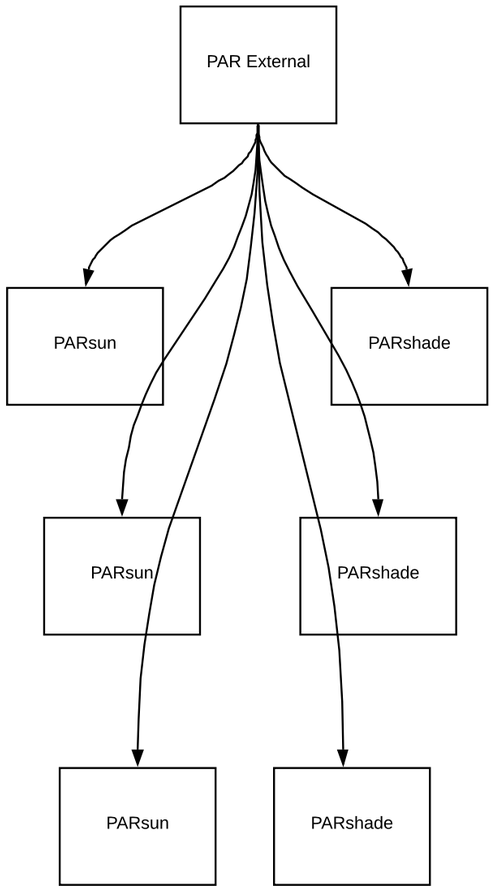
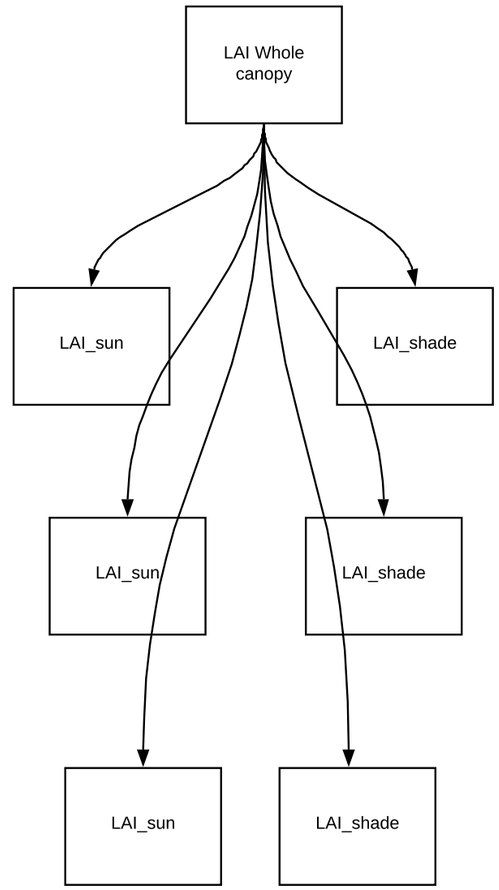
Distribution of inputs per layer and per sun shade

Each variable needs to be distributed per layer and per sunlit and shaded leaves

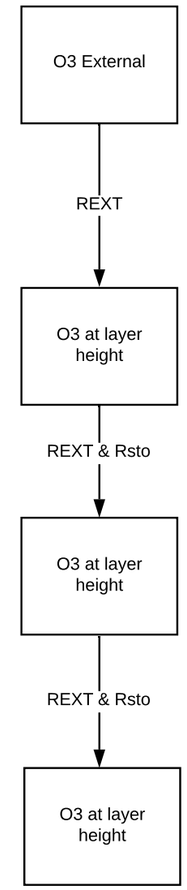
PAR distributed based on acumulated LAI which causes increased shading from top to bottom of canopy



LAI is split per layer and per sunlit and shaded portions



O3 at each layer calculated through O3 deposition



Check this is correct in model

Should we distribute O3 between sunlit and shaded?

