1          **Supplementary Figures**
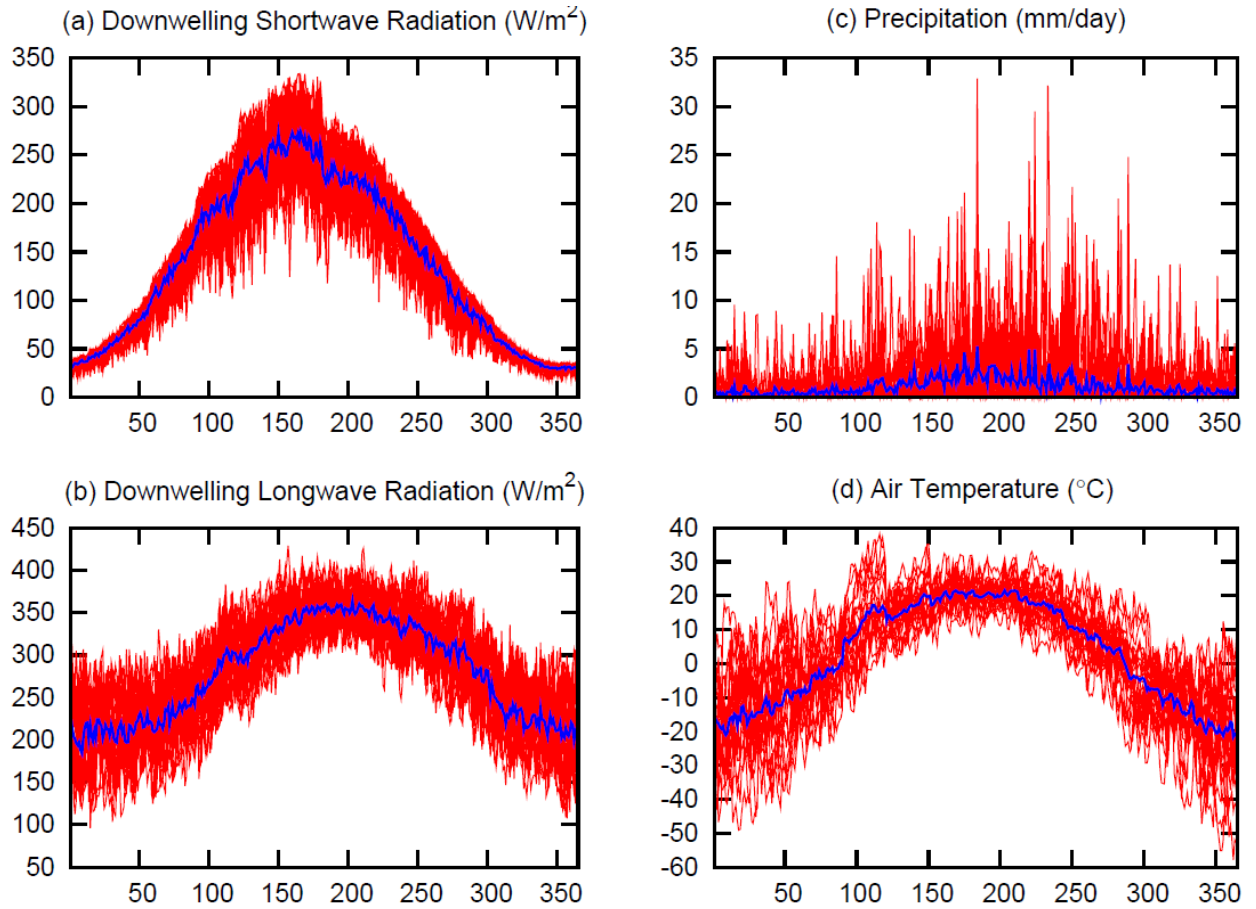