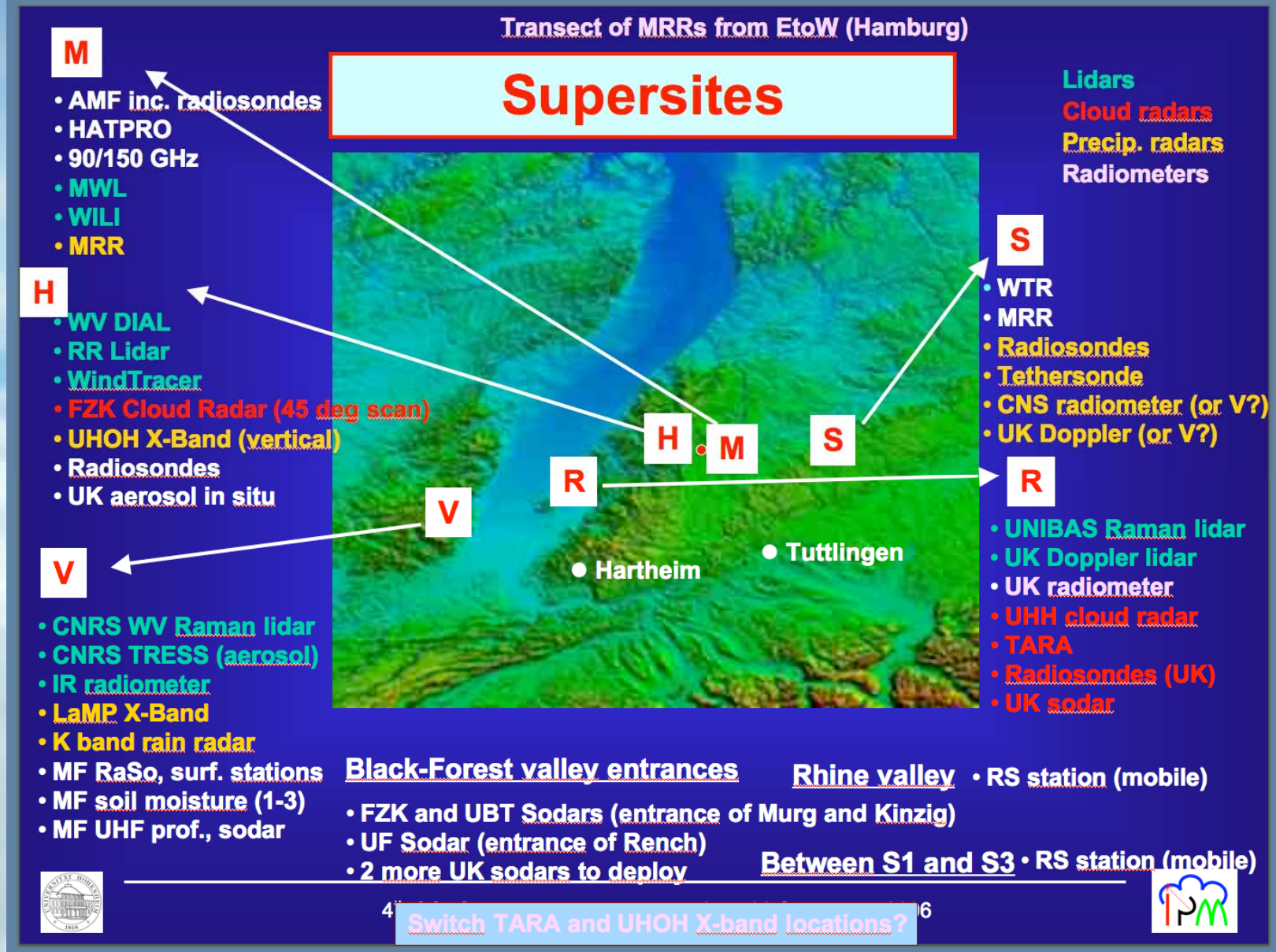
Comparison of Radiation and Clouds at the COPS Rhine Valley, Hornisgrinde, and AMF Sites

Chuck long

COPS Sites


Transect of MRRs from EtoW (Hamburg)
Supersites
M
• AMF inc. radiosondes
• HATPRO
• 90/150 GHz
• MWL
• WILI
• MRR
H
• WV DIAL
• RR Lidar
• WindTracer
• FZK Cloud Radar (45 deg scan)
• UHOH X-Band (vertical)
• Radiosondes
• UK aerosol in situ
V
• CNRS WV Raman lidar
• CNRS TRESS (aerosol)
• IR radiometer
• LaMP X-Band
• K band rain radar
• MF RaSo, surf. stations
• MF soil moisture (1-3)
• MF UHF prof., sodar
Lidars
Cloud radars
Precip. radars
Radiometers
S
• WTR
• MRR
• Radiosondes
• Tethersonde
• CNS radiometer (or V?)
• UK Doppler (or V?)
R
• UNIBAS Raman lidar
• UK Doppler lidar
• UK radiometer
• UHH cloud radar
• TARA
• Radiosondes (UK)
• UK sodar
H
M
S
R
V
Hartheim
Tuttlingen
Black-Forest valley entrances
• FZK and UBT Sodars (entrance of Murg and Kinzig)
• UF Sodar (entrance of Rench)
• 2 more UK sodars to deploy
Rhine valley
• RS station (mobile)
Between S1 and S3
• RS station (mobile)
Switch TARA and UHOH X-band locations?

