Diurnal cycle of SEP Sc and drizzle in CAM/SAM

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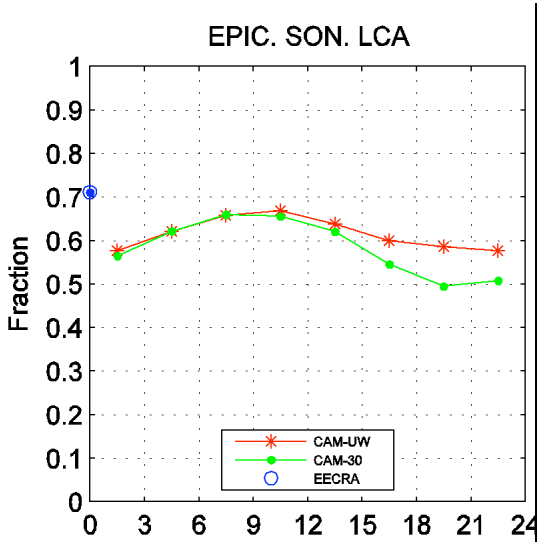
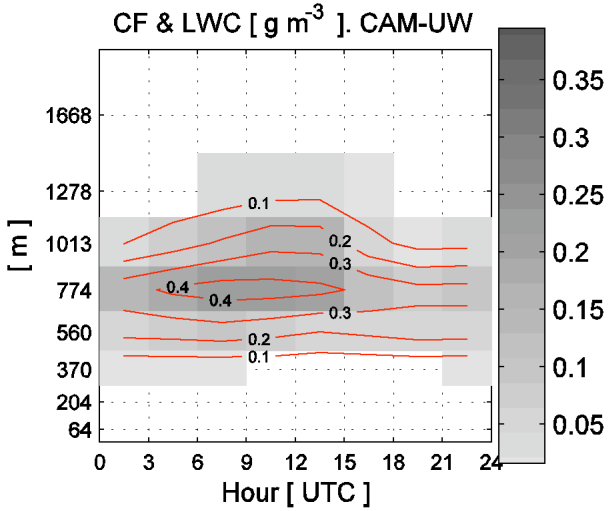
