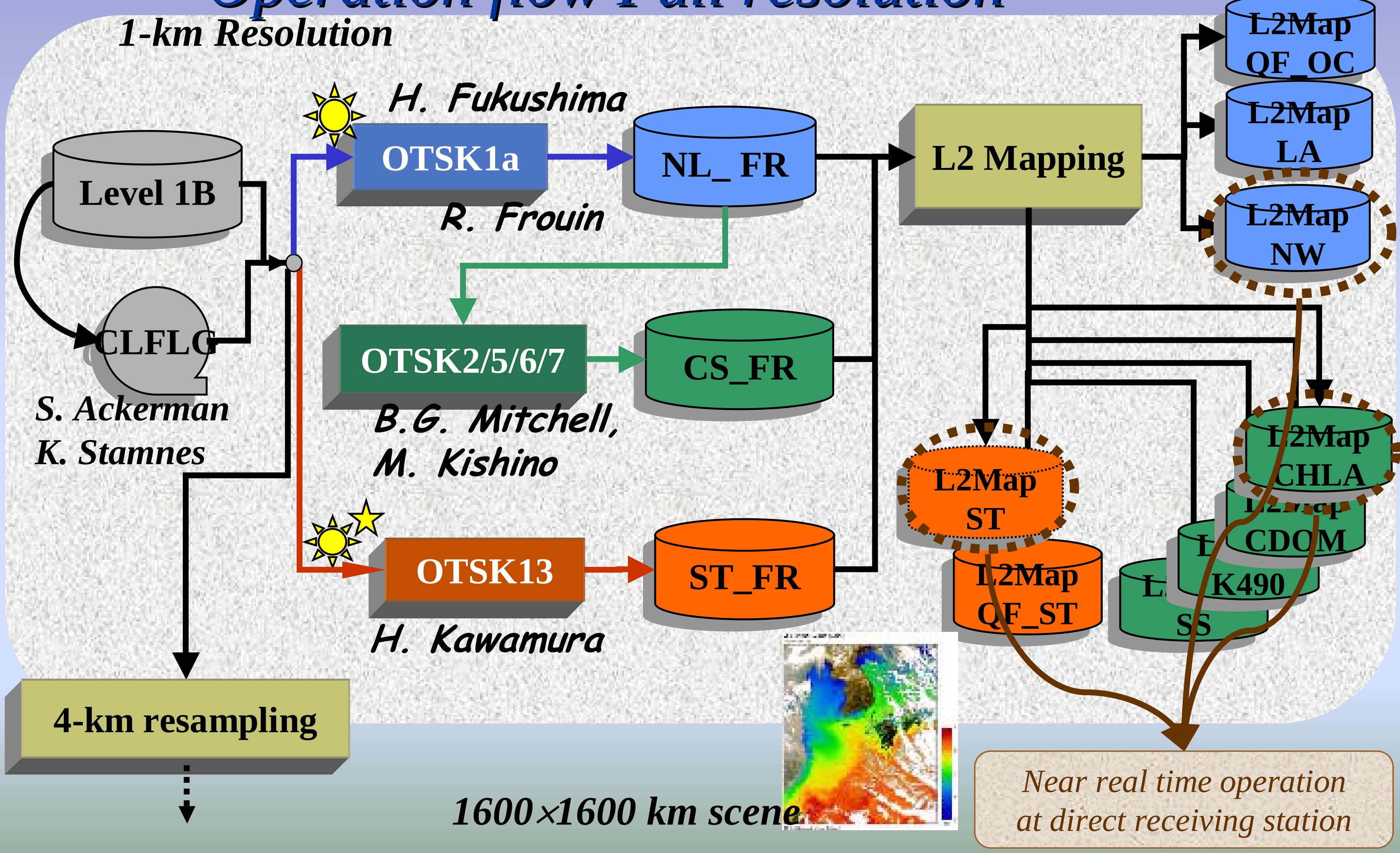