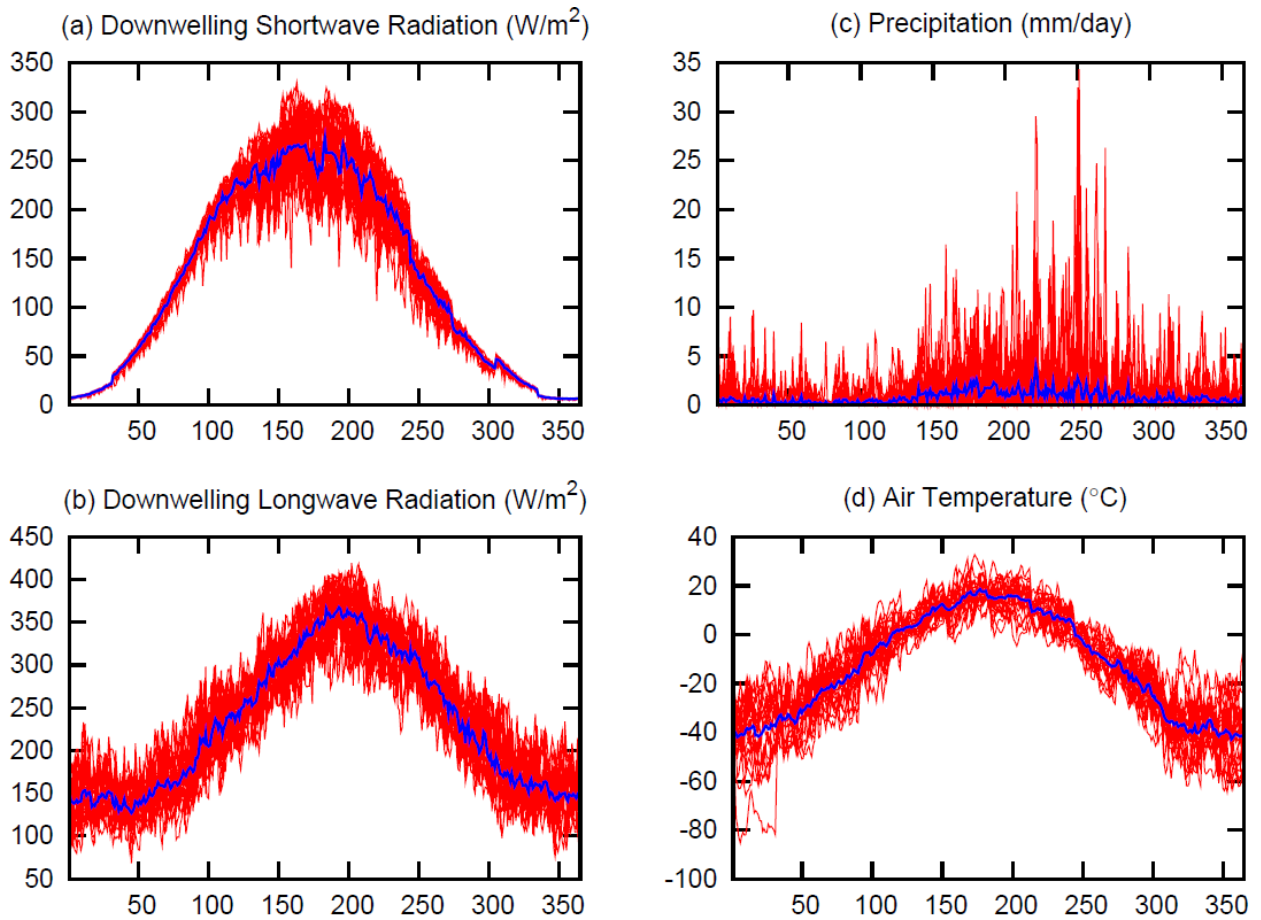


