This is a revision to the paper:

Specifically, it revises the 'CLD' subsection of Appendix 3, where logical conditional symbols were incorrectly presented. This correction is dated 7 January 2016.

Please direct any queries to Ian Harris: i.harris@uea.ac.uk

Appendix 3 – Formulae used to convert between variables

CLD

Cloud percentage cover is derived from observations of sun hours as follows:

Firstly, sun hours is converted to sun fraction, using monthly declination constants and 'maximum possible sunshine hours' estimates from Table 3 in Doorenbos and Pruitt (1984). Secondly, sun percent is converted to cloud cover oktas*10. The relationship is negative and piecewise-linear, with conditionals determining the relationship for different values of sun hours (expressed as a fraction, 'srat'):

if srat >= 0.95, cloud cover = 0.0
if 0.95>srat>=0.35, cloud cover = (0.95-srat)*100
if 0.35>srat>=0.15, cloud cover = ((0.35-srat)*50 +60)
if 0.15>srat>0.00, cloud cover = ((0.15-srat)*100 +70)
cloud cover is then capped at 80 (oktas*10)

Finally, cloud cover percent is derived by multiplying the okta*10 values by 1.25.

Synthetic CLD anomalies at each station are estimated from station DTR anomalies, using pre-calculated monthly coefficients (factors and offsets) for each half-degree latitude band.

$$CLD = (DTR * factor_j) + offset_j \qquad \text{(A9)}$$

Where j = grid box latitude, and the factors and offsets were calculated from CRU TS2.10 gridded CLD and DTR values for each latitude band.