Parameters in file SeaState_2015_met_sfc_flx_V0_10min
There is both a matlab version and a NetCDF version of this file. They contain the same variables.
June 16, 2016 OP

File name shows that values are 10-minute averages (or interpolations for wave parameters) for Days 274 (Oct 1) through 310 (Nov 6) 2015 along track of R/V Sikuliaq.

column varName description

1 jd_ref decimal day-of-year at start of averaging interval
2 lat_ref latitude
3 lon_ref longitude, +/- 180 deg
4 sog_ref gps speed over ground, m/s
5 std_sog_ref std deviation in sog, m/s
6 cog_ref gps course over ground, deg
7 hed_ref gps heading, deg
8 std_hed_ref std deviation in gyro heading, deg
9 wspd_ref true windspeed, composite, m/s
10 wdir_ref true wind direction, composite, m/s
11 rwspd_ref relative wind speed, composite, m/s
12 std_rwspd_ref std deviation rel wind speed, composite, m/s
13 rwdir_ref relative wind dir, composite, +/- 180 deg from bow
14 std_rwdir_ref std deviation rel wind direction, composite, deg
15 ta_ref air temperature, C
16 rh_ref relative humidity, %
17 qa_ref specific humidity, g/kg
18 ts_skn_ref composite skin temperature from ship-based IR sources, deg C
19 ts_snk_ref sea-snake temperature when deployed (either at 10 cm depth or on top of ice/snow), deg C
20 to_frz_ref freezing point of sea water from salinity from ship intake (6.5 m depth), deg C
21 sal_ref salinity at ship intake (6.5 m depth), PSU
22 qs_ref surface saturation specific humidity, g/kg
23 p_mb_ref atmospheric pressure at height zp, mb
24 slp_ref sea-level pressure by height-correcting p_mb_ref, mb
25 swd_med_ref downwelling SW radiation, manually edited, W/m2
26 swd_bst_ref downwelling SW radiation, linear interpolation across gaps, W/m2
27 lwd_med_ref downwelling LW radiation, manually edited, W/m2
28 lwd_bst_ref downwelling LW radiation, gaps estimated by linear interpolation between good data points, W/m2
29 mlh_ref atmospheric mixed-layer height estimated from soundings at times of soundings, m
30 cld_bas_ref median cloud base from ceilometer during 10-min period, m
31 pcp_ref precipitation rate (set to 0.1 mm/h when logs indicated precip; otherwise 0)—i.e., only coarse indicator if precipitating or not
32 zt_ref air temperature measurement height, m
33 zq_ref air humidity measurement height, m
34 zp_ref air pressure measurement height, m
35 zu_ref wind speed measurement height, composite
36 hs_blkr bulk sensible heat flux (W/m2) calculated using COARE or SHEBA flux schemes depending on ice concentration (50% threshold). Neither scheme was developed for mixed waves and ice. Parameters 32-35 used for instrument heights.
37 hl_blkr bulk latent heat flux (W/m2), as for sensible heat flux
38 ust_blkr bulk friction velocity (m/s), as for sensible heat flux

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39 swu upwelling shortwave radiation estimated from best downwelling SW
   radiation and estimated surface albedo; W/m2
40 lwu upwelling longwave radiation estimated from composite skin
   temperature, estimated surface emissivity, and Stefan-Boltzmann relation;
   W/m2
41 alb_ref surface albedo estimated from the observed surface conditions(ice
   conc, snow depth, skin temperature, water freezing point) and subjective
   estimates of alb=0.08 (open water), 0.35 (thin ice), 0.65(thicker ice),
   0.85 (snow covered ice)
42 emiss_ref surface emissivity estimated from surface type/conditions:
   emiss=0.99 (open water), 0.985 (ice covered water)
43 fatm net atmospheric energy flux at the surface(=swd_bst_ref-swu+
   lwd_bst_ref-lwu-hs_blk_ref-hl_blk_ref); W/m2
44 ice_concvo_ref total ice concentration from visual observations,0-10
45 ice_typ1vo_ref primary ice type from visual observations
   10-frazil;11-shuga;12-grease;13-slush;20-nilas;30-pancakes;40-young grey
   ice 10-15cm; 50-young grey ice 15-30 cm; 60-first year < 70 cm; 70-first
   year 70-120 cm; 80-first year>120 cm; 75-second year; 85-multiyear;
   90-brash; 95-fast ice
46 ice_z_ref ice thickness estimates from visual observations, cm
47 snow_z_ref snow depth estimates from visual observations, cm
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Notes:

1) The bulk turbulent fluxes are very preliminary and are based on roughness lengths and conditions for either over near 100% multi-year ice cover or open water conditions using parameterized Charnock relationships, depending on the estimated ice cover (50% threshold). There is no application of the roughness lengths to be determined from the covariance turbulent flux measurements from the cruise, nor do these bulk fluxes use the measured wave heights. Hopefully, these will all be applied by the end of the project.
2) The parameters described as “composite” (e.g., wspd_ref, ts_skn_ref) utilize data from different sensors on the ship depending on the ship-relative wind direction or riming conditions to try to minimize the effects of the ship or riming on these parameters. The selection of instrument used for each hour has been carefully done by comparing time series, ship-relative wind directions, temperature/humidity conditions, and manual notes by onboard scientists.
3) The downwelling radiation was significantly contaminated by riming. The obviously contaminated values have been manually removed. The “best” estimates of these parameters include linear interpolation across the missing data points. Negative values of SWd are set to 0 W/m2. Other techniques for filling in these gaps are also possible but are not included in this file; they may be utilized in future versions.
4) The upwelling radiation terms are obtained from surface albedo values estimated from measured surface conditions (ice concentration; snow depth; surface skin temperature) providing SWu, or the surface skin temperature and estimated surface emissivity (emiss_ref) providing LWu using the Stefan-Boltzmann relation. These estimated upwelling radiation terms are combined with the downwelling radiation terms and the bulk turbulent fluxes to obtain the complete surface energy budget fatm. The values for SWu, LWu, alb_ref, emiss_ref, and fatm are based on the above technique applied using values for albedo and emissivity felt

appropriate by O. Persson and indicated in description for variables 41 and 42. Other choices or techniques are possible and may give slightly different results.

5) The variables obtained from visual observations (variables 44, 45, 46, & 47) are obtained from the spreadsheet summarizing the manual observations obtained from the bridge throughout the cruise (SKQ201512S_Clean_Summary)
6) The atmospheric mixed-layer depth (variable 29) is estimated from each balloon sounding and is only documented for the 10-minute period closest to the sounding time
7) The cloud base (variable 30) is obtained from the ceilometer 15-s backscatter profiles, and the cloud base value reported is the median value during the 10-min time period