

All L2 files:

- First 4 bytes from Cloud Mask flags.

- 1 byte for each pixel:

Bit	Description	Result
0	Ascending or Descending	0=descending, 1=ascending
1	Atmospheric Correction atmos_corr, bad ancillary data, and/or sun glint	0=successful, 1=failed due to
2	Satellite Zenith Angle	1=too large, 0=ok
3	Solar Zenith Angle	1=too large, 0=ok
4	Shallow water	1=shallow
5	Sun_Glint - Glint > threshold	
6	Supp_Data - Invalid or missing ancillary data	
7	Spare	

Gordon file - 3 bytes:

quality - 1 byte

- 0-1 Mandatory Quality for all of Gordon's nLw bands:
  - 0 (good) if general bits are ok, and flag bits 1-12 are ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flags 9-12
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances (all 9) are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 2-3 Mandatory Quality for Carder's clear water epsilon band
  - 0 (good) if general bits are ok, and input Lw's are ok, and flag 14 ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flag 14
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 4-7 Spare

flags - 2 bytes

- 0 Cloudy - Albedo @ 865 > threshold
- 1 Bad\_Lw - One or more bands missing
- 2 Bad\_Lw - Any LwXXX <= 0.
- 3 Bad\_Lw - Any band counts < 0
- 4 Atmos\_Corr - Questionable polarization correction/mirror reflectance 5  
Atmos\_Corr - Gordon aerosol failure
- 6 Atmos\_Corr - Epsilon out of range (< lower limit or > upper limit)
- 7 Atmos\_Corr - Any LaXXX <= 0.
- 8 Atmos\_Corr - Invalid Raleigh scattering data
- 9 nLw550\_low - Calculated nLw550 is too small
- 10 Cocco - Coccolithophorid radiance exceeds threshold
- 11 TurbidCase2 - Actual\_rrs555 > Turbid\_rs555
- 12 Hi\_la865 - Calculated La865 is too large
- 13 input Lw's for Carder's clear water epsilon band (11,13) are ok 14  
lo\_eps - epsilon < threshold
- 15 Spare

Derived 1 file - 6 bytes:

quality - 3 bytes

- 0-1 Mandatory Quality for Clark's pig\_c band
  - 0 (good) if general bits are ok, and input Lw's are ok
  - 1 (questionable) if any of: shallow, large zenith angles
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 2-3 Mandatory Quality for Clark's pig\_total band
  - 0 (good) if general bits are ok, and input Lw's are ok
  - 1 (questionable) if any of: shallow, large zenith angles
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 4-5 Mandatory Quality for Clark's susp\_solid band
  - 0 (good) if general bits are ok, and input Lw's are ok
  - 1 (questionable) if any of: shallow, large zenith angles
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 6-7 Mandatory Quality for Clark's k490 band
  - 0 (good) if general bits are ok, and input Lw's are ok
  - 1 (questionable) if any of: shallow, large zenith angles
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 8-9 Mandatory Quality for Abbott's fl\_baseline band:
  - 0 (good) if general bits are ok, and input Lw's are ok, and 7-11 are ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flags 7-11
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 10-11 Mandatory Quality for Abbott's FLH bands:
  - 0 (good) if general bits are ok, and input Lw's are ok, and 7-11 are ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flags 7-11
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 12-13 Mandatory Quality for Abbott's Chlor Fluorescence efficiency band:
  - 0 (good) if general bits are ok, and input Lw's are ok, and 7-11 are ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flags 7-11
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 14-15 Mandatory Qual for Gordon's cocco\_pig\_c,cocco\_conc,calcite\_conc bands:
  - 0 (good) if general bits are ok, and input Lw's are ok, and 13-15 are ok
  - 1 (questionable) if any of: shallow, large zenith angles
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land, or flags 13-15

- 16-17 Mandatory Qual for Hoge's peb and pub bands:  
 0 (good) if general bits are ok, and input Lw's are ok, and 17-21 are ok  
 1 (questionable) if any of: shallow, large zenith angles  
 2 (cloud) if any input radiances are negative and saturated  
 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land, or flags 17-21