Layer 0

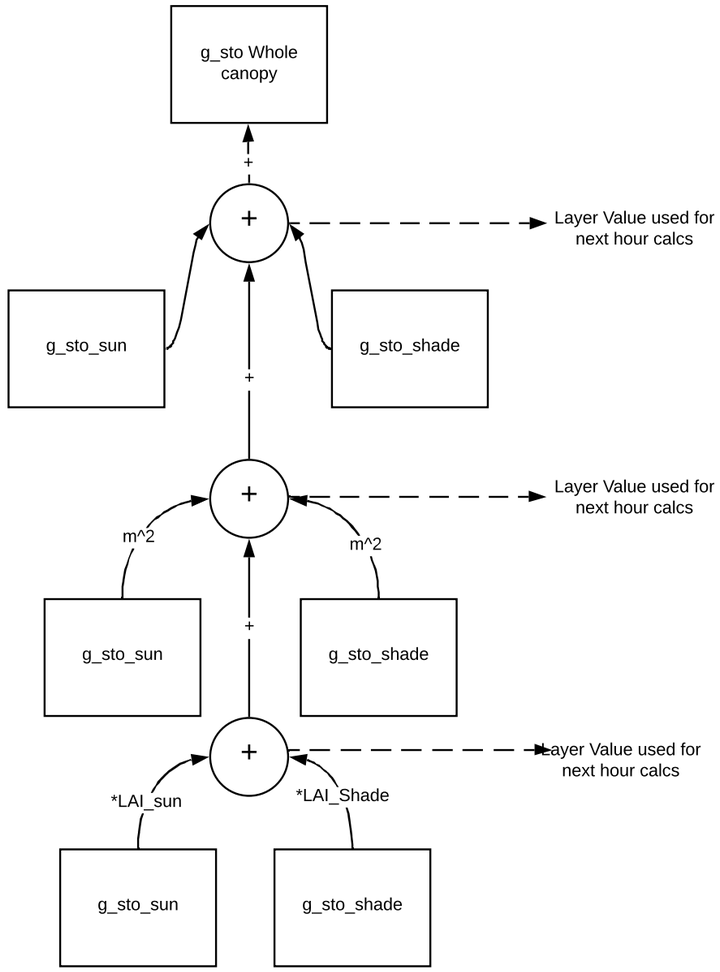
Layer 1

Layer 2

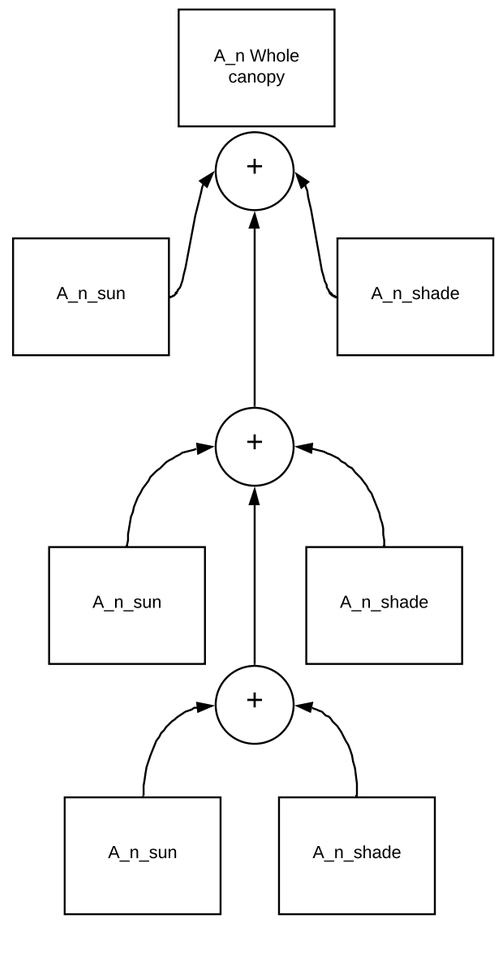
Upscaling of Outputs per layer and per sun shade

Each output neds to be scalled back up to layer and canopy distributions

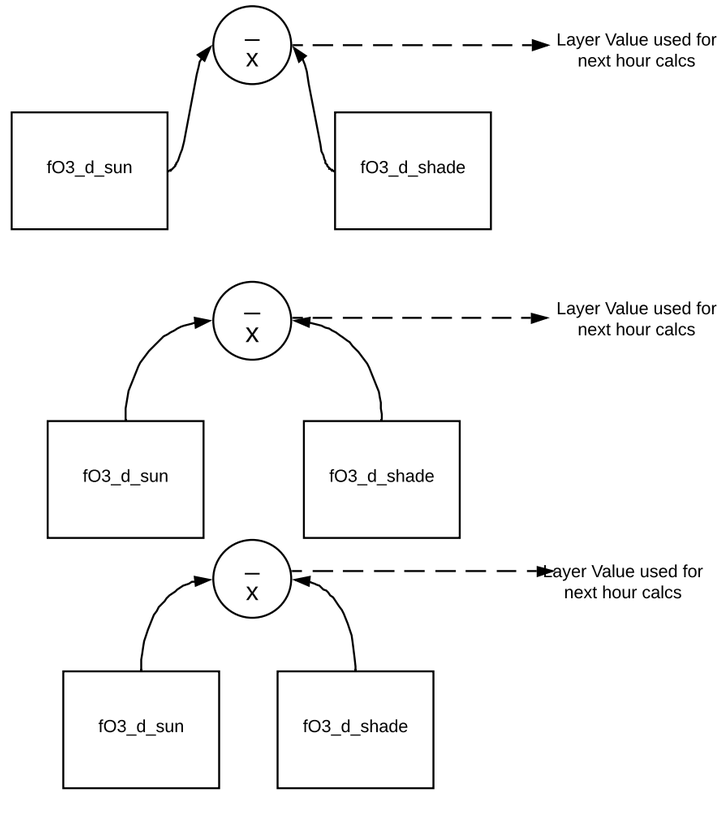
Gsto calculated per layer per sun shade. Then integrated(Sum) to get whole canopy