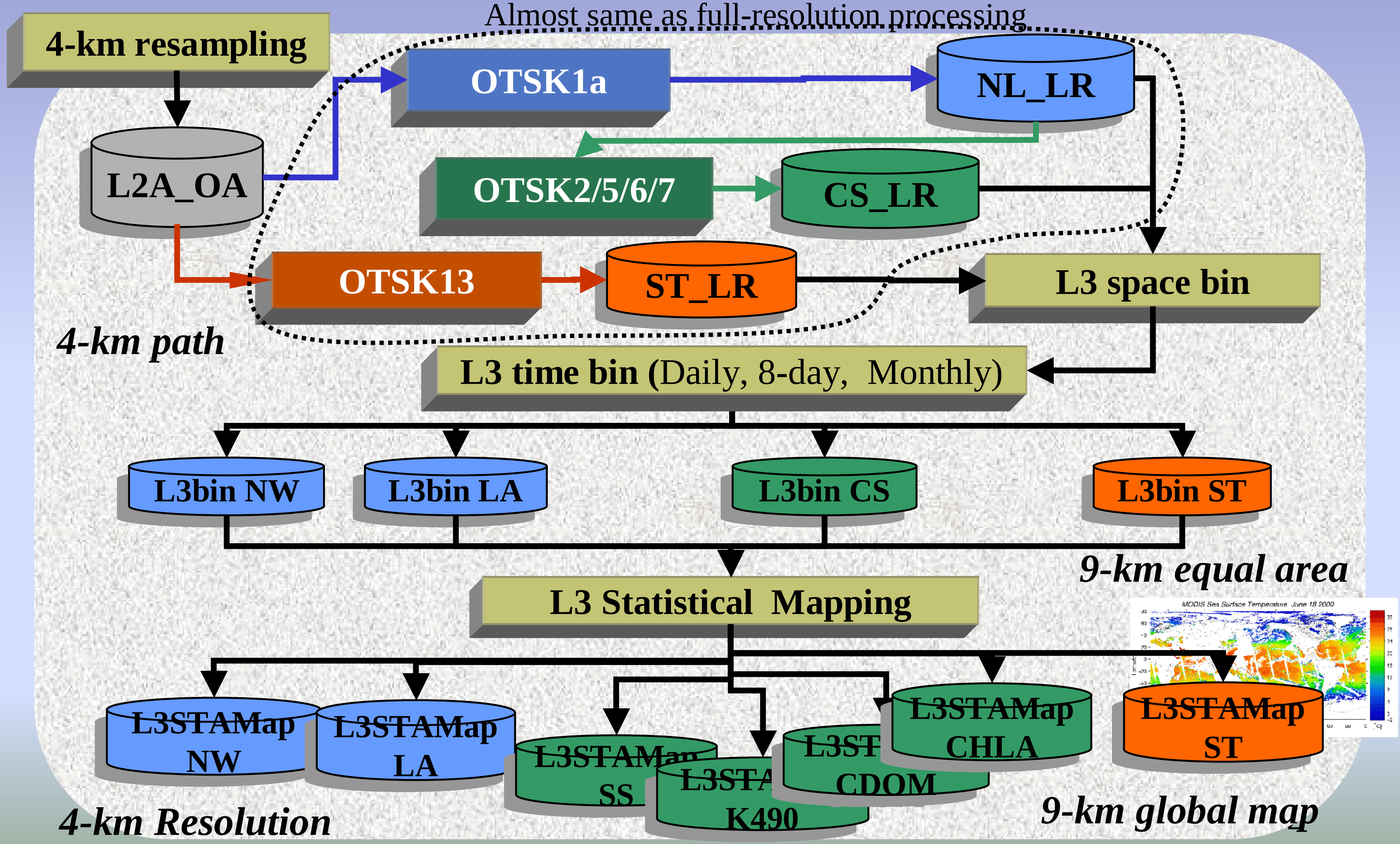
3. GLI Ocean algorithms