18-23 Spare

flags - 3 bytes

- 0 =0 if pig\_c input Lw's (9,12) are ok  
 1 =0 if pig\_total input Lw's (9,10,11,12) are ok  
 2 =0 if susp\_solid input Lw's (9,10,11,12) are ok  
 3 =0 if k490 input Lw's (9,12) are ok  
 4 =0 if Abbott's Fluor baseline input Lw's (13,15) are ok  
 5 =0 if Abbott's FLH input Lw's (13,14,15) are ok  
 6 =0 if Fluorescence efficiency input Lw's (8-13) are ok  
 7 FLH\_Range - FLH out of range  
 8 L748\_High - L748 > L667  
 9 L678\_Base - L678 peak below baseline  
 10 chlflag - Chlor < 2.0 mg/m<sup>3</sup>  
 11 chlbad - Invalid chlor input

Gordon Cocco:

- 12 =0 if cocco input Lw's (9,12) are ok  
 13 LoRadiance - value below lower bound of lookup table  
 14 HiRadiance - value above upper bound of lookup table  
 15 InvalidEntry - invalid data in lookup table Hoge:  
 16 Hoge's peb, pub input Lw's (8-12) are ok  
 17-21 range\_iop\_flags[5]: 5 separate flags; one for each IOP to flag if any IOP is outside of an expected realistic range. \*\*\* If any one of these flags is set, output IOPs are suspect.

21-23 Spare

Derived 2 file - 3 bytes:

quality - 1 byte

- 0-1 Mandatory Qual for Carder's chl\_modis, ag400, aphi675, atot\_mod\*:  
 0 (good) if general bits are ok, and input Lw's are ok, and 2-9 are ok  
 1 (questionable) if any of: shallow, large zenith angles, or flags 2-9  
 2 (cloud) if any input radiances are negative and saturated  
 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land, or flag 1  
 2-3 Mandatory Qual for Carder's ipar and arp bands:  
 0 (good) if general bits are ok, and input Lw's are ok, and 1,11 ok  
 1 (questionable) if any of: shallow, large zenith angles, or flag 11  
 2 (cloud) if any input radiances are negative and saturated  
 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land, or flag 1  
 4-7 Spare

flags - 2 bytes

Carder Chlorophyll:

- 0 =0 if input Lw's (8-13) for Carder's bands are ok
- 1 neg\_rrs\_flag - one or more rss are less than or equal to zero
- 2 low\_412\_flag - rss[0](412) less than thresh\_412
- 3 low\_555\_flag - rss[4](555) less than thresh\_555
- 4 default\_flag - using default chlorophyll model
- 5 chl\_inconsistent\_flag - calc chl exceeds chl\_incon.\_thresh
- 6 chl\_quality\_flag - (currently unused)
- 7 hi\_scatter\_flag - (currently unused)
- 8 blend\_flag - aph\_mod between .03 and .06 chlor. blend
- 9 package\_flag - chl package or unpackage Carder PAR:
- 10 =0 if ipar,arp input Lw's (8-13) are ok
- 11 hi\_windspeed - wind speed > threshold
- 12-15 Spare

Sst file 3 bytes:

quality - 1 byte

- 0-1 Mandatory Qual for sst band:
  - 0 (good) if general bits are ok, and input Lw's are ok, and 2-7 are ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flags 2-7
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 2-3 Mandatory Qual for sst4 band:
  - 0 (good) if general bits are ok, and input Lw's are ok, and 8-13 are ok
  - 1 (questionable) if any of: shallow, large zenith angles, or flags 8-13
  - 2 (cloud) if any input radiances are negative and saturated
  - 3 (bad, other than cloud) if any input radiances are negative and not saturated, or Atmos Corr (bit 1 above) failed, or land
- 4-7 Spare

flags - 2 bytes

- 0 =0 if sst input Lw's (20,31,32) are ok
- 1 =0 if sst4 input Lw's (22,23) are ok
- 2 31/32 uniformity test 1
- 3 31/32 uniformity test 2
- 4 31/32 zenith angle 1
- 5 31/32 zenith angle 2
- 6 31/32 tree test
- 7 31/32 sst diff from reference
- 8 22/23 uniformity test 1
- 9 22/23 uniformity test 2
- 10 22/23 zenith angle 1
- 11 22/23 zenith angle 2
- 12 22/23 tree test
- 13 22/23 sst diff from reference

