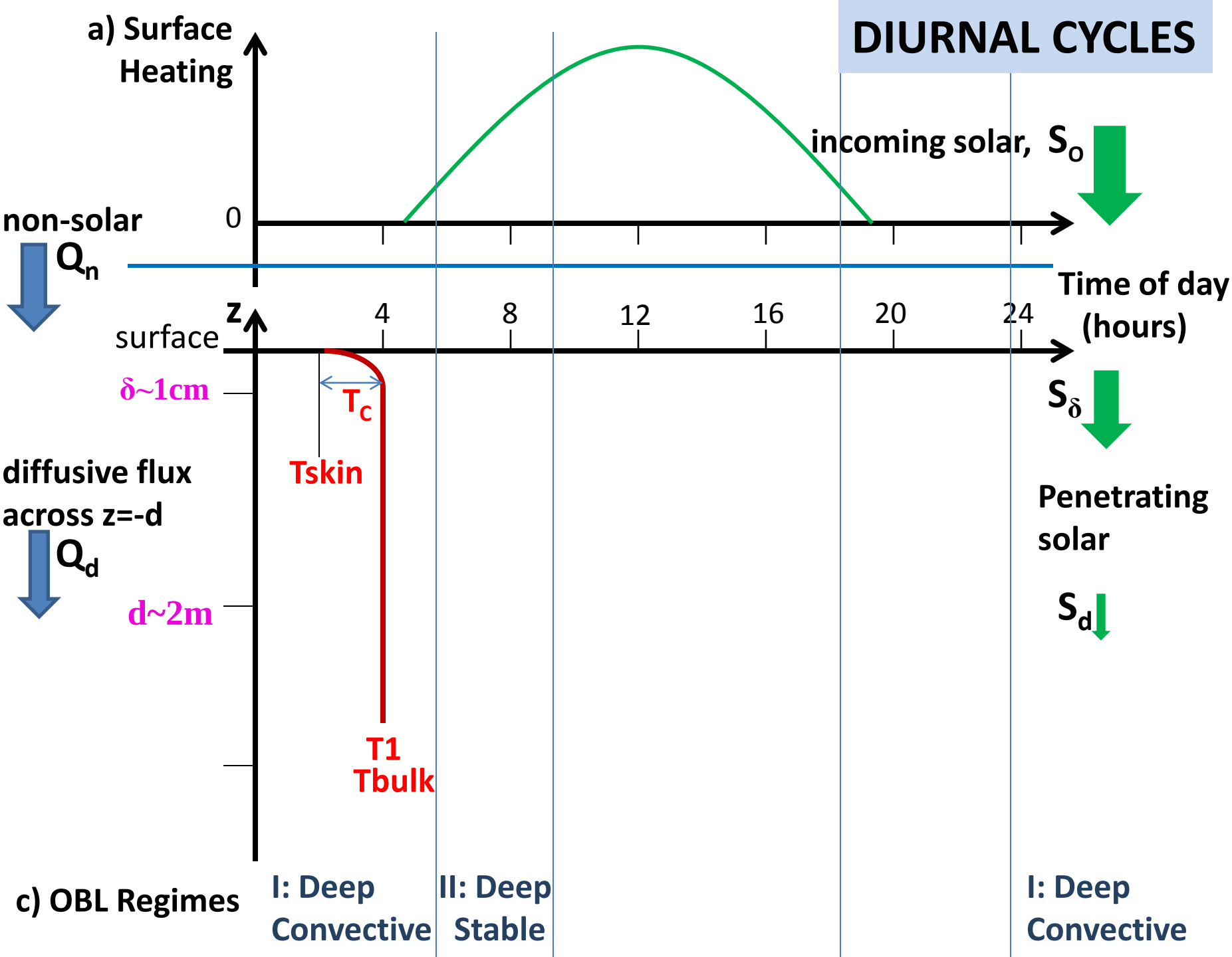
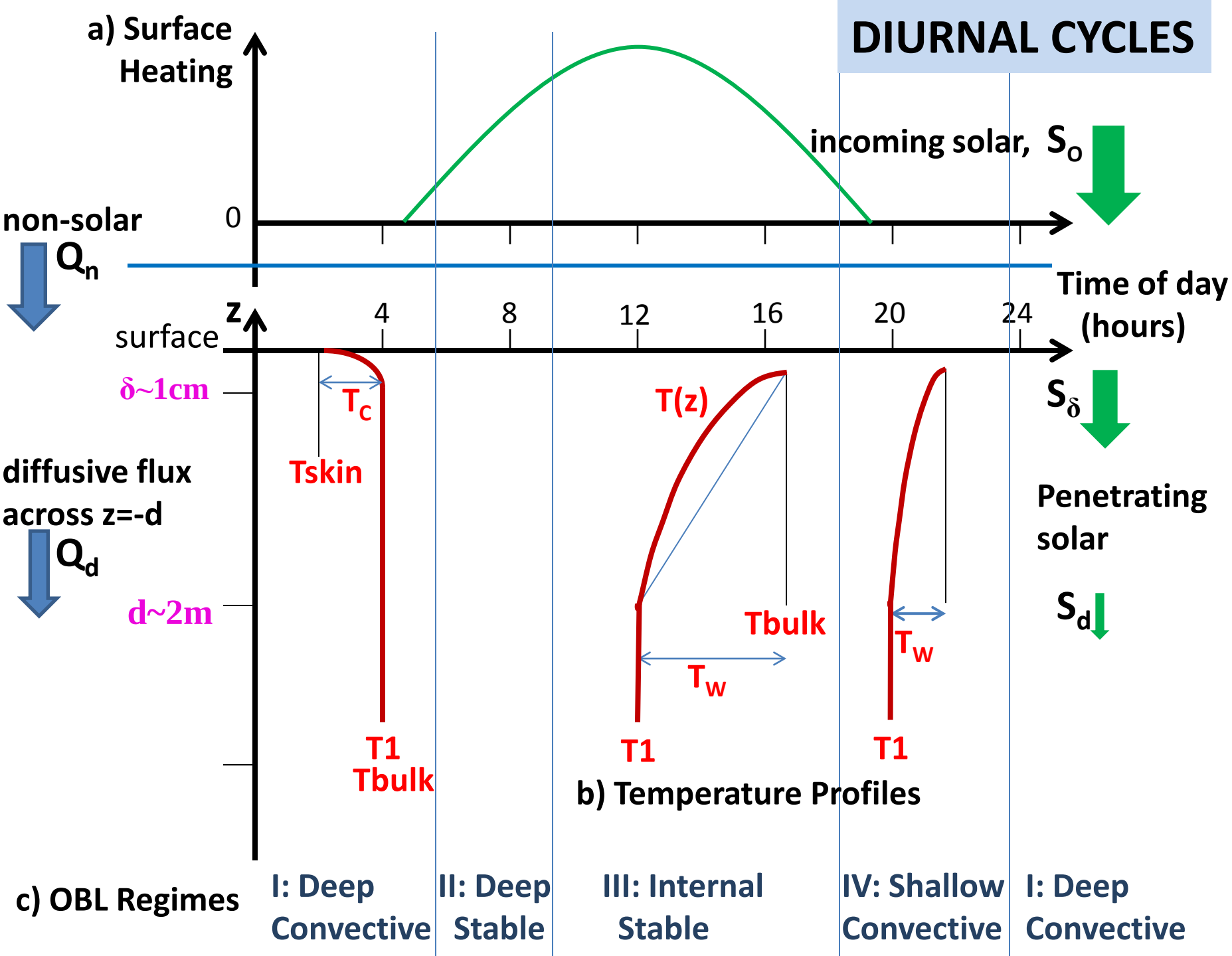
OCEAN DIRUNAL CYCLING in the Flux Coupler