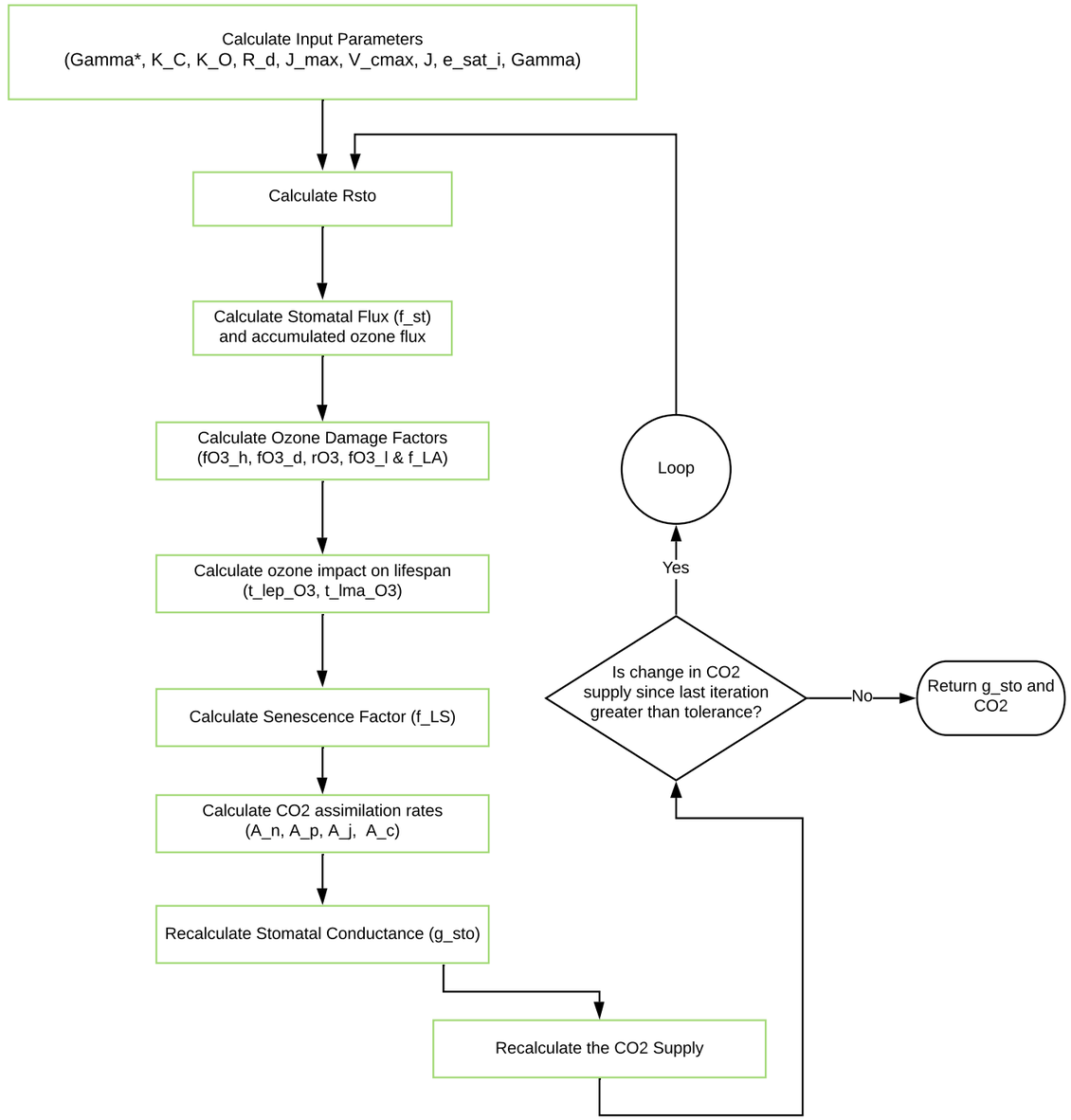
A_n calculated per layer per sun shade. Then integrated(Sum) to get whole canopy