Rhine Valley Site

- **Outskirts of Achern**
- **Nestled amongst the sewage treatment plant**

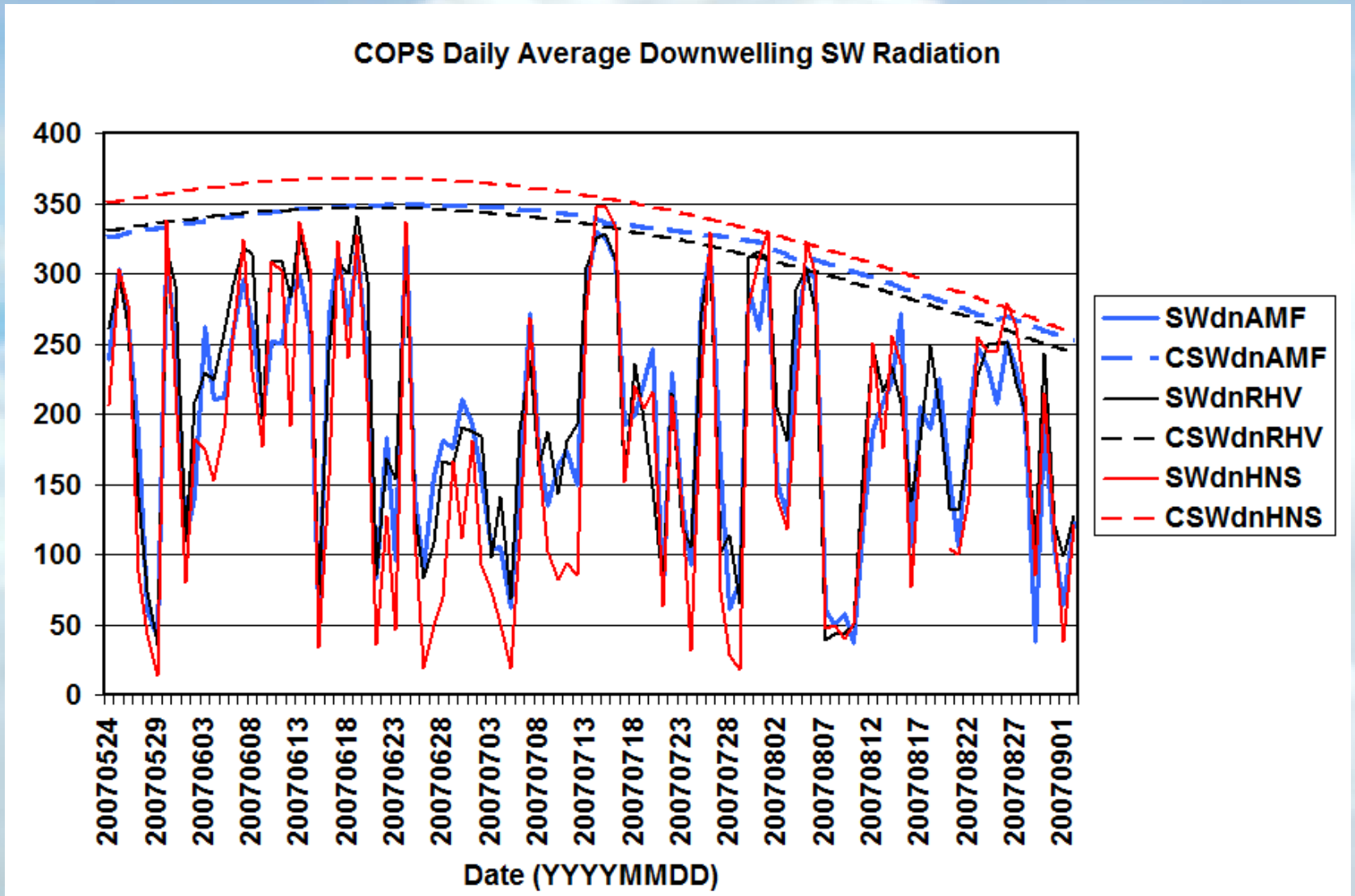
Hornisgrinde Site

- **Mountain top site**
- **Elev: about 1200 m**