? Standard Diagnostics ?


DIURNAL CYCLES
a) Surface Heating
incoming solar, S_o
non-solar
Q_n
0
4
8
12
16
20
24
Time of day (hours)
z
surface
δ~1cm
T_c
S_δ
Tskin
diffusive flux across z=-d
Q_d
Penetrating solar
d~2m
S_d
T1
Tbulk
c) OBL Regimes
I: Deep Convective
II: Deep Stable
I: Deep Convective


DIURNAL CYCLES
a) Surface Heating
incoming solar, S_o
non-solar
Q_n
0
4
8
12
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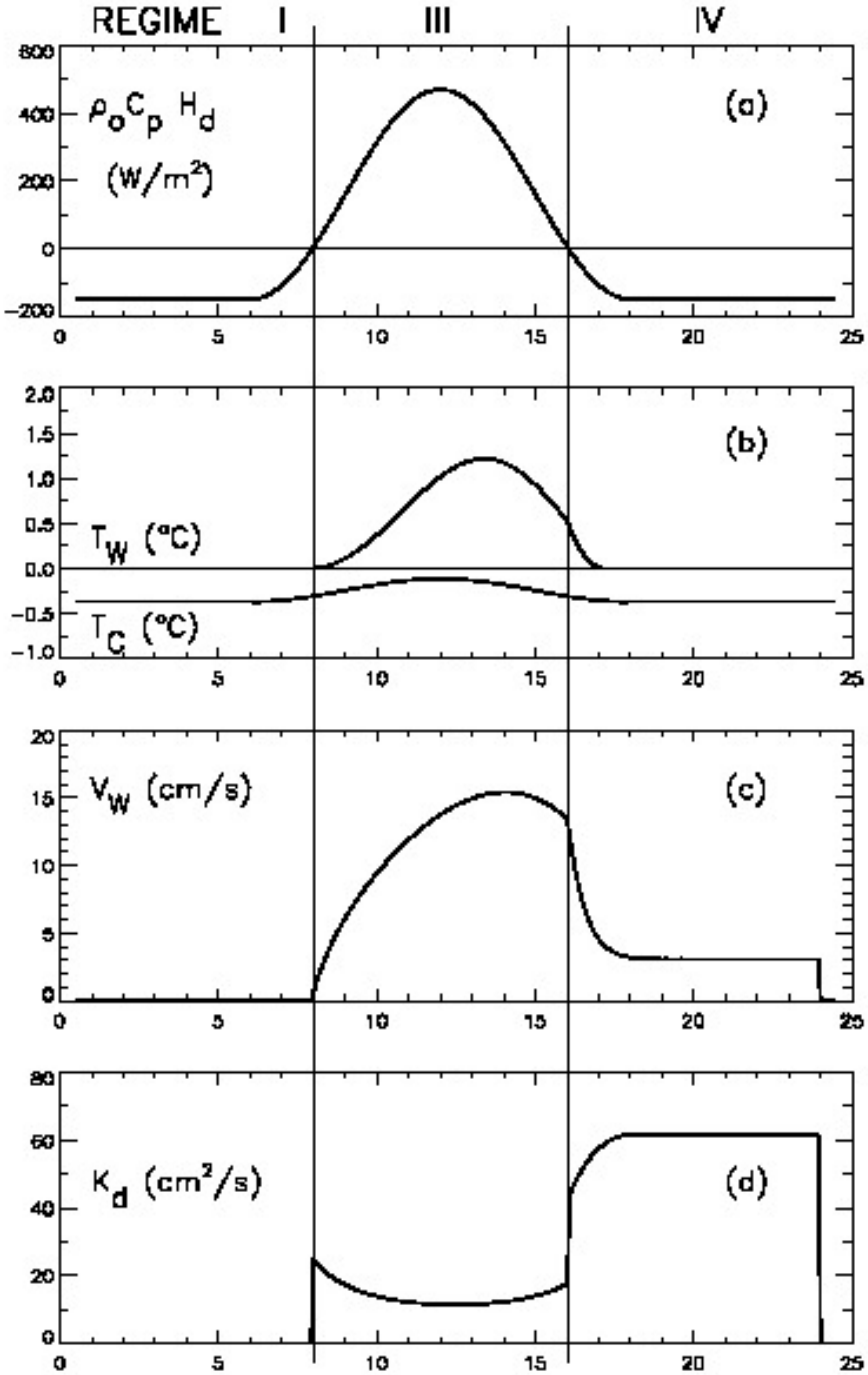
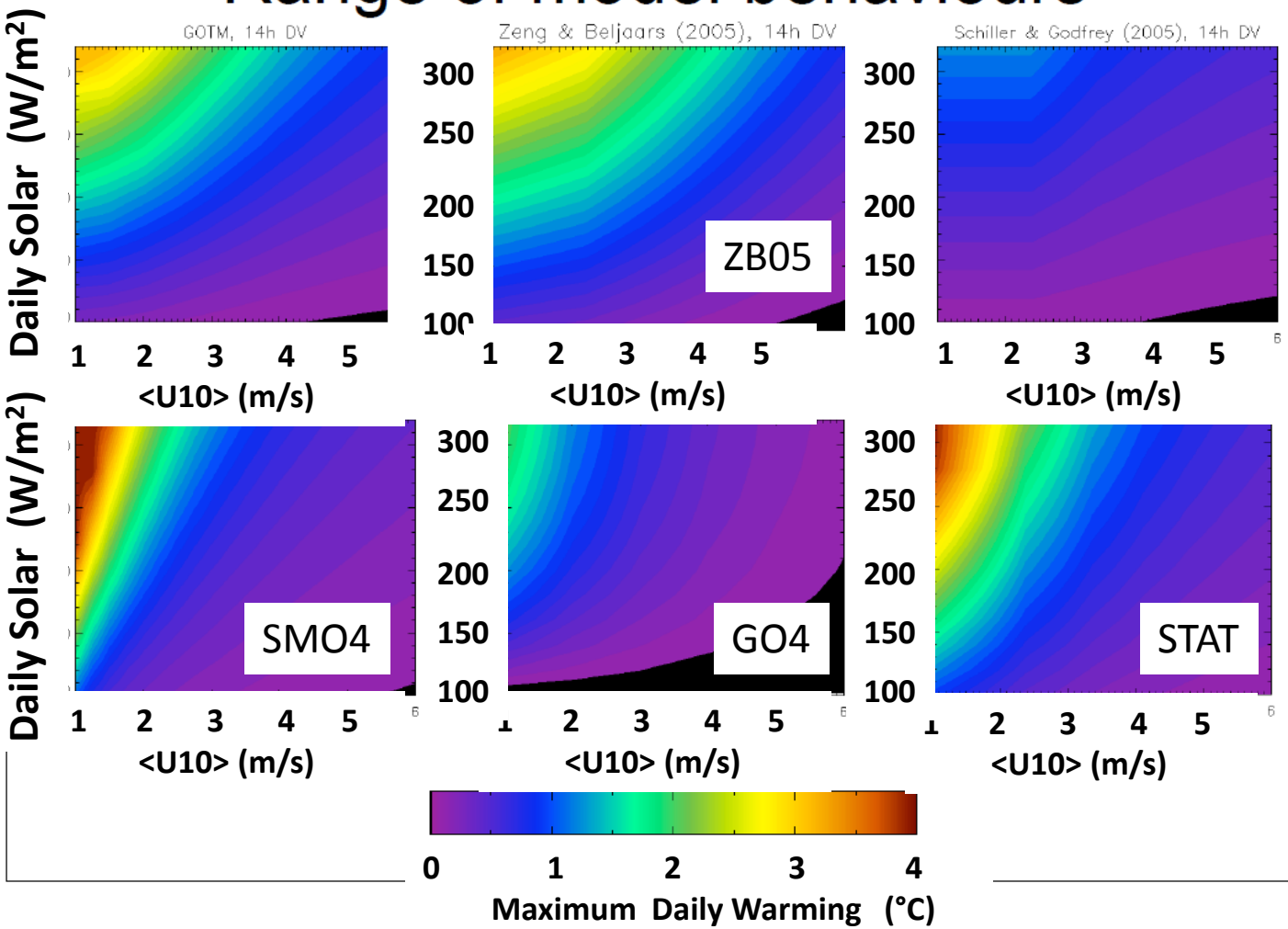
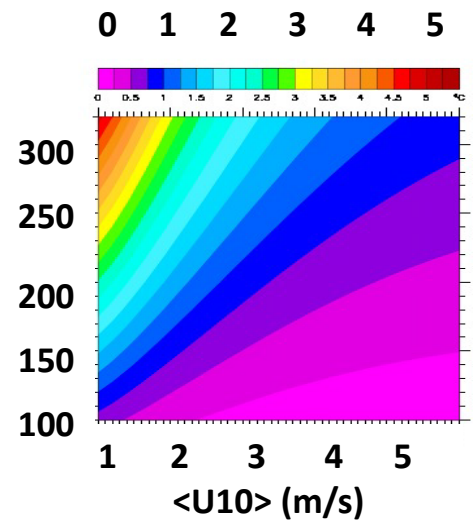
Time of day (hours)
z
surface
δ~1cm
T_c
Tskin
T(z)
S_δ
diffusive flux across z=-d
Q_d
Penetrating solar
S_d
d~2m
Tbulk
T_w
T_w
T1
Tbulk
T1
T1
b) Temperature Profiles
c) OBL Regimes
I: Deep Convective
II: Deep Stable
III: Internal Stable
IV: Shallow Convective
I: Deep Convective


