



**Scenario: Present-day (2020)**

**CKD model: ecRad-RRTMG**

Bias TOA upwelling:  $-0.35 \text{ W m}^{-2}$

Bias surface downwelling:  $-0.40 \text{ W m}^{-2}$

RMSE TOA upwelling:  $0.59 \text{ W m}^{-2}$

RMSE surface downwelling:  $0.73 \text{ W m}^{-2}$

RMSE heating rate (0.02-4 hPa):  $0.194 \text{ K d}^{-1}$

RMSE heating rate (4-1100 hPa):  $0.106 \text{ K d}^{-1}$