Operation flow Full resolution

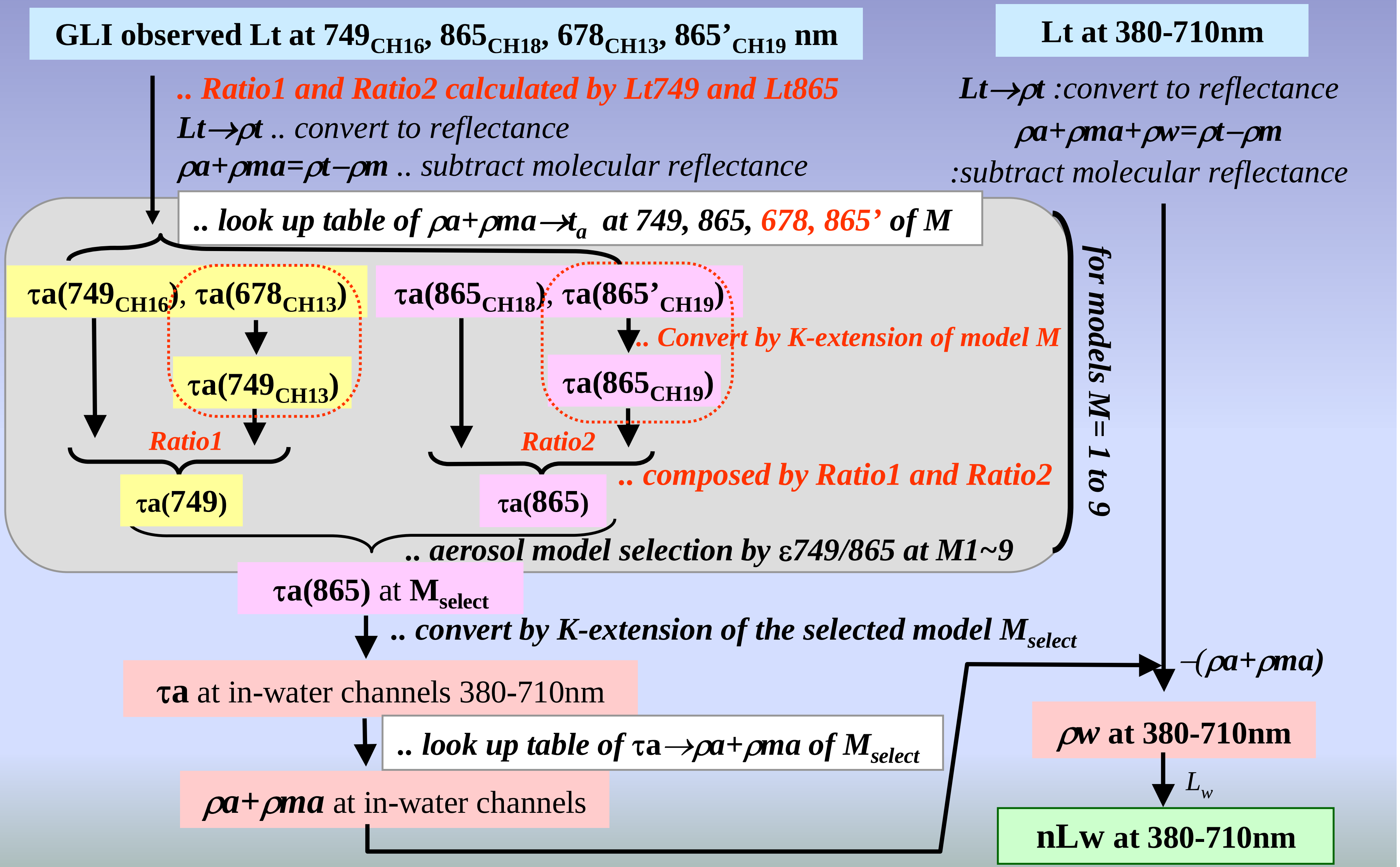


3. GLI Ocean algorithms (conti.)

Operation flow Low resolution



3. Algorithm (basic flow of OTSK1a with band switch)



3. Algorithm (characteristics of **OTSK1a** *)*

•Principal investigator is Prof. H. Fukushima same as OCTS.

