

Comparison of Longwave Radiation from Reanalysis to the Berdahl Model

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to

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Longwave Radiation Models

(ref: Roberto Lamberts March 2021 e-mail)

Author $\epsilon_{sky,clear}$

Clark & Allen $= 0.787 + 0.764 \ln (T_{dp}/273)$

Martin & Berdahl $= 0.758 + 0.521 (T_{dp}/100) + 0.625 (T_{dp}/100)^2$

Brunt $= 0.618 + 0.056 (P_{wv})^{0.5}$

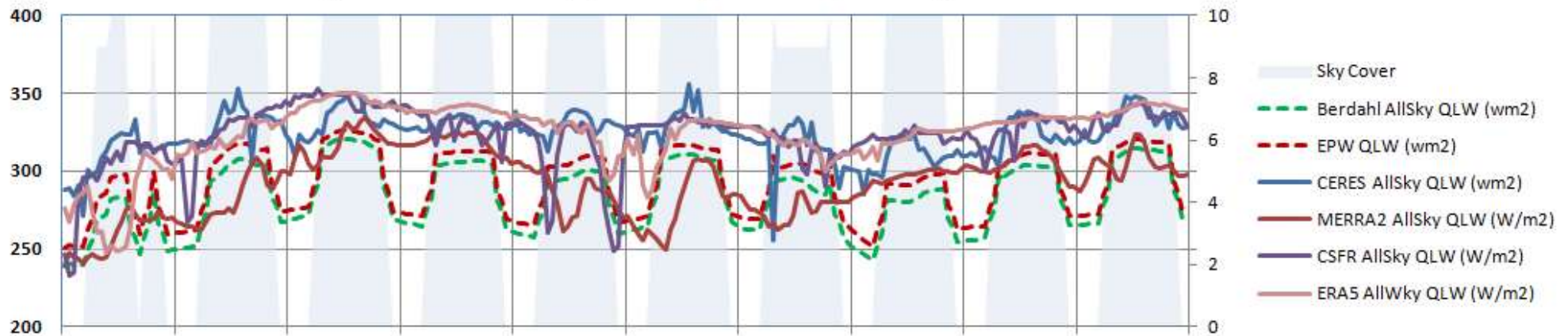
Idso $= 0.685 + 3.2 \times 10^{-5} (P_{wv}) e^{1699/T_{db}}$

$$\epsilon_{sky} = \epsilon_{sky,clear} (1 + 0.0224N - 0.0035N^2 + 0.00028N^3)$$

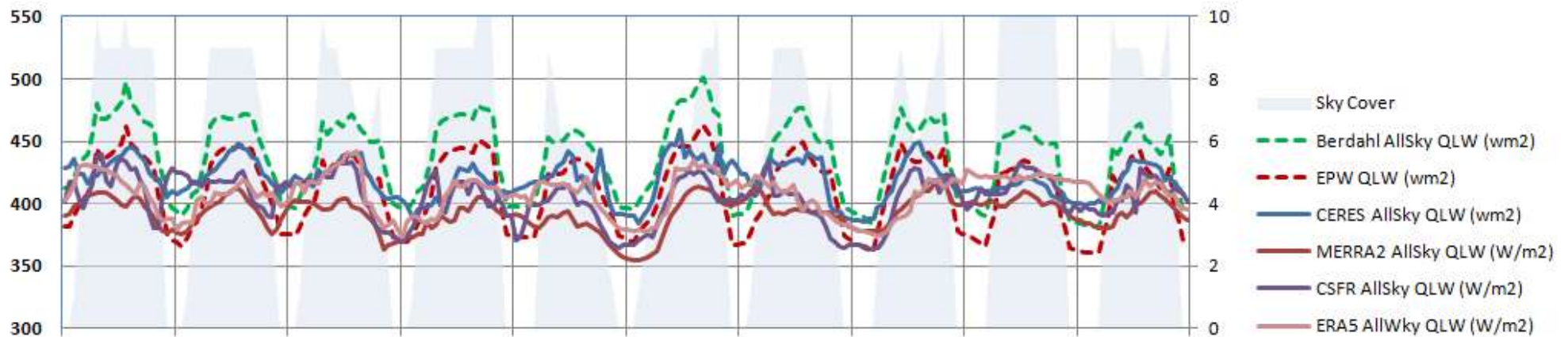
Comparison of longwave radiation from the Berdahl Model and Reanalysis for Suzhou China

Jan 2-11 and Jul 1-10, 2019

Long wave Fluxes CHN_SUZHOU_583580_LIYANG_583450 Jan 2 - 11 2019



Long wave Fluxes CHN_SUZHOU_583580_LIYANG_583450 Jul 1 - 10 2019

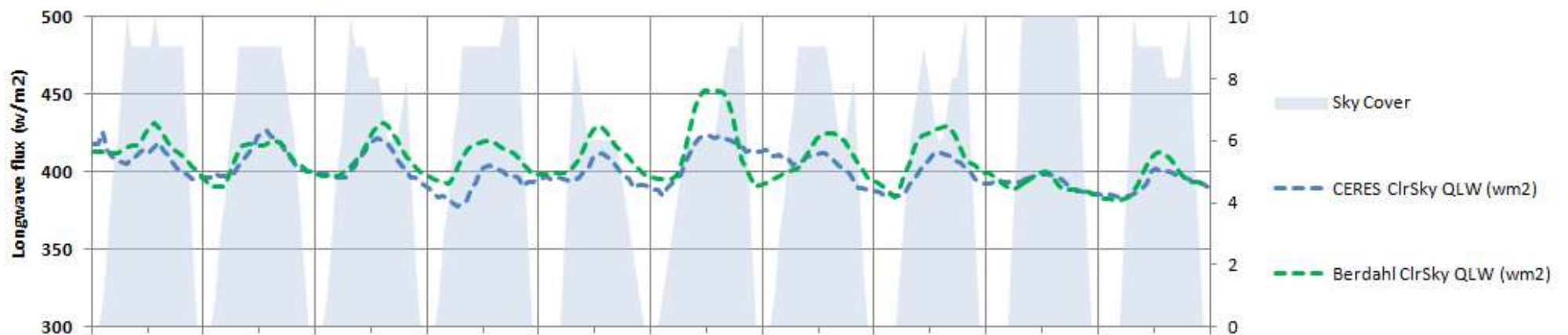


Comparison of clear sky longwave radiation from the Berdahl Model and CERES for Suzhou China Jan 2-11 and Jul 1-10, 2019

Long wave Fluxes CHN_SUZHOU_583580_LIYANG_583450 Jan 2 - 11 2019



Long wave Fluxes CHN_SUZHOU_583580_LIYANG_583450 Jul 1 - 10 2019



Future Work

- Repeat the analysis for 10-20 locations around the world with climate conditions from arid to humid.
- Find measured data sets of QLW to verify ground truth.
- Investigate the feasibility of extracting Cloud Cover from the ratio of $QLW_{allsky}/QLW_{clrsky}$ by back-calculation of the following equation:

$$\epsilon_{sky} = \epsilon_{sky,clear} (1 + 0.0224N - 0.0035N^2 + 0.00028N^3)$$