2

3    Figure S1: Annual cycle of primary meteorological variables used to the drive the coupled
4    CLASS and CTEM models at the Manitoba location. The red lines in each panel show daily
5    values for the individual 21 years and the blue line shows the average of daily values across
6    the 21 years.

(a) Downwelling Shortwave Radiation (W/m$^2$)

(c) Precipitation (mm/day)

(b) Downwelling Longwave Radiation (W/m$^2$)
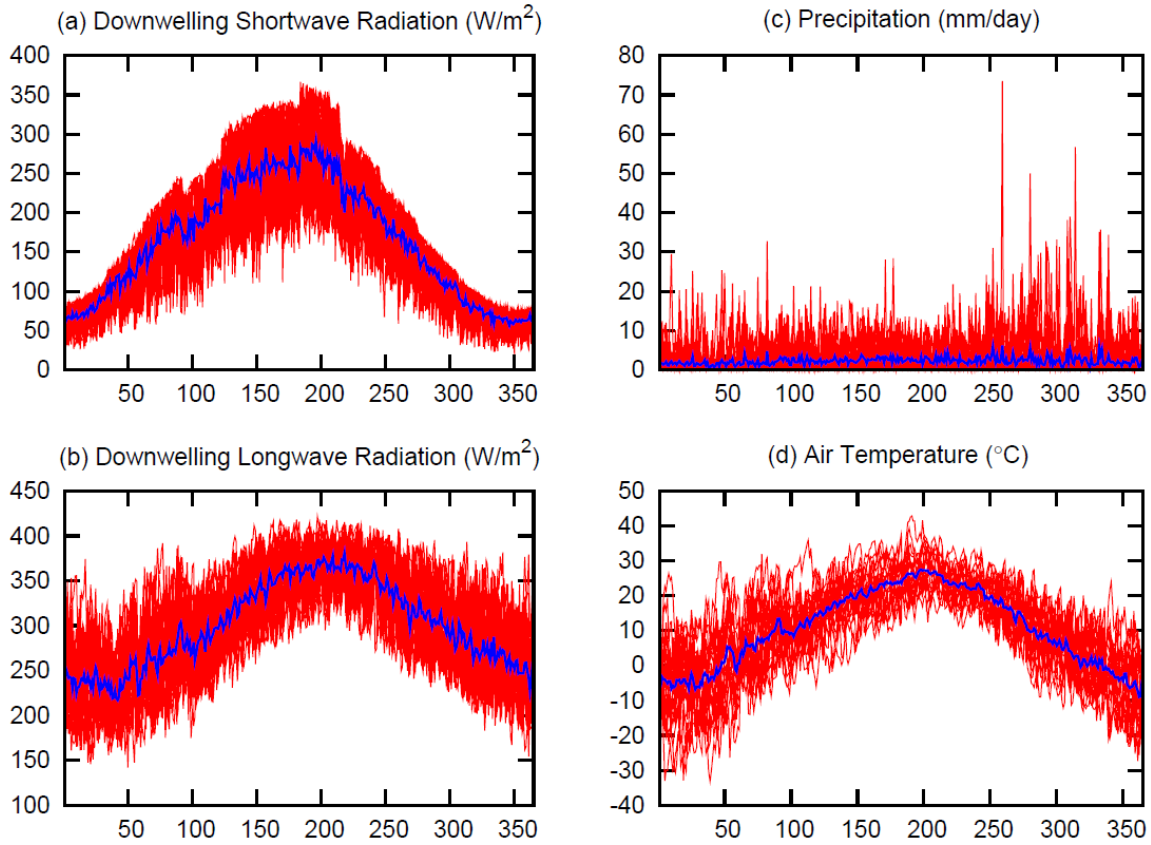
(d) Air Temperature (°C)

