Mean meteorological variables and COARE 3.5 fluxes for HiWinGS 2013 – version 1

05/20/2014 – Ludovic Bariteau

This document is the Readme for *HiWinGS_2013_1minMeansNFluxes*, *HiWinGS_2013_10minMeansNFluxes* and *HiWinGS_2013_hrMeansNFluxes*. All versions are available in a Matlab format or in text files and refer to 1min, 10 min and hourly averages.
In this first version, please note the following:

- the wind speed relative to water was used to compute the fluxes
- Fluxes are defined as negative downward and positive upwards
- wave height and wave slope were set to NaN as it was not available at the time of version1 data set.
- The sea temperature from the ship (5m deep) was preferred to compute fluxes as the PSD sea snake was flying out of the sea during high winds thus reflecting most likely a mean temperature of the top few cm of the ocean and lowest cm of the air. The cool-skin affect is removed in the coare35vn algorithm and therefore fluxes have been computed based on Tsea measurements that have been corrected for cool skin. Warm layer effects are null for this experiment (strong mixing) and was therefore not included in the computations.
- Fluxes are defined as negative downward and positive upwards. For example, the net heat flux is defined as: Qnet = Solarup+Solardn+IRup+IRdn+lhf+shf+rhf
  Qnet<0 is heating ocean
- The wind and current directions are in meteorological convention (i.e., direction from).
- Refer to *HiWinGS_2013_Means_Rev1.docx* readme for more information on the mean meteorological variables

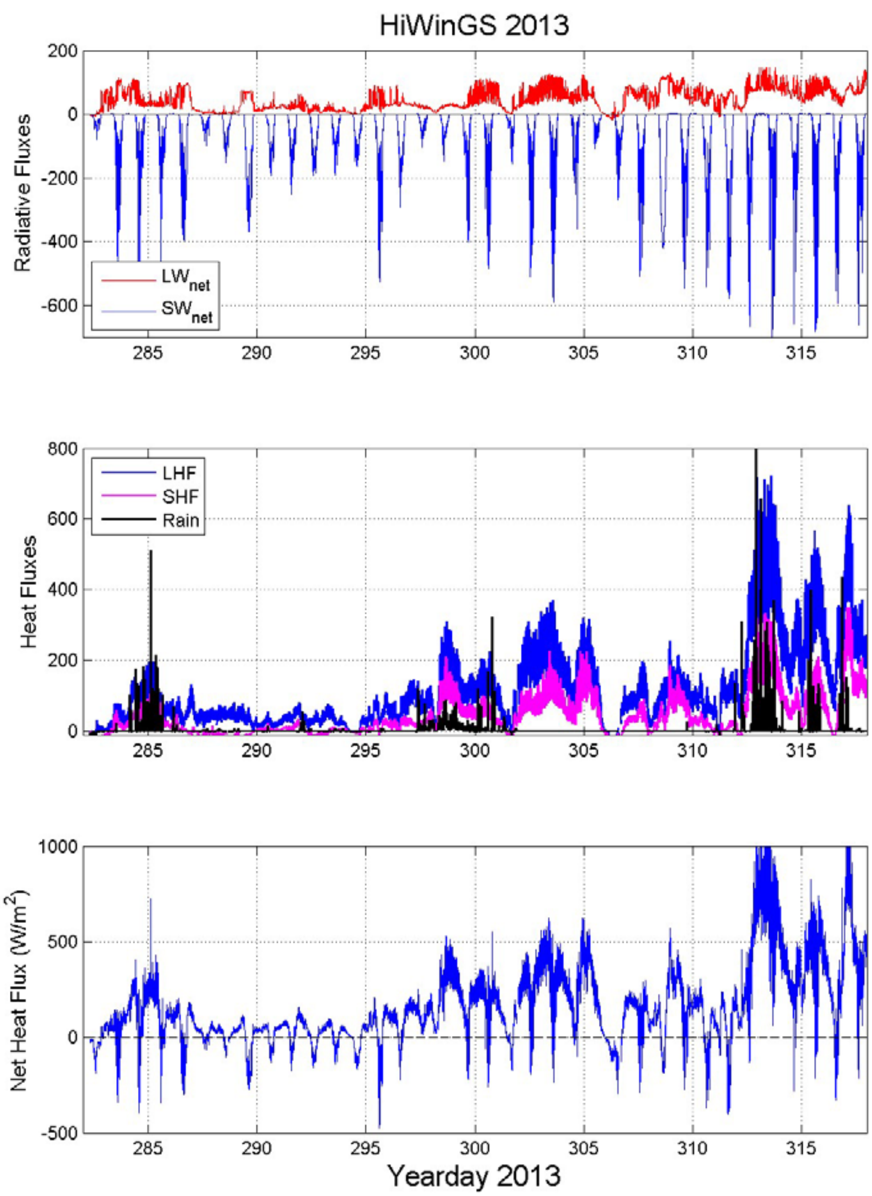
The files can be directly acquired with MATLAB. For instance to read the 1min text file from your local directory, use:

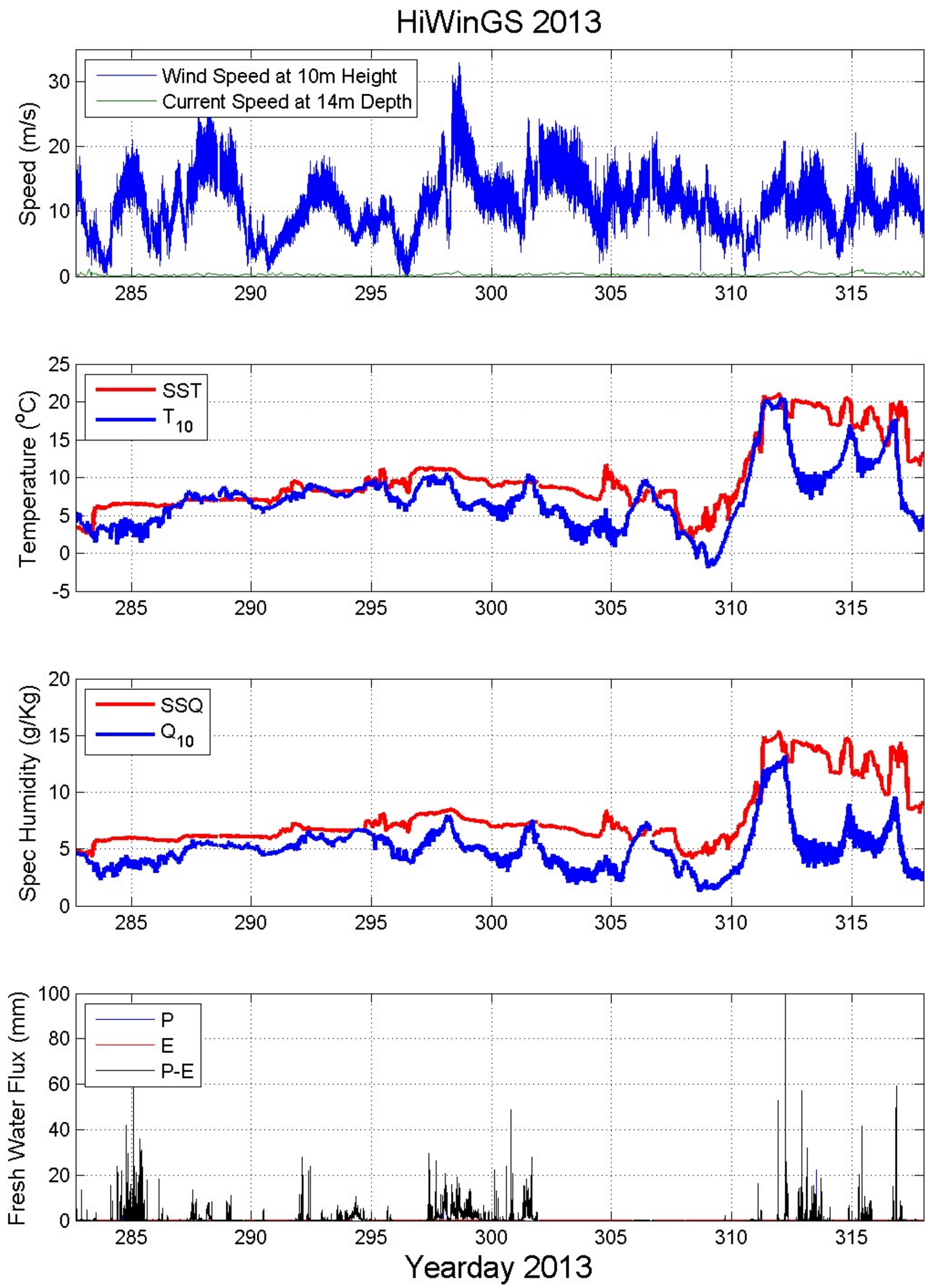
```
A =importdata('your_local_directory\HiWinGS_2013_1minMeansNFluxes.txt')
A=A.data;
```