REGIME
I
III
IV
$\rho_o C_p H_d$
(W/m²)
(a)
T_W (°C)
T_C (°C)
(b)
V_W (cm/s)
(c)
K_d (cm²/s)
(d)

Range of model behaviours





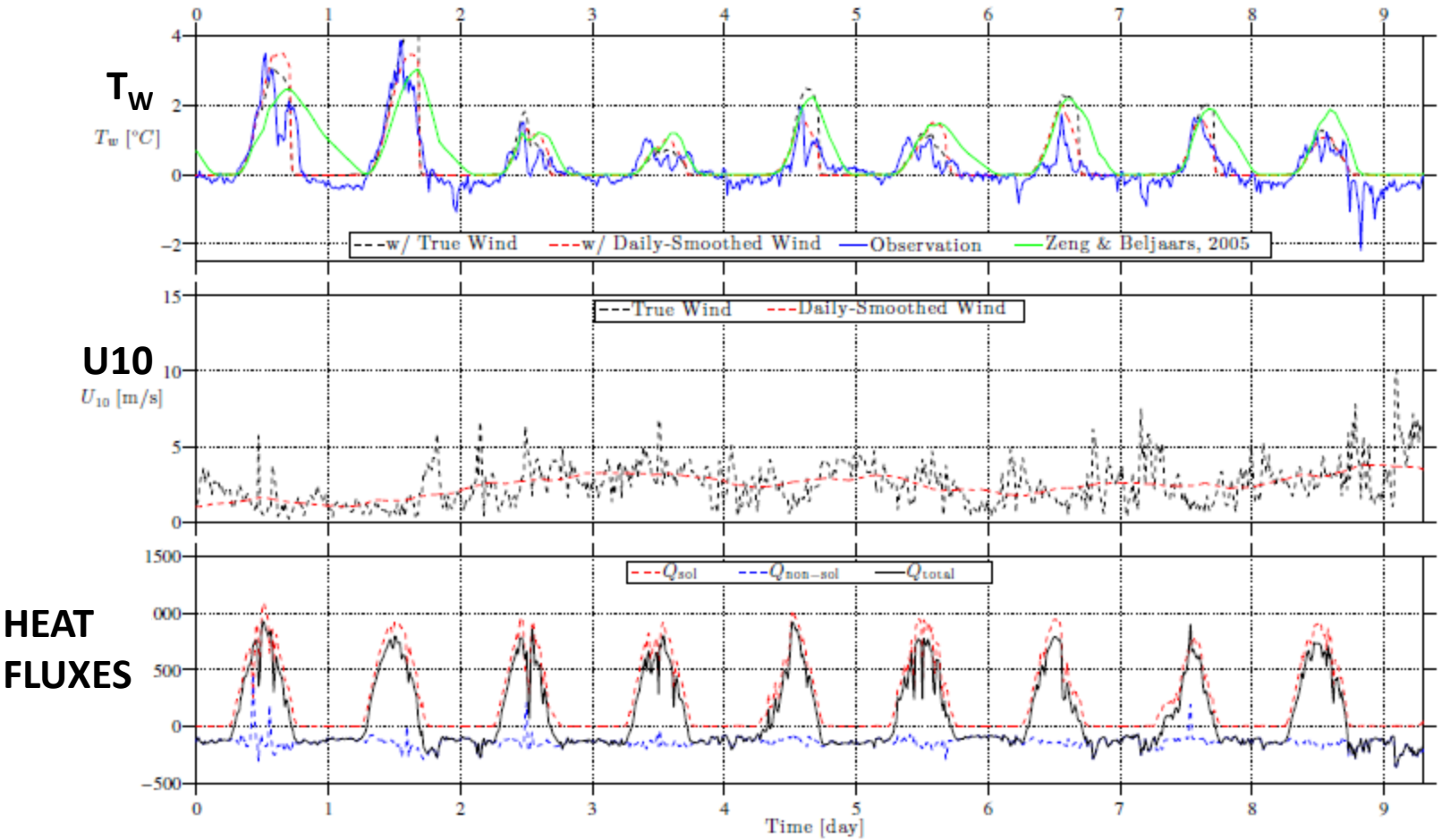