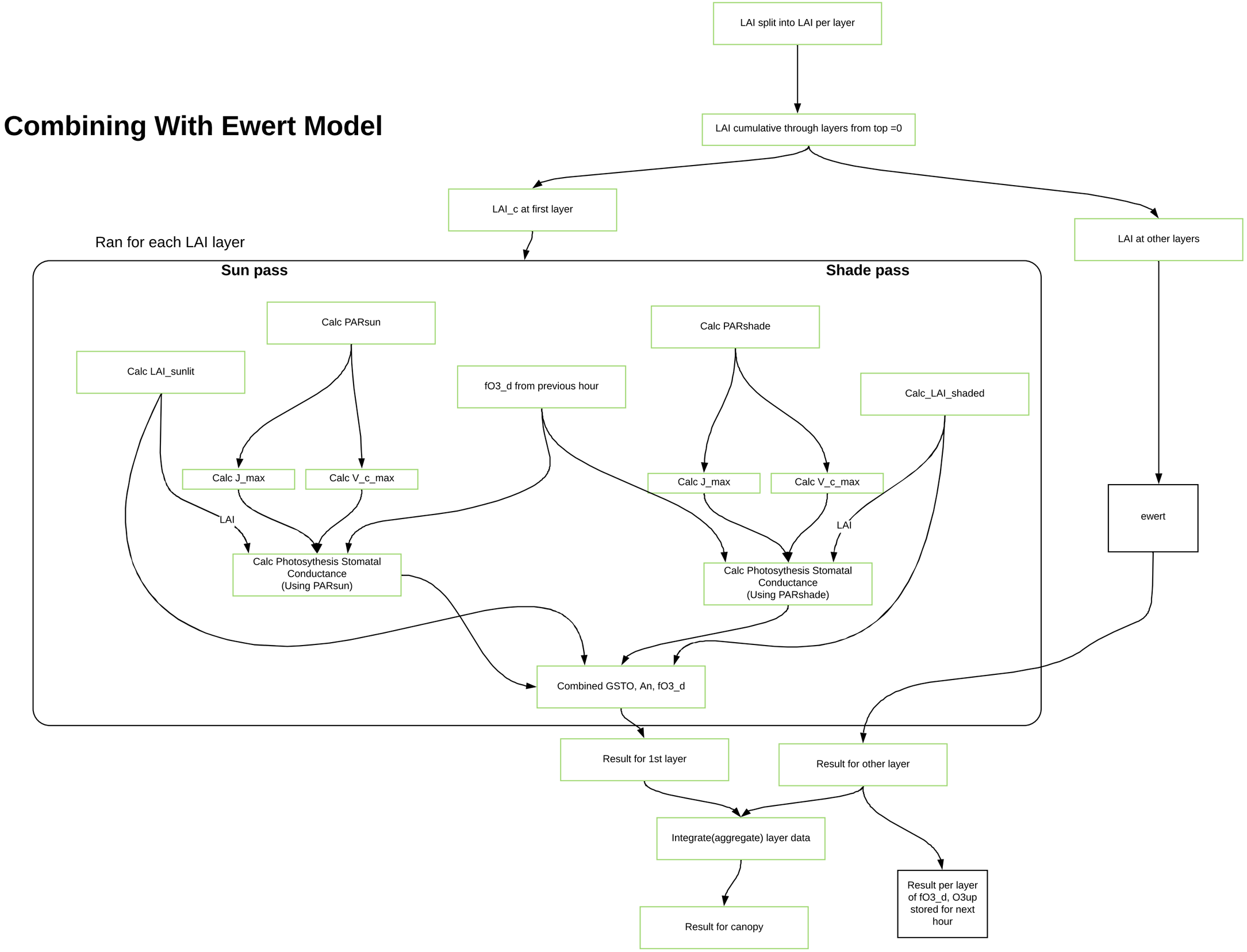
f_O3_d calculated per layer per sun shade. Then averaged per layer



Calc Photosynthesis Stomatal Conductance (Ewert Method)



Combining With Ewert Model



Ewert Inputs(Highlight sun/shade difference)

Config
t_lse_constant
gamma_1
gamma_2
gamma_3
g_sto_0
m
Lm
previous state
t_l_estimate
t_lem
t_lma
t_lep
t_lse
V_cmax_25
J_max_25
PARsun
PARshade
LAI
D_0
g_bv
td_dd
td_dd_prev
fO3_d_prev
O3up_prev
O3up_acc_prev
uh
external data
Tleaf_C
O3_nmol
eact
sinB
c_a
is_daylight

Ewert Outputs

Tleaf_C
g_sv
A_n
A_c
A_j
A_p
A_n_limit_factor
R_d
O3up_out
O3up_acc_out
fO3_h_out
fO3_d_out
c_i
Canopy_A_n

Combined GSTO, An, fO3_d

Average of sun and shade output
Sum of sun and shade output
??

Thuy Notes on Ewert upscaling implementaion

Yes, the integration can be done via the “depth or layer” of the canopy. They can be three-point or five points (five “depths/layers”) Gaussian integration. We estimate separately the photosynthesis for sunlit and shaded leaves at each point (depth/layer) then integrates (summing) them to the whole canopy for each time step (hourly).