The files contain 31 variables which are as follow:

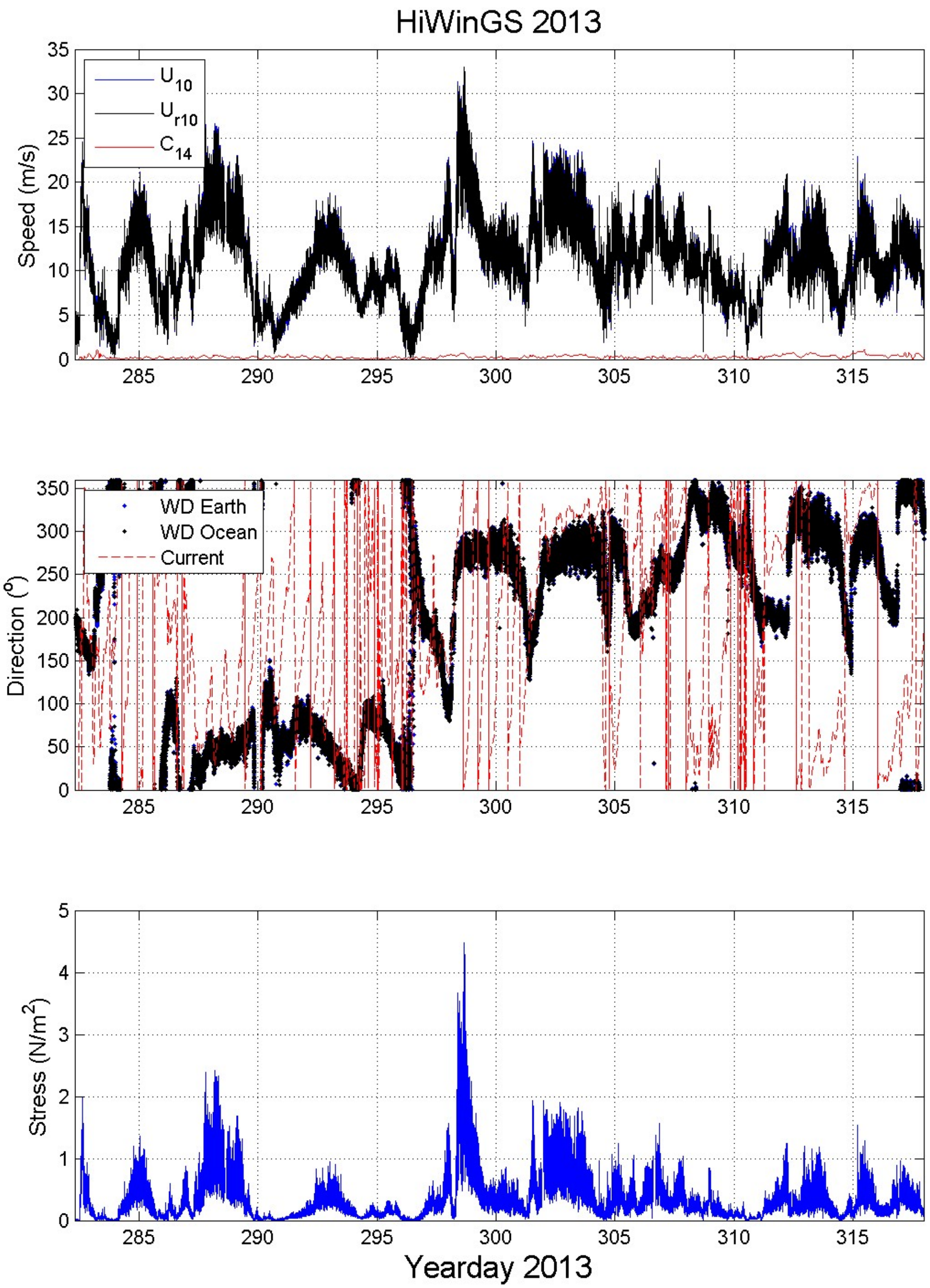
```
yday=A(:,1);    %Decimal yearday (UTC)
Lat=A(:,2);     %Latitude (deg)
Lon=A(:,3);     %Longitude (deg)
SOG=A(:,4);     %Speed over ground (m/s)
COG=A(:,5);     %Course over ground (deg)
Heading=A(:,6); %Ship's heading (deg)
cspd=A(:,7);    %Current speed (m/s) at 14m depth
cdir=A(:,8);    %Current direction (deg) from at 14m depth
U10=A(:,9);     %Wind speed (m/s) relative to earth adjusted to 10 m
wdir=A(:,10);   %Wind direction (deg) from relative to earth
Ur10=A(:,11);   %Wind speed (m/s) relative to water adjusted to 10 m
wdirR=A(:,12);  %Wind direction (deg) from relative to water
rdir=A(:,13);   %Relative Wind direction (deg) from
Pair10=A(:,14); %Pressure (mb) adjusted to 10 m
RH10=A(:,15);   %Relative humidity(%) adjusted to 10 m
T10=A(:,16);    %Temperature (C) adjusted to 10 m
```

```
Tsea=A(:,17);    %Sea temperature (C) from ship at 5m depth
SST=A(:,18);     %Sea surface temperature (C) from Tsea minus cool skin