•Atmospheric correction by 749nm and 865nm bands (except for band-saturated area)

•Look Up Table ($\tau a \leftarrow$(aerosol model)$\rightarrow \rho_a + \rho_{ma}$) is calculated by RSTAR-5b (PSTAR) developed by Prof. Nakajima of CCSR Tokyo Univ.

The next version will include functions of

•*Sunglint correction developed by Prof. H. Fukushima*

•*Whitecap correction developed by Dr. R. Frouin of SIO*

•*Iteration for non-zero L_w using in-water algorithm developed by Tanaka-Toratani*

•*Band switching to avoid NIR band saturation*

3. Algorithm

Formulations of the GLI in-water empirical algorithms

OTSK2/5/6/7

Variable	Algorithm source	Type	Equation, Coefficients (a*), Band Ratio (R)
CHLA	OC4-GLI by Mitchell and Kahru Modified from O'Reilly et al., 1998	Max Band Ratio, Modified Cubic Polynomial	CHLA = $10^{(a0 + a1\times R + a2\times R\text{^}2 + a3\times R\text{^}3)}$ +a4
			R = $\log_{10}$(NWLR443 > NWLR460 > NWLR520) / NLWR545)
K490	GLI-K490 Modified from Mitchell and Kahru, 1998	Cubic polynomial in log-log	K490 = $10^{(a0 + a1\times R + a2\times R\text{^}2+ a3\times R\text{^}3)}$
			R = $\log_{10}$(NWLR460/NLWR545)
CDOM	In preparation by Mitchell and Kahru	Linear band ratio in log-log	CDOM440 = $10^{(a0 + a1\times R)}$
			R = $\log_{10}$(NWLR443/NLWR520)
SS	Provided by Kishino, May, 2002	Square polynomial in log-log	SS=$10^{(a0 +a1\times R+a2\times R\text{^}2)}$
			R=$\log_{10}$(NWLR443/NWLR545)
RED TIDE flag	*Renewed* Kahru and Mitchell, 1998	Threshold of band ratio	REDTIDE index on, if R < a0 and CHLA > a1
			R = NWLR380/NLWR412

