Preliminary bulk fluxes from the 2007 AMMA/ PIRATA Northeast Extension/ Sahara Dust
Readme for flux summary files

The data file 'flux_5hf_amma_07.txt' contains computations of bulk meteorological variables
and fluxes derived the ETL system based on preliminary analysis done during the AMMA 2007
cruise. Most quantities given are subject to future modification based on accounting for other
sources of data and revised calibrations. No direct turbulent flux calculations are included in this
present data.

The file is 30 columns and 7200 lines covering Julian days 123 (May 3) through day 174 (May
26). The data columns are not labeled so they can be directly acquired with a MATLAB 'load'
statement.

```
x=load('your_local_directory\flux_5hf_amma_07.txt');%read file with 5-min
average data; set your local directory
```

The columns are as follows:

```
jdy=x(:,1);%julian day at beginning of 5-min average
U=x(:,2); %true wind speed, m/s; etl sonic anemometer (18.5 m)
dir=x(:,3);%true wind direction (from), deg (clockwise rel north)
tsnk=x(:,4);%sea snake temperature, C (0.05 m depth)
tsg=x(:,5);%tsg water temperature, C (5 m depth)
sal=x(:,6);%tsg salinity, psu (5 m depth)
ta=x(:,7);%air temperature, C (z=15.5 m)
qse=x(:,8);%sea surface specific humidity, g/kg
qa=x(:,9);%air specific humidity, g/kg (z=15.5 m)
rs=x(:,10);%downward solar flux, W/m^2 (ETL units)
rl=x(:,11);%downward IR flux, W/m^2 (ETL units)
org1=x(:,12);%rainrate, mm/hr (ETL STI optical rain gauge #1, uncorrected)
ushp=x(:,13);%ship speed, m/s (SCS gps)
head=x(:,14);%ship heading, deg clockwise rel north (SCS laser ring gyro)
urel=x(:,15);%relative wind speed, m/s (ETL sonic)
reldir=x(:,16);%relative wind direction (from), deg clockwise rel ship's
      bow(ETL sonic)
Lat=x(:,17);%latitude, DDMM.MMMM  (SCS pcode)
Lon=x(:,18);%longitude, DDDMM.MMMM (SCS pcode)
zts=x(:,19);%depth for bulk flux Ts reference, =0.05 when snake is used
sig_u=x(:,20);%std dev of ship speed, m/s (>.2 indicates maneuver)
Taub=x(:,21);%bulk wind stress along mean wind, N/m^2
Hsb=x(:,22);%bulk sensible heat flux, W/m^2
Hlb=x(:,23);%bulk latent heat flux, W/m^2 (includes Webb et al. correction)
Hrain=x(:,24);%rain heat flux, W/m^2 as per Gosnell et al
Ta_im=x(:,25);% IMET air temp, C (15 m)
 Qa_im=x(:,26);% IMET air specific humidity, g/kg (15 m)
U_im=x(:,27);% IMET true wind speed, m/s (15 m)
Dir_im=x(:,28);% IMET true wind direction, deg (15 m)
Psp_im=x(:,29);% IMET solar flux, w/m^2
Pir_im=x(:,30);% IMET IR flux, w/m^2
```

The data in this file comes from three sources: The ETL sonic anemometer (acquired at 10 Hz),
the ships SCS system (acquired at 2 sec intervals), and the ETL mean measurement systems

(sampled at 10 sec and averaged to 1 min). The sonic is 5 channels of data; the SCS file is 16 channels, and the ETL mean system is 42 channels. A series of programs are run that read these data files, decode them, and write daily text files at 1 min time resolution. A second set of programs reads the daily 1-min text files, time matches the three data sources, averages them to 5 or 30 minutes, computes fluxes, and writes new daily flux files. The 5-min daily flux files have been combined and rewritten as a single file to form flux_5hf_amma_07.txt.

Further experimental details are as follows:

True wind speed is computed from the sonic anemometer using the ship's GPS system; thus, it is interpreted as the speed relative to the fixed earth. Some modest flow distortion corrections have been used in an attempt to reduce the transitions when stopping for stations.

Air sea fluxes were computed using the COARE bulk algorithm version 3.0.