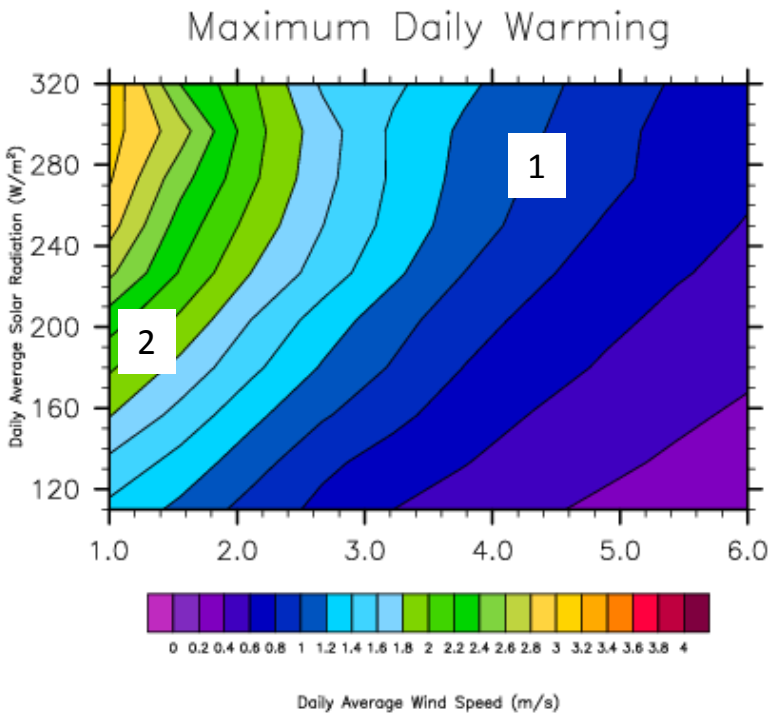


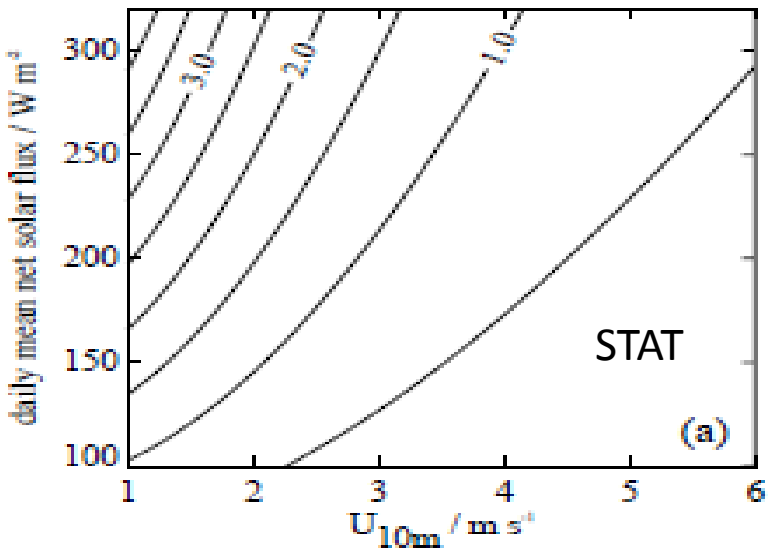
Figure 1: TOGA COARE Data, $d = 3$m

San Nguyen and Aneesh Subramanian, Scripps IO

Realistic Diurnal Warming (°C)