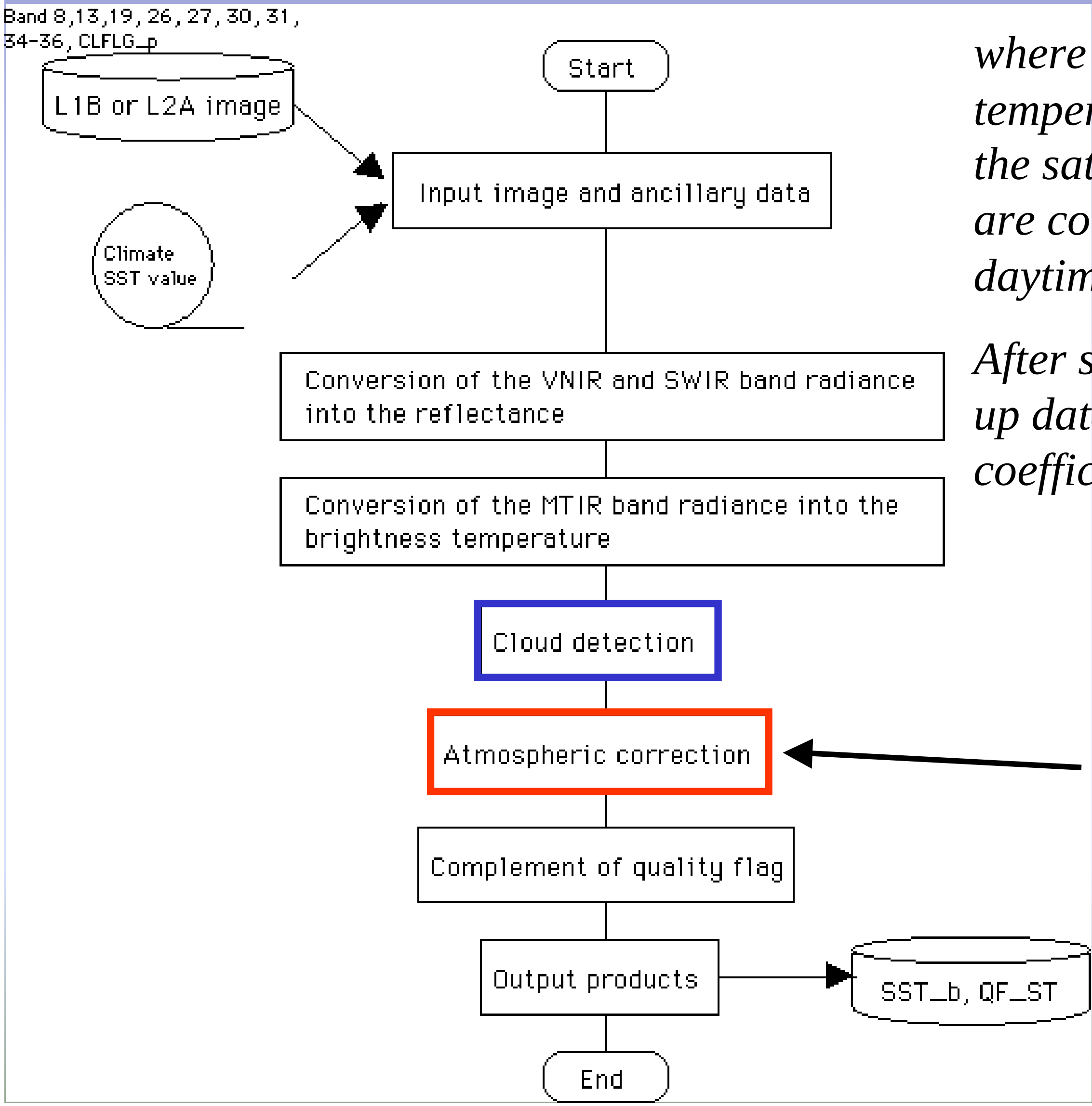
3. Algorithm

GLI SST algorithms

OTSK13

Atmospheric correction for SST

$$SST = a\,T35 + b\,(T35-T36) + c\,(T35-T34) + d\,(T35-T36)(1-1/\cos\theta s) + e\,(T35-T34)(1-1/\cos\theta s) + f$$



where T34, T35 and T36 are brightness temperatures of bands-34, -35 and -36, θs is the satellite zenith angle, a, b, c, d, e, and f are constant coefficients; the coefficients in daytime may differ from those in nighttime.

After starting of GLI operation, the match-up data set will be used to adjust the coefficients (a, b, c, d, e, f) of the equation.

GLI SST algorithm (OTSK13) is based on the split-window MCSST technique.