Q10=A(:,19);     %Specific humidity (g/Kg) adjusted to 10 m
Qsea=A(:,20);    %Specific humidity (g/Kg) 'near' ocean surface from Tsea
SSQ=A(:,21);     %Sea surface specific humidity (g/Kg) from Qsea minus cool
skin
stress=A(:,22); %Surface stress (N/m2) measured relative to water
shf=A(:,23);     %Sensible heat flux (W/m2)
lhf=A(:,24);     %Latent heat flux (W/m2)
rhf=A(:,25);     %Sensible heat flux from rain (W/m2)
Solarup=A(:,26); %Reflected solar (W/m2) estimated from Payne (1972)
Solardn=A(:,27); %Measured downwelling solar (W/m2)
IRup=A(:,28);    %Upwelling IR (W/m2) computed from SST
IRdn=A(:,29);    %Measured downwelling IR (W/m2)
E=A(:,30);       %Evaporation rate (mm/hr)
P=A(:,31);       %Precipitation rate (mm/hr)
```





HiWinGS 2013
Wind Speed at 10m Height
Current Speed at 14m Depth
Speed (m/s)
Temperature (°C)
SST
T_{10}
Spec Humidity (g/Kg)
SSQ
Q_{10}
Fresh Water Flux (mm)
P
E
P-E
Yearday 2013



HiWinGS 2013
Speed (m/s)
U10
Ur10
C14
Direction (°)
WD Earth
WD Ocean
Current
Stress (N/m2)
Yearday 2013