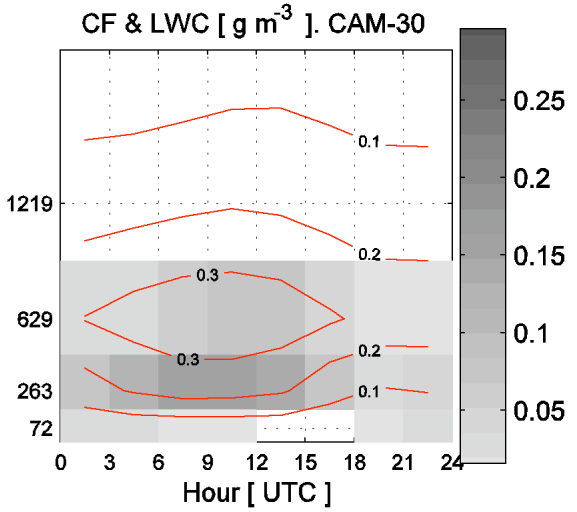
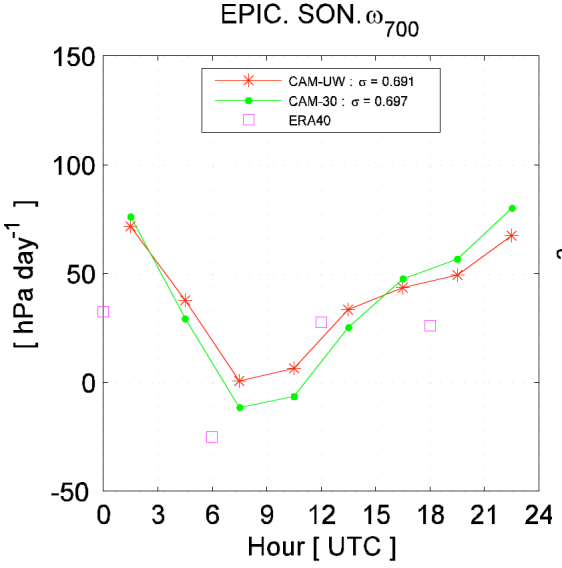
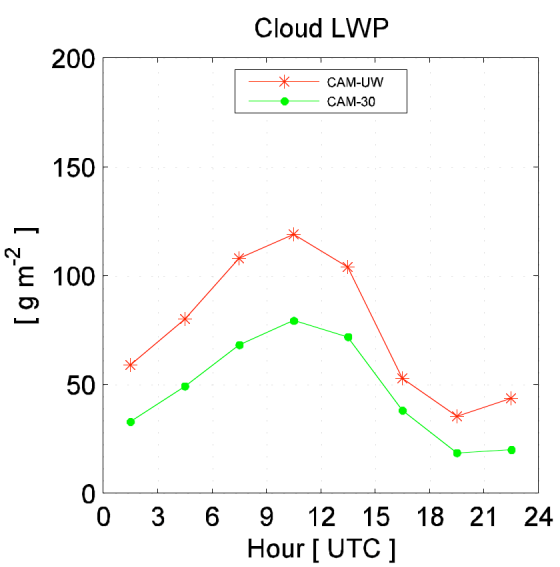
20S 85W SON diurnal cycle in CAM-UW and CAM3 (S. Park)

