	0.000	0.3220	-0.1990
nLw_510	0.0008519	0.01809	0.005754	0.001000	0.2850	-0.1440
nLw_555	0.0004575	0.01410	0.004621	0.001000	0.2210	-0.1140
nLw_670	-0.007034	0.03080	0.008861	0.001000	0.09400	-0.8000

# MS112 Advantages

## Improved Readability, Maintainability

- Meaningful variable and function names.
- Clearly delineated correction steps.
- Standard C with some F77 functions.
- Easily accomodates new derived products.

# MS112 Advantages

## User Flexibility

- Auto-recognition of multiple sensor input formats.
- Sub-scene processing capabilities.
  - input data of arbitrary scan width.
  - line and pixel cropping and sub-sampling.
- HDF output format with user-specified content and multiple output files.

# MS112 Output Product List

Product (SDS) Name	Definition
chl_oc2	chlorophyll-a, OC2 algorithm
chl_octsc	chlorophyll-a, OCTS-C algorithm
pigment_seabam	pigment concentration, SeaBAM algorithm
pigment_ndpi	pigment concentration, NDPI algorithm
ndvi	normalized difference vegetation index
k490	diffuse attenuation coefficient
aer_model_min	minimum bounding aerosol model #
aer_model_max	maximum bounding aerosol model #
aer_model_ratio	model mixing ratio
epsilon	retrieved epsilon used for model selection
solz	solar zenith angle
sola	solar azimuth angle
senz	sensor zenith angle
sena	sensor azimuth angle
l2_flags	level-2 processing flags (Reference xxx)
ozone	ozone concentration (from input ancillary data)
windspeed	magnitude of wind
water_vapor	precipital water concentration
pressure	barometric pressure
humidity	relative humidity
nLw_nnn	normalized water-leaving radiance
Lw_nnn	water-leaving radiance
Lr_nnn	Rayleigh radiance
La_nnn	aerosol radiance
TLg_nnn	TOA glint radiance
tLf_nnn	foam (white-cap) radiance
Lt_nnn	calibrated TOA radiance
t_sol_nnn	Rayleigh-aerosol transmittance, sun to ground
t_sen_nnn	Rayleigh-aerosol transmittance, ground to sensor
t_oz_sol_nnn	ozone transmittance, sun to ground
t_oz_sen_nnn	ozone transmittance, ground to sensor
taua_nnn	aerosol optical depth
Es_nnn	extra-terrestrial surface irradiance



# MS112 Partial Parameter List

Keyword	Definition	Default
par	input parameter file	none
ifile	input L1b file name	none
ofile1	output L2 file #1 name	none
l2prod1	products to be included in ofile #1	nLw chl_oc2
ofile[#]	additional output L2 file names	none
l2prod[#]	products to be included in ofile[#]	none
spixl	start pixel number	1
epixl	end pixel number	the last pixel
dpixl	pixel subsampling interval	1
sline	start line number	1
eline	end line number	the last line
dline	line subsampling interval [default	1
aer_opt	aerosol mode option  1-12: Multi-scattering with fixed model.  0: Multi-scattering with 765/865 model selection.  -1: Multi-scattering with 670/865 model selection.  -2: Single-scattering white aerosols (CZCS).	0
filter_opt	filtering input data option (1: On, 0: Off)	0
filter_file	data file for input filtering	filter.dat
met1	1st meteorological ancillary data file	use climatology
met2	2nd meteorological ancillary data file	none
met3	3rd meteorological ancillary data file	none

# MS112 Future Work

- Update with selected algorithms.
- Perform extensive comparison testing to ensure consistency with ANLY.
- Final delivery to SDPS and SeaDAS, begin full SeaWiFS reprocessing.