

Data from Penman Analysis for IOP on 16th June 2008

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Variable	Value	Errors (\pm)
Net Radiance (Rn)	125.58 Wm ⁻²	3.77 Wm ⁻²
Sensible Heat Flux (H)	17.15 Wm ⁻²	5.09 Wm ⁻²
Ground Heat Flux (G)	34.99 Wm ⁻²	1.05 Wm ⁻²
Latent Heat Flux (λE)	73.44 Wm ⁻²	5.76 Wm ⁻²
Bowen Ratio (B)	0.234	0.072
H / Rn	0.137	0.041
Effective Canopy Resistance (r_c)	130 sm ⁻¹	---
Roughness Length (z_0)	0.050 m	0.023 m
Friction Velocity (U_*)	0.138 ms ⁻¹	0.014 ms ⁻¹
Temperature (T)	17.23 °C	0.17 °C
Dew Point Temperature (T_d)	3.60 °C	0.04 °C

Comment [RJH1]: Note that the canopy resistance was adjusted to make the sensible heat flux agree with the value from one of the profile masts. For an independent estimate of sensible heat flux from the Penman method, you would need to download the original Penman data from the module web site and process it with the default value (or other suitable value) for canopy resistance.

GENERAL NOTES - Errors

- Increasing the value of Canopy Resistance and / or Roughness Length *increases* Sensible Heat Flux and *decreases* Latent Heat Flux. An error for Canopy Resistance has not been included because this value was estimated using the value found for Sensible Heat Flux. It might also be worth noting that the suggested Canopy Resistance for this type of site is 200 \pm 50 sm⁻¹ – this error does not cover the value found above.
- Errors for Sensible and Latent Heat Fluxes were calculated as a standard error from the data the Penman mast collected for the time of the IOP. Thus the error for Bowen Ratio and the quantity H/Rn was found by combining errors as per the sheet from MT23E.
- Errors for Temperatures, Net Radiance and Ground Heat Flux were assumed to be instrument accuracy - 1% for Temperatures and otherwise 3%.
- Errors in Roughness Length and Friction Velocity were found by considering the range of values in group A1's presentation, including PRT's and mercury thermometers.

Further Notes

- Latent Heat Flux tends to drop as the day progresses as the air becomes warmer and Relative Humidity falls.
- No significant rainfall in a few days prior to the IOP would perhaps have a bearing on quantities such as Latent Heat and therefore Bowen Ratio.
- Many people commented during the conference, but to reiterate, roughness length of approximately half a metre is perhaps influenced by nearby buildings and / or nature.