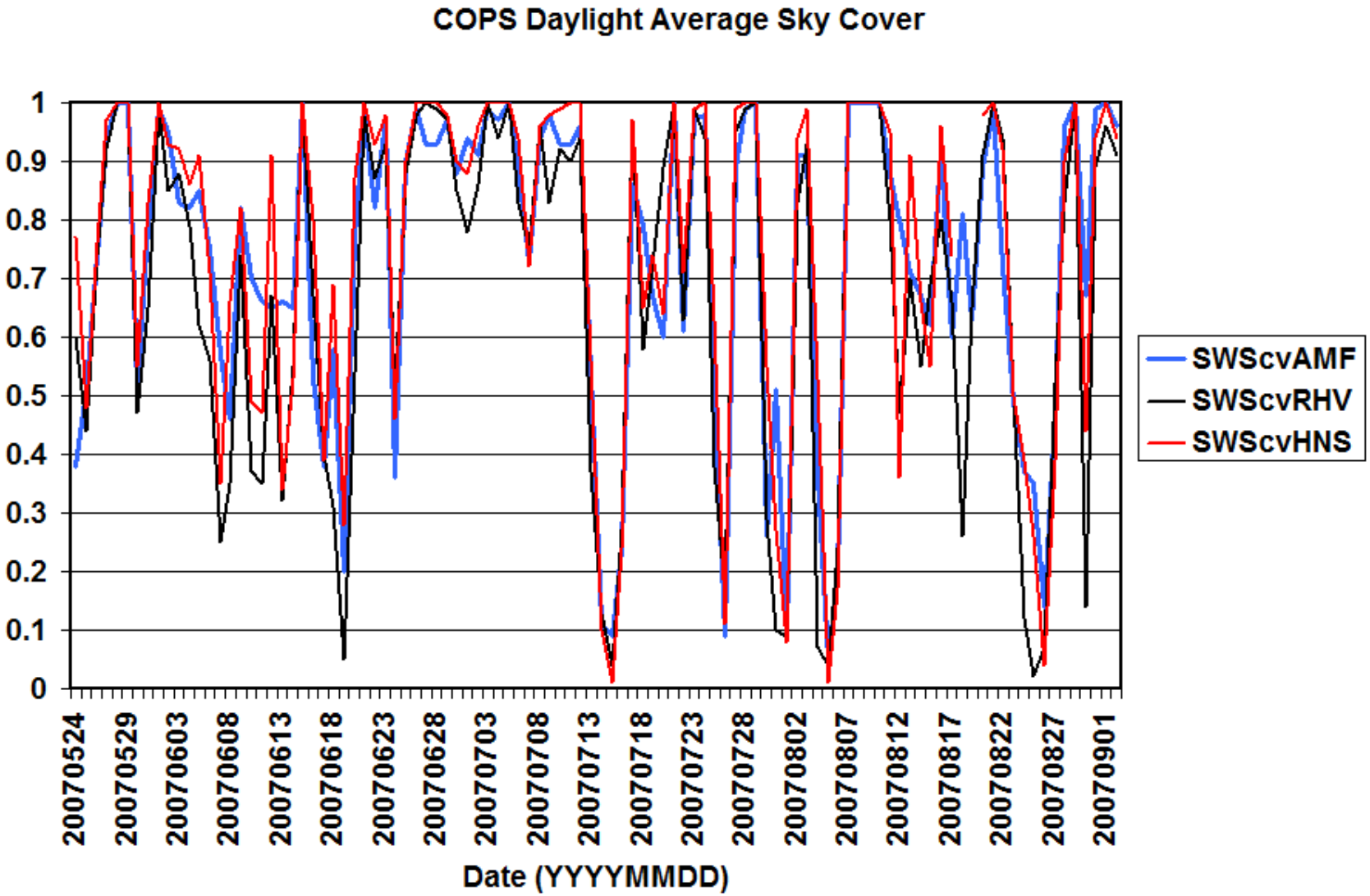
ARM AMF

- Near Heselbach
- Pre-experiment radiometer comparison for normalization

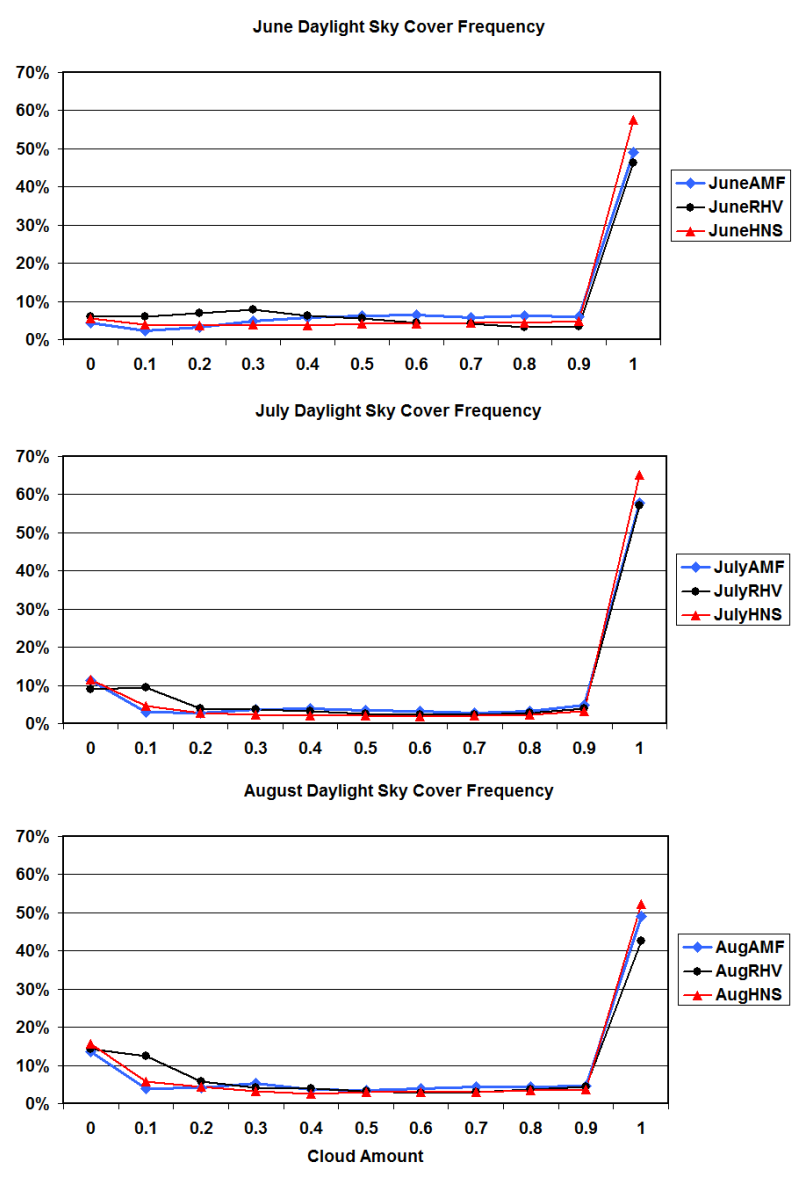
Daily Average SW



Daylight Average Sky Cover

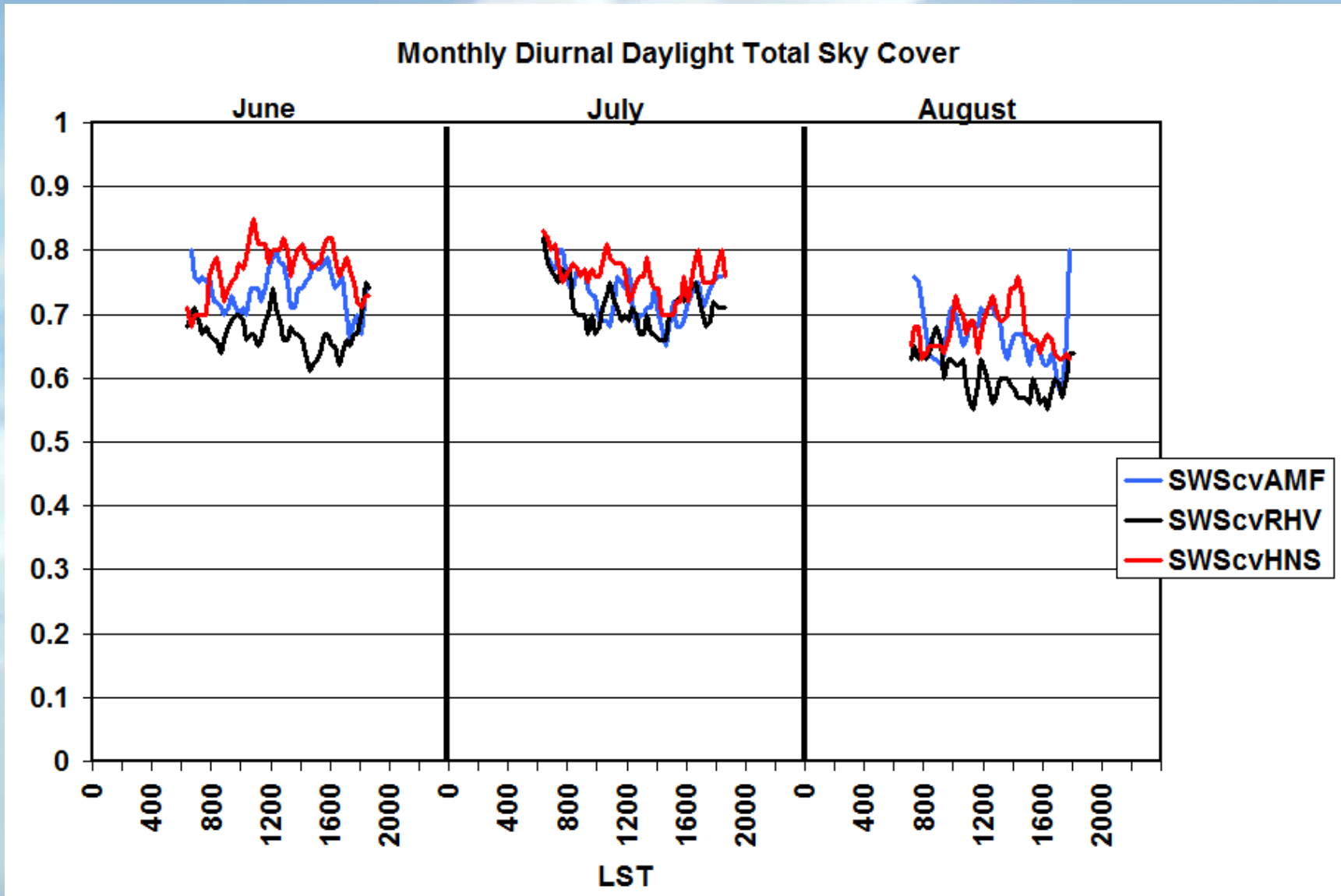