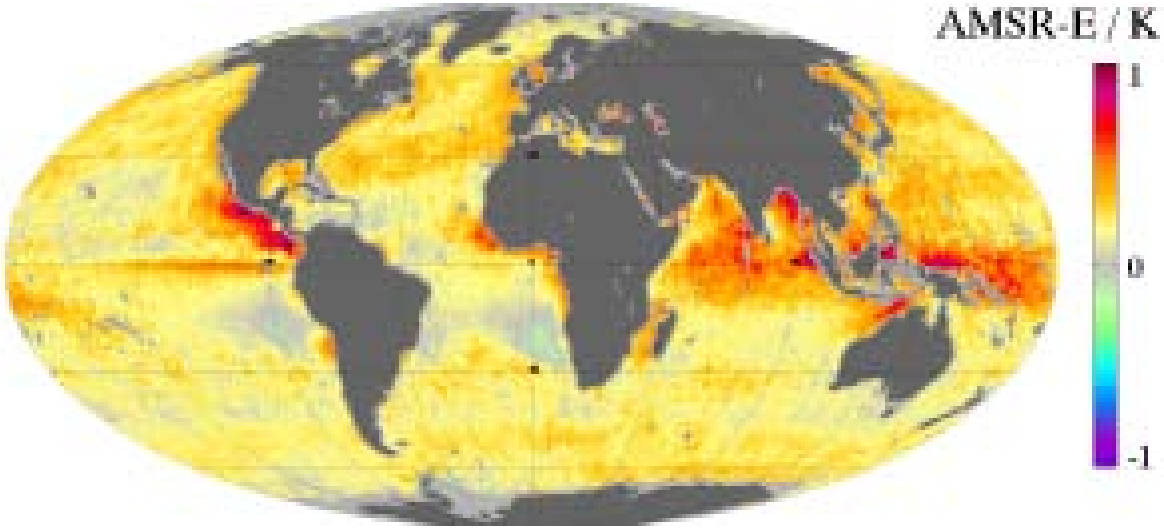
CESM AMIP



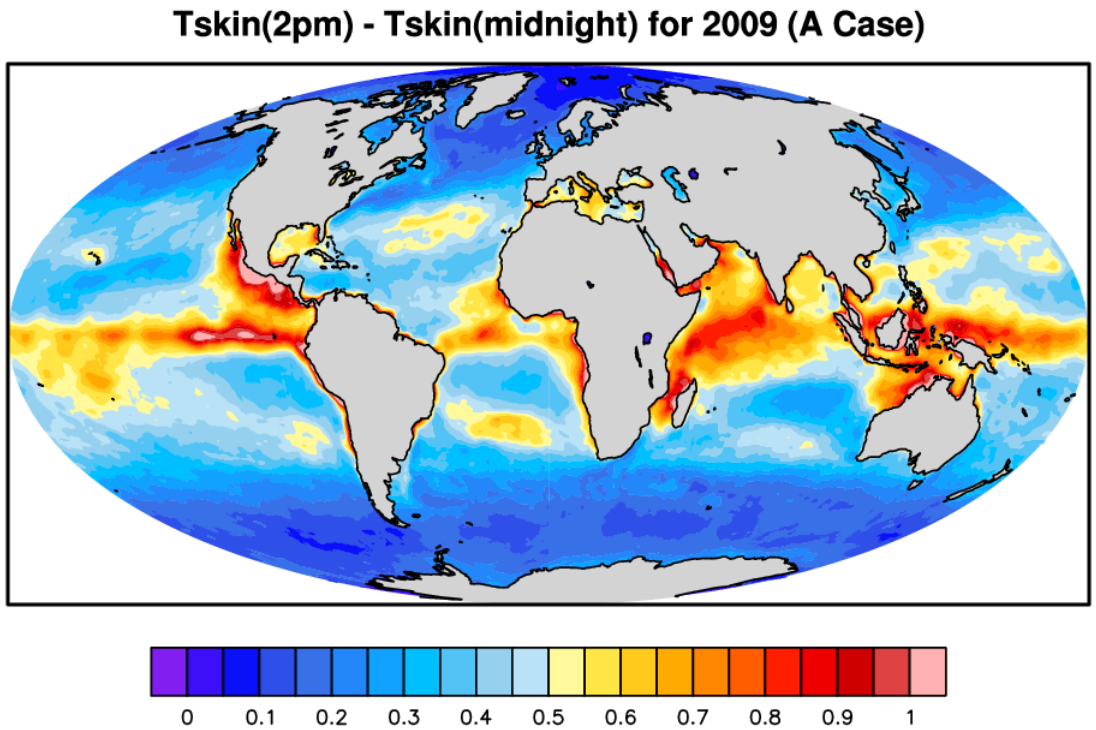


Annual Average Diurnal Warming (°C)

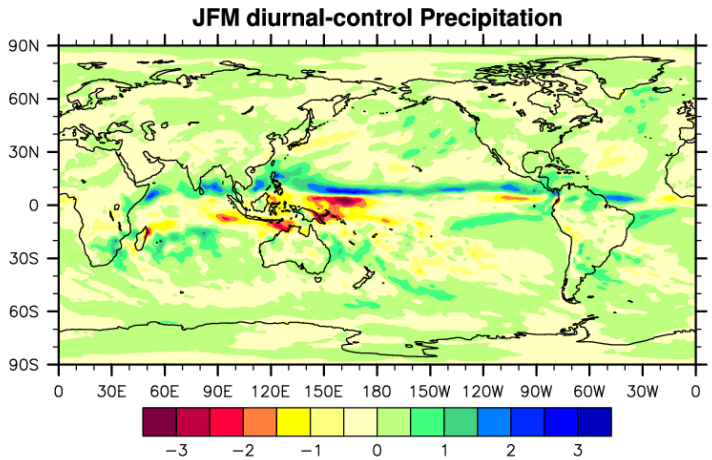
Tskin(2pm) – Tskin(dawn) for 2007 Observed

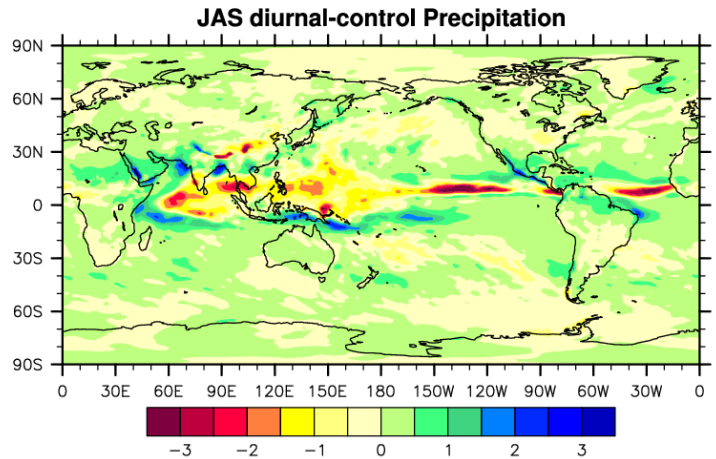


CESM data



Seasonal Precipitation (mm/day)





COUPLER DIAGNOSTICS ?

- Mean T_{skin}
- Mean T_{bulk}
- Mean $T_{skin}(14:00) - T_{skin}(0:00)$
- Mean $T_{bulk}(14:00) - T_{bulk}(0:00)$
- Mean Speeding, V_W
- Mean Salting,
- Other Statistics
- Any Instantaneous
- Flux Effects LW(T_{skin}) ; Sensible/Latent (T_{bulk})