Figure S2: Annual cycle of primary meteorological variables used to the drive the coupled CLASS and CTEM models at the Siberia location. The red lines in each panel show daily values for the individual 21 years and the blue line shows the average of daily values across the 21 years.
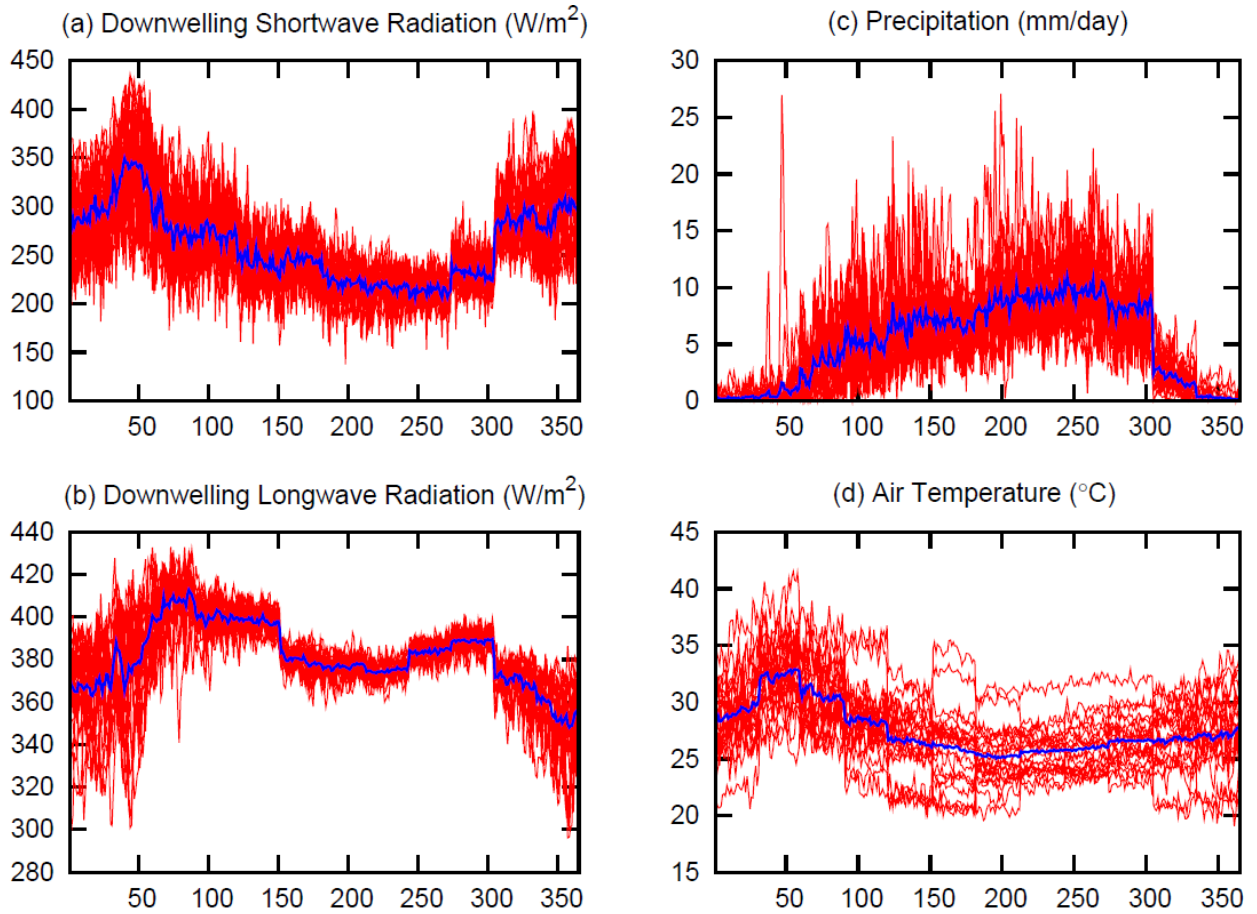
Figure S3: Annual cycle of primary meteorological variables used to the drive the coupled CLASS and CTEM models at the eastern U.S. location. The red lines in each panel show daily values for the individual 21 years and the blue line shows the average of daily values across the 21 years.

Figure S4: Annual cycle of primary meteorological variables used to the drive the coupled CLASS and CTEM models at the Africa location. The red lines in each panel show daily values for the individual 21 years and the blue line shows the average of daily values across the 21 years.