Daylight Sky Cover Frequency

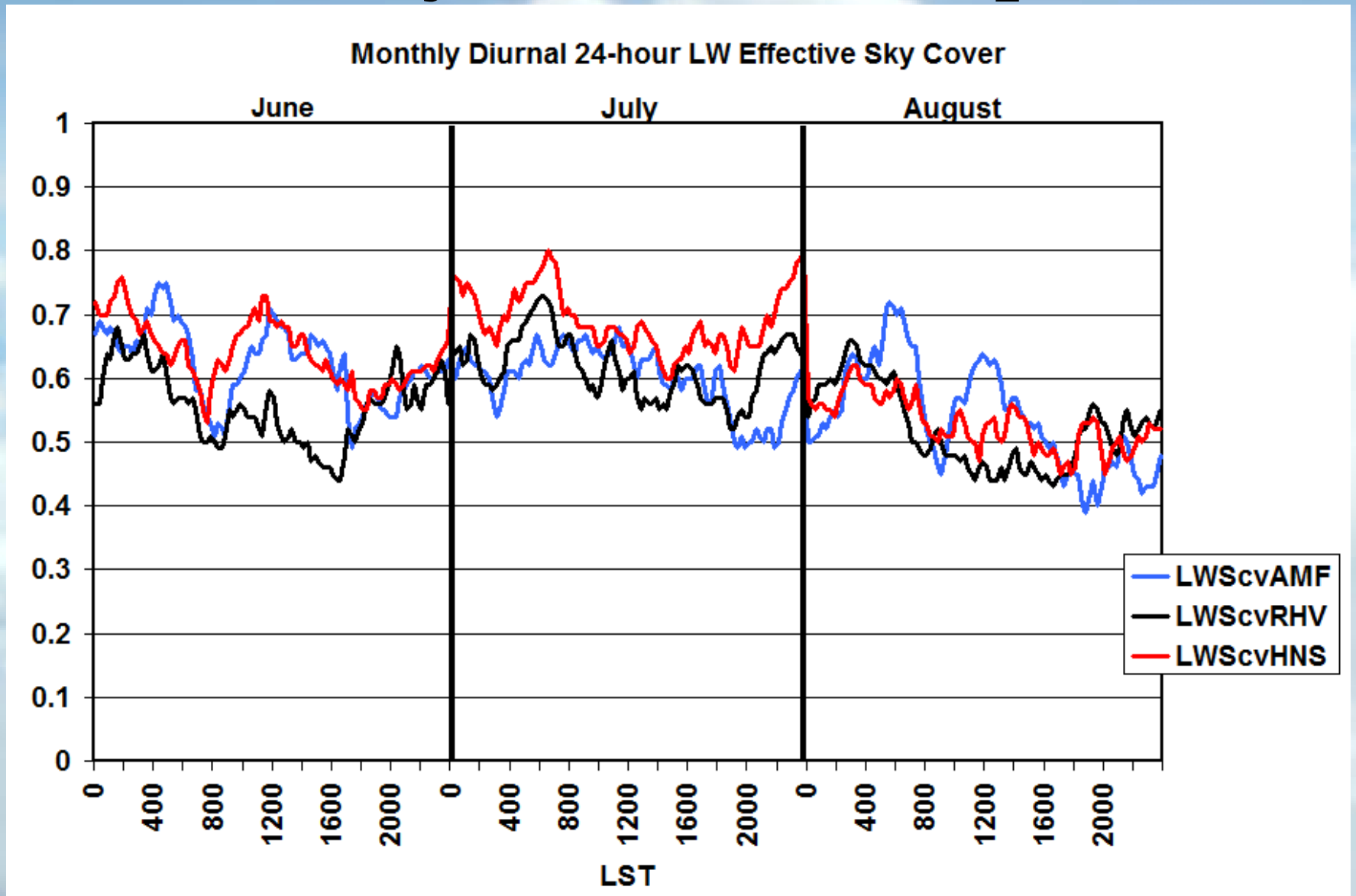


- **All months show infrequent clear-sky occurrence, 50% or more overcast.**

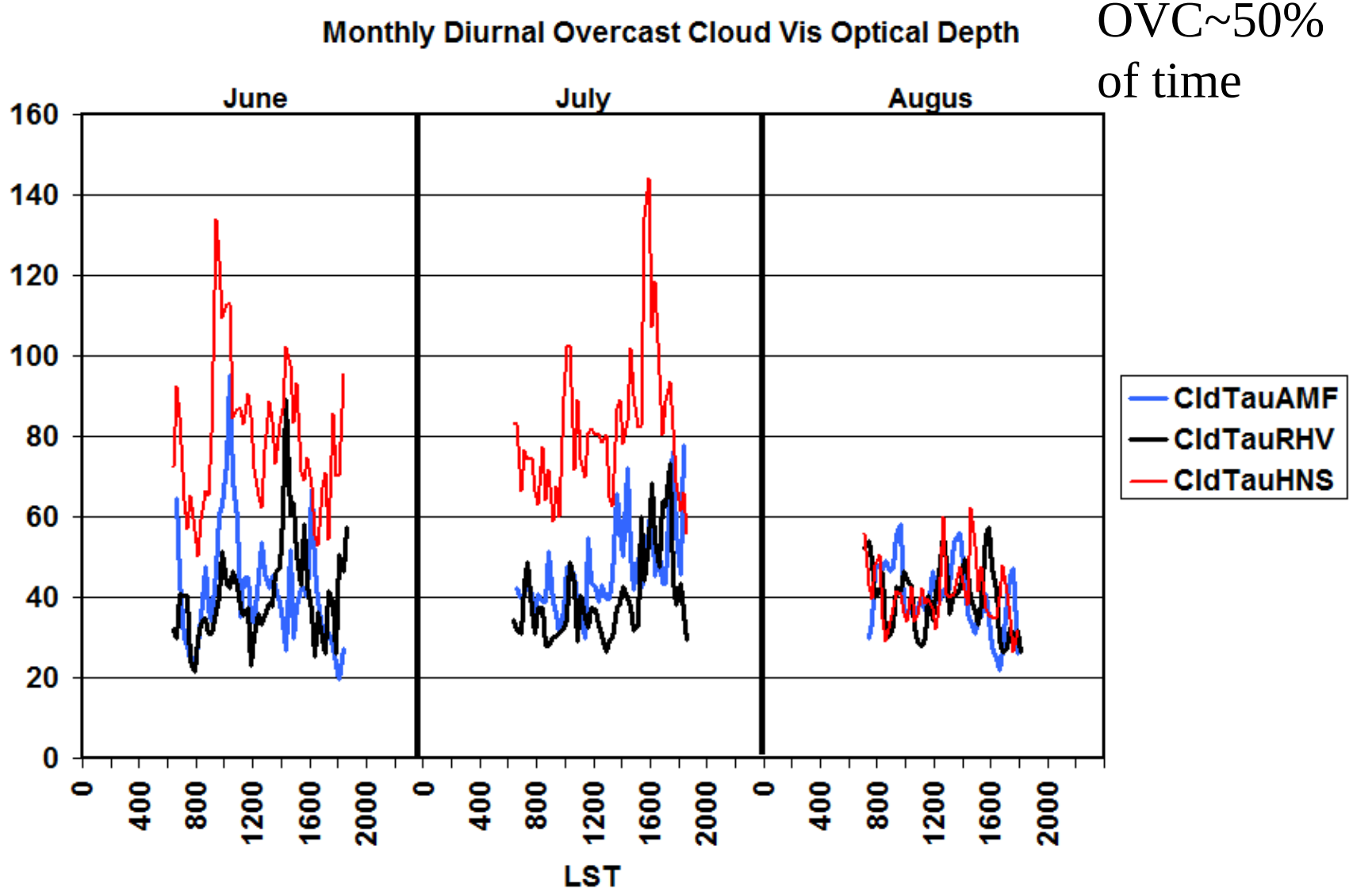
Monthly Diurnal Composite