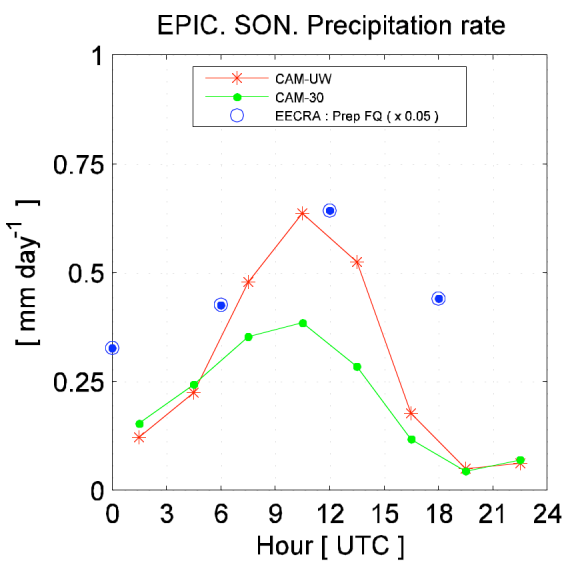








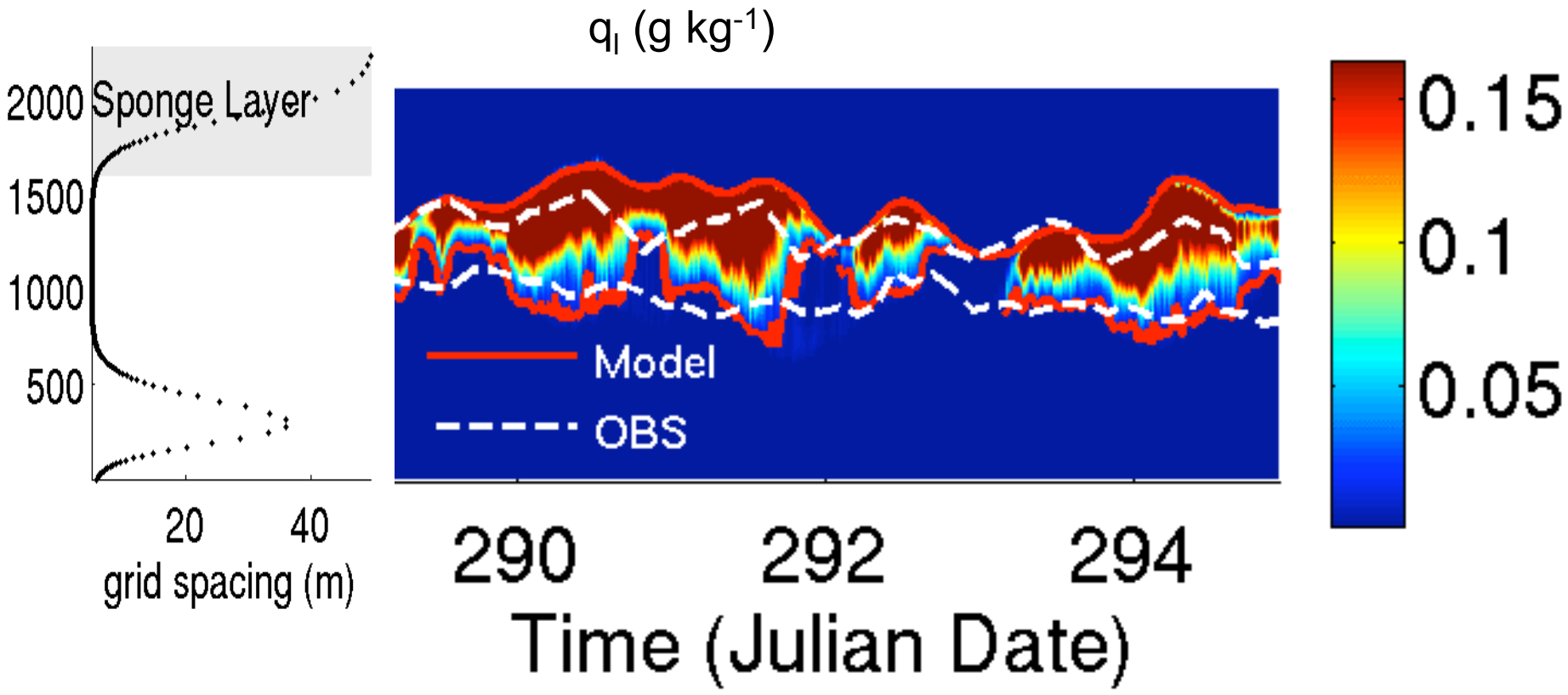




Overall diurnal cycle is good, esp. in CAM-UW. Probs: Excess drizzle, shallow PBL