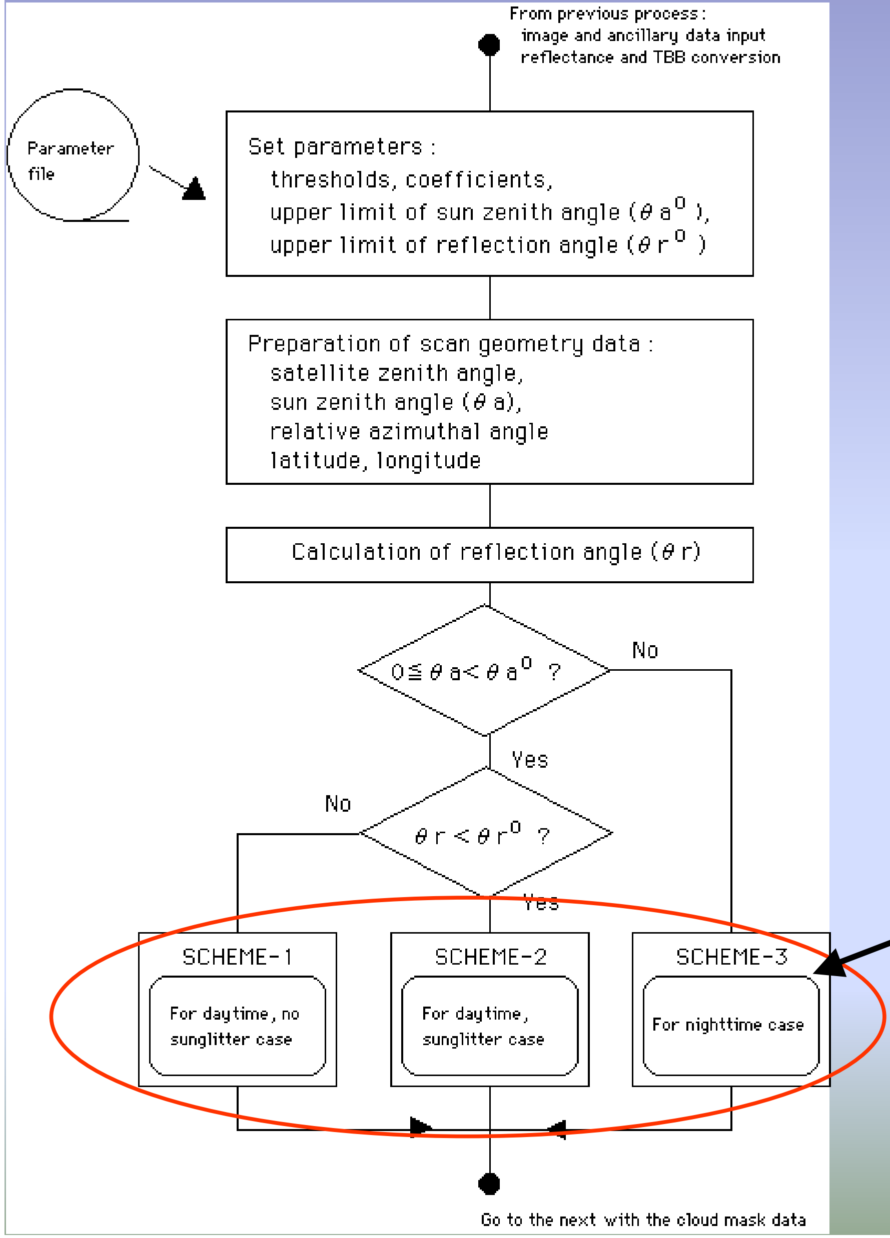
From algorithm description by H. Kawamura

3. Algorithm

GLI SST algorithms

OTSK13

Cloud detection for SST



The framework of the cloud detection algorithm is to apply up to some threshold tests to detect cloud, and then to identify a pixel as cloud-free only when all the tests prove negative.

