Detailed specifications

# Version 1\_2\_7\_0

# December 22, 2016

Specifications highlighted in yellow are those implemented or those that will be implemented first. Specifications highlighted in blue are those that may be implemented in a future version.

# For all options

1. Depth to which the primary productivity is computed.
   1. Option A)

1. Sea ice concentration.
   1. Option A)

Where P is the primary productivity.

* 1. Option B)

Where SIC is the sea ice concentration.

1. Rrs > 0.
   1. Option A)

Reject pixels when at least one of the Rrs(λ) < 0.

* 1. Option B)

Keep all pixels with any Rrs(λ).

* 1. Option C)

If Rrs(667) < 0, Rrs(667) = minimal value (which one?).

1. 0 < [chl] < 100 and IOPs > 0.
   1. Option A)

The primary productivity is computed even if not (0 < [chl] < 100 and IOPs > 0).

* 1. Option B)

The primary productivity is given a fill value (-999.) if not (0 < [chl] < 100 and IOPs > 0).

1. [ice] < 10.
   1. Option A)

The primary productivity is computed even if not ([ice] < 10).

* 1. Option B)

The primary productivity is given a fill value (-999.) if not ([ice] < 10).

1. aphy(λ, z) for at(λ, z).

Let aphy(6λ, z) an array on the six band of MODIS-Aqua.

Let aphy(61λ, z) an array on the 61 wavelengths from 400 to 700 nm by steps 5 nm.

We interpolate aphy(61λ, z) to aphy(6λ, z) in the computation of at(λ, z)

* 1. Option A)

Linear interpolation between the two nearest wavelengths. For example, we compute aphy(412, z) with the linear interpolation between aphy(410, z) and aphy(415, z)

* 1. Option B)

Nearest-neighbor wavelength. For example, we compute aphy(412, z) with aphy(410, z). aphy(412, z) = aphy(410, z).

1. at(λ, z = 0-) < aphy(λ, 0-).
   1. Option A)

Reject pixel.

* 1. Option B)

at(λ, z = 0-) = at(λ, z = 0-).

* 1. Option BC)

at(λ, z = 0-) = aw(λ) + aphy(λ, z = 0-).

1. bbt(λ, z = 0-).
   1. Option A)

Lee et al. (2002). bbt(λ, z = 0-) is a function of the Rrs.

* 1. Option B)

Wang et al. (2005). bbt(λ, z = 0-) is a function of the chl.

1. GSM.
   1. Keep the original code of David Dessailly and the subsequent modifications and the constants aw and bbw.
   2. Keep the original code of David Dessailly and the subsequent modifications but change the constants aw and bbw for the constants in ~/Applications/seadas-7.3.2/ocssw/run/data/common/water\_spectra.dat of SeaDAS 7.3.2.
   3. Keep the original code of David Dessailly and the subsequent modifications but change the constants aw and bbw for the constants in ~/Applications/seadas-7.3.2/ocssw/run/data/common/water\_spectra.dat of SeaDAS 7.3.2 averaged over the bandwidth.
   4. Change for the code of SeaDAS 7.3.2.
2. QAA.
   1. Keep the original code of David Dessailly and the subsequent modifications and the constants aw and bbw.
   2. Keep the original code of David Dessailly and the subsequent modifications but change the constants aw and bbw for the constants in ~/Applications/seadas-7.3.2/ocssw/run/data/common/water\_spectra.dat of SeaDAS 7.3.2.
   3. Keep the original code of David Dessailly and the subsequent modifications but change the constants aw and bbw for the constants in ~/Applications/seadas-7.3.2/ocssw/run/data/common/water\_spectra.dat of SeaDAS 7.3.2 averaged over the bandwidth.
   4. Change for the code of SeaDAS 7.3.2.
3. aw and bbw.
   1. Keep the original constants aw and bbw of David Dessailly and the subsequent modifications.
   2. Standardize the constants aw and bbw at different emplacement in the code.
4. E0(λ, z, t).
   1. Option A)

E0(λ, z, t) = Ed(λ, z, t) \*Kd(λ, z, t) / ( a(λ, z)+ bb(λ, z) )

* 1. Option B)

E0(λ, z, t) = Ed(λ, z, t) \*Kd(λ = 490, z, t) / (a(λ = 490, z)+ bb(λ = 490, z))

1. PUR
   1. Option A)

References: ATBD of Bélanger and Babin version 1.0, 2011 equation 6.

* 1. Option B)

References: Bélanger, Babin and Tremblay 2013 equation 2.

1. Ek
   1. Option A)

References: ATBD of Bélanger and Babin version 1.0, 2011 equation 8.

Arrigo et al. 1998 equation 10.

* 1. Option B)

References: ATBD of Bélanger and Babin version 1.0, 2011 equation 8, manuscript correction.

Arrigo 1994 equation 12.

1. Ekmax
   1. Option A)

80 mol photons m-2 s-1

References: ATBD of Bélanger and Babin version 1.0, 2011.

* 1. Option B)

80 μmol photons m-2 s-1.

Reference: Arrigo et al. 1998.

1. Ed(0-)
   1. Option A)

Ed(0-) <- Ed(0-)

* 1. Option B)

Ed(0-) <- Ed(0-) \* (1 – SIC)

1. θs to compute Kd. Note that the real θs is always used to compute Ed(0-).
   1. Option A)

θs <- θs

* 1. Option B)

If CF > 0.3, then θs <- 45°