Monthly Diurnal Composite

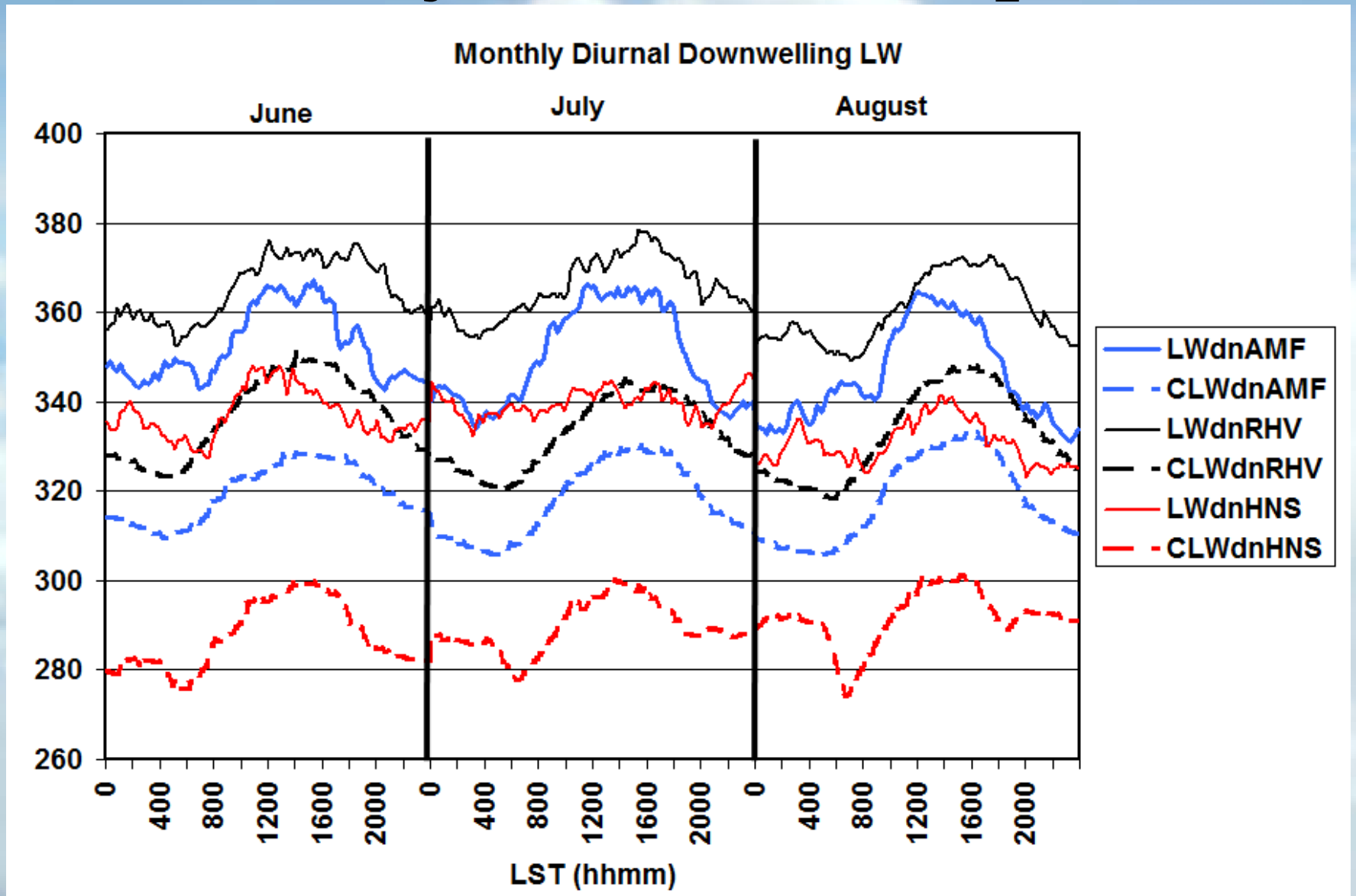


Monthly Diurnal Composite

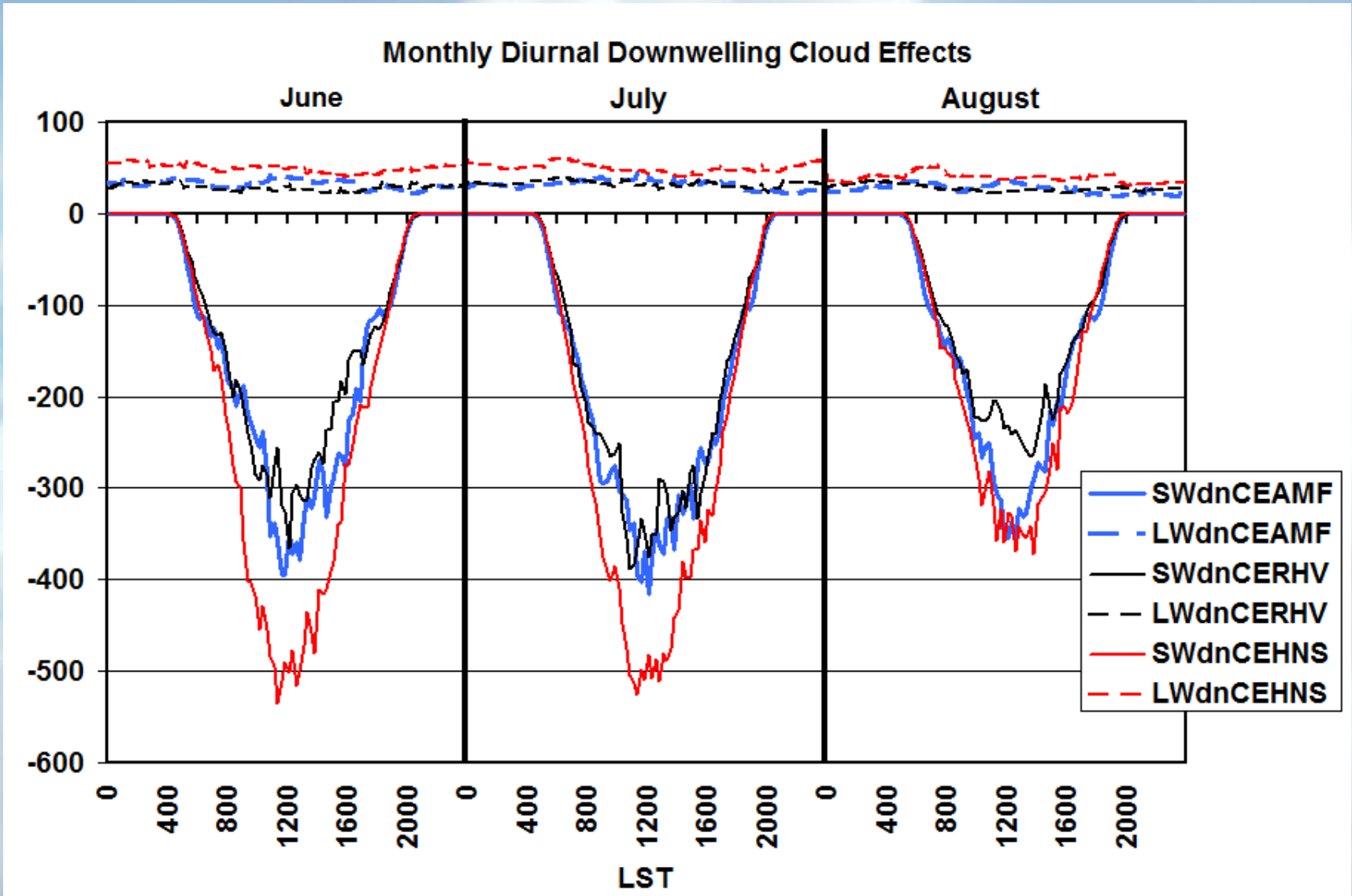


OVC~50% of time

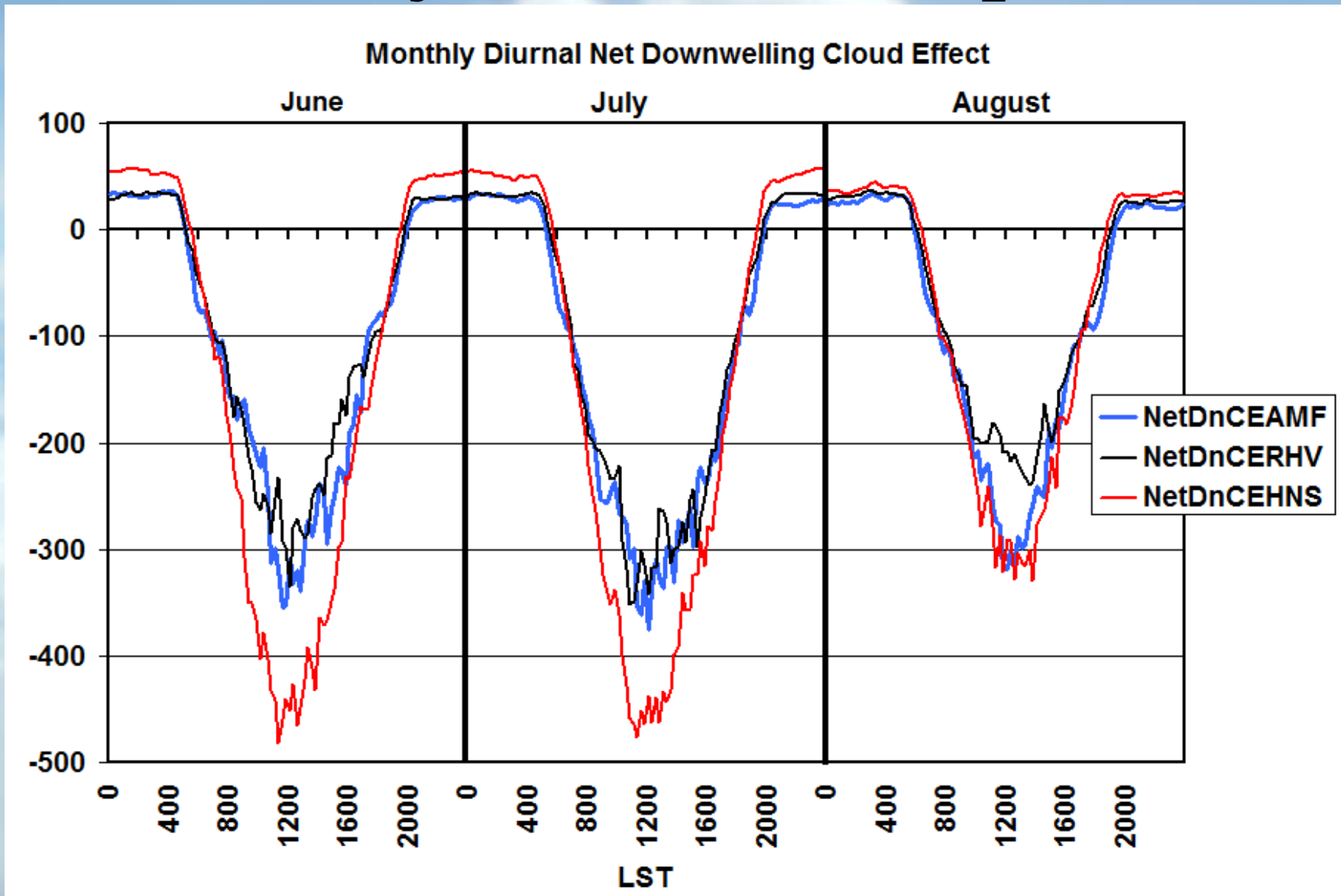
Monthly Diurnal Composite



Monthly Diurnal Composite



Monthly Diurnal Composite



Summary

- **Larger scale influences drive day-to-day cloud and radiation more so than orographic influences**
  - **Similar evolution of radiation and cloud amount**
  - **Similar cloud amount frequency distributions**
- **Hornisgrinde experiences optically thicker cloudiness (overcast) and greater radiative downwelling cloud effects**

Status

- **We are applying the ARM QCRad VAP to all AMF radiation data sets**
  - **Pt. Reyes, Niger, COPS, China, etc.**

- **I am willing to submit Radiative Flux Analysis data sets for the Pt. Reyes, COPS, and Niger AMF deployments as a PI Product**