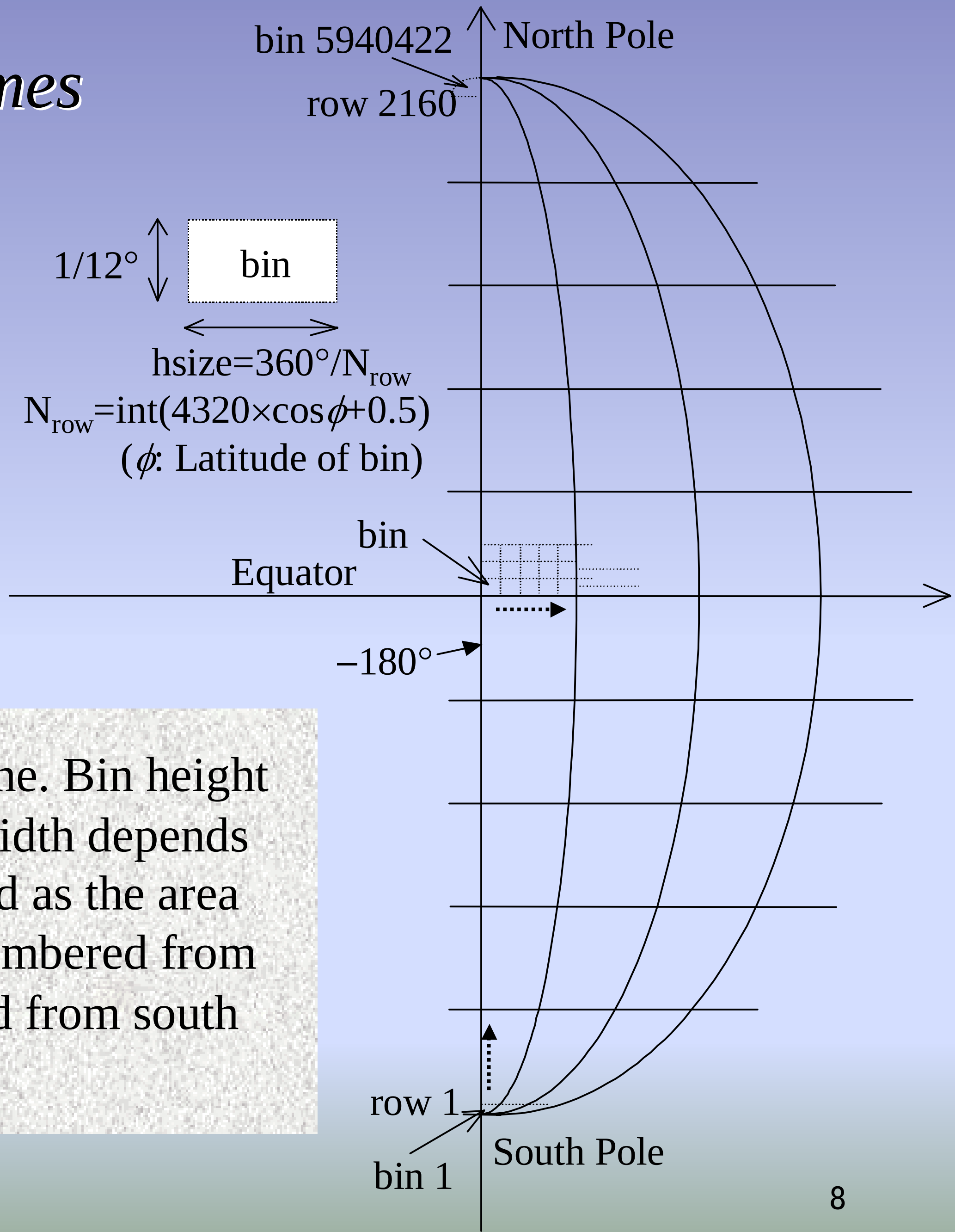
Coefficients of the threshold tests and the number of the tests will be determined using the real GLI data after the ADEOS-II launch.

3. Algorithm
GLI Level 3 binning schemes

L3 space/time bin

Grid definition

Equal area grid same as OCTS and SeaWiFS



Each bin is place along latitude line. Bin height is 1/12° in everywhere. But bin width depends on its latitude, which is considered as the area of each bin is equal. The bin is numbered from –180° longitude to eastbound, and from south to north.

3. Algorithm
GLI Level 3 binning schemes

L3 space/time bin

valuable	***equation***
*chla, cdom, ss, k490 nLw**, La**, Tau_865, alpha_78*	*log-scheme* $$\log(Ave) = \frac{\sum_{BIN} \left\{ \left(\sum_{i=1,N_{BIN}} \log(Data_i) \right)_{BIN} \Big/ N_{BIN} \cdot \sqrt{N_{BIN}} \right\}}{\sum_{BIN} \left(\sqrt{N_{BIN}} \right)_{BIN}}$$ *Same as OCTS*
sst	*linear-scheme* $$Ave = \frac{\sum_{BIN} \left\{ \left(\sum_{i=1,N_{BIN}} Data_i \right)_{BIN} \Big/ N_{BIN} \cdot \sqrt{N_{BIN}} \right\}}{\sum_{BIN} \left(\sqrt{N_{BIN}} \right)_{BIN}}$$ *Same as SeaWiFS*