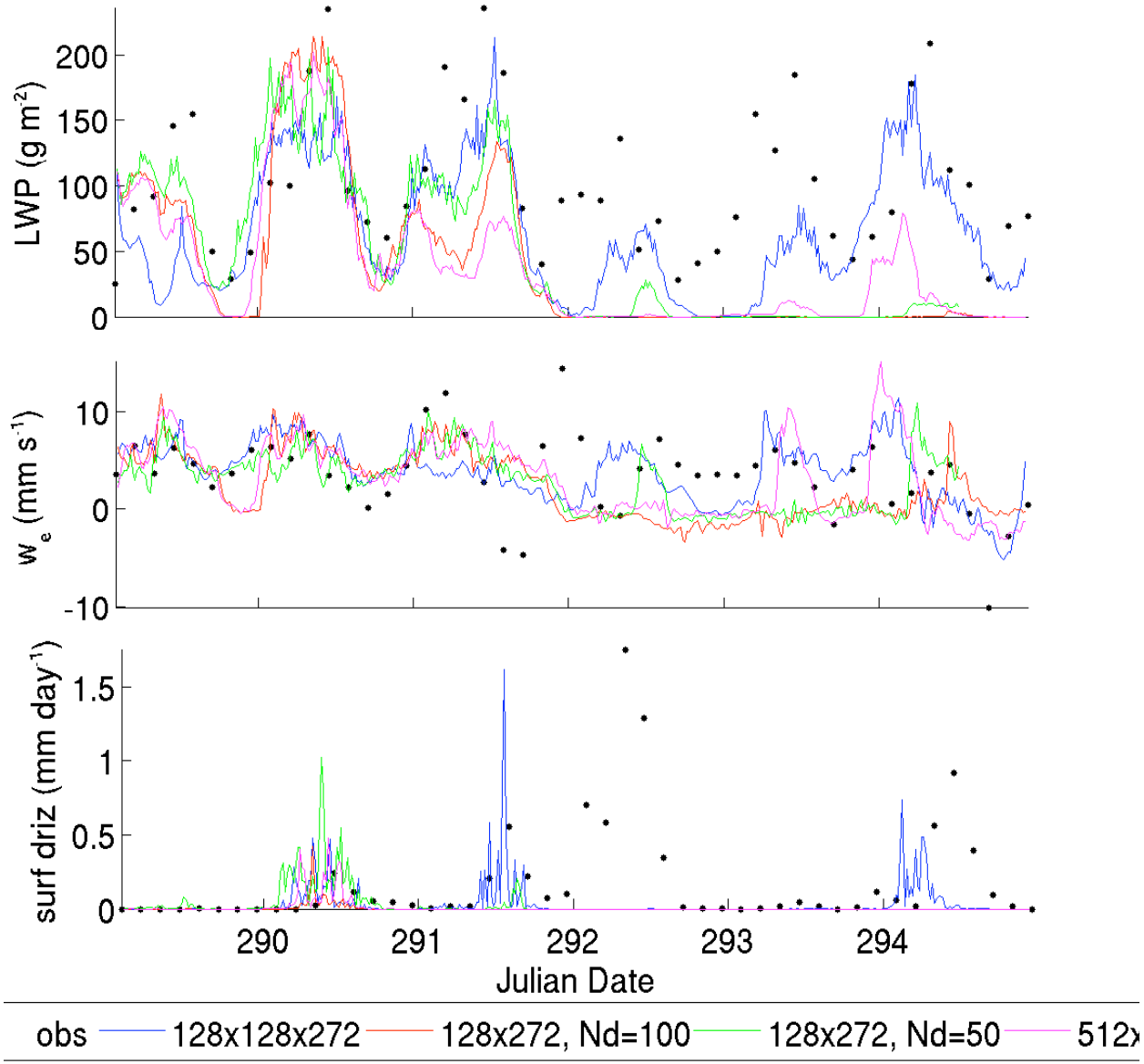
EPIC2001 Sc LES (P. Caldwell)

- SAM6.5 (thanks, Marat), Δx = 25 m, Δz_{min}= 5 m, 128x272
  Diurnal radiation, K-K microphys., droplet sedimentation with σ_g=2.
- EPIC Sc integrated dataset (16-21 Oct. 2001, 20S 85W) used for forcing/validation, except uniform N_d=100 cm^{-3} .
  Hor. adv and ω derived from ERA40. Mean winds nudged to sondes



Challenging to sustain Sc for 6 days

- Simulated PBL less well mixed.
- Cloud dies after 3 days (forcings?)
- Drizzle and cloud properties fairly insensitive to N_d
- Excessive drop sedimentation needed to compensate over-efficient entrainment



Conclusions

- GCMs can simulate the climatological diurnal cycle of Sc and subsidence in the SEP.
- GCM parameterizations of Sc are now mature enough to benefit from improved understanding of cloud-drizzle-aerosol feedbacks.
- LES simulations of the deep CTBLs in the SEP are fairly challenging, especially over multiple diurnal cycles. The effect of nighttime drizzle on daytime cloud albedo is not entirely clear-cut.
- GCSS intercomparisons (DYCOMS RF01/02, RICO) are focusing on precipitating Sc and Cu as well. They show entrainment and dynamics definitely modulate microphysical/aerosol feedbacks, sometimes in unexpected ways.