

\*\*\*\*\* README \*\*\*\*\*

Datawell MK-III Directional Waverider binary and unpacked data files are contained in the two directories Apr\_July\_2012 and Jun\_Sept\_2013. Time series and summary data were recorded in the buoy to binary files with extensions '.RDT' and '.SDT', respectively. These are located in the subdirectories 'Data\_Raw' in each of the top-level deployment directories. '.RDT' files contain 3 days of time series (at 1.28 Hz) in 30 minute "bursts". Each '.SDT' file contains summary statistics for the month indicated computed at half-hour intervals for each burst. Each deployment directory also contains a description (in 'File.list') of the Datawell binary data files, and a figure ('Hs\_vs\_yearday') showing the significant wave height associated with each .RDT file (decoded from the filename).

The corresponding unpacked Matlab .mat files are contained in the subdirectories 'Data\_Mat'. These files have the extension '.mat' but use the root filename of the source .RDT and .SDT files.

RDT .mat file description:

fname	name of source .RDT data file (string)
westD, northD, heaved	time x burst arrays of buoy displacement (cm)
fs	sample rate (Hz)
t	timeline for each burst [0:1799.2] (s)
burstT	ending time of each burst (Matlab datenum)
YMDHMi	[yr,mo,day,hr,mi] of each burst (burst x 5)
yday	yearday of each burst (note: 0.5 is 1200 Jan 1)
contents	description of file contents (string)

SDT .mat file description:

fname	filename of source .SDT data file (string)
tburst	ending time of each burst (Matlab datenum)
ymdhmi	[yr,mo,day,hr,mi] of each burst (burst x 5)

spc.	spectral data structure
f	frequency (Hz)
df(f)	spectral bandwidth (Hz)
psd(f,burst)	normalized height power spectrum (max = 1)
dir_mean(f,burst)	mean direction (degT - from)
dir_sprd(f,burst)	directional spread (deg)
m2(f,burst)	centered directional coeff of cos <sup>2</sup> (a-a <sub>0</sub> )
n2(f,burst)	centered directional coeff of sin <sup>2</sup> (a-a <sub>0</sub> )
K(f,burst)	check_factor = 1/ellipticity of orbit
contents	description of this structure

sys.	summary data structure
Hs(burst)	significant wave height (m)
Tz(burst)	mean up-crossing period (s)
Smax(burst)	spectrum maximum (m <sup>2</sup> /Hz)
lat(burst)	latitude (deg, south < 0)
lon(burst)	longitude (deg, west < 0)
batt_life(burst)	battery life remaining (days)
batt_status(burst)	battery status (see Table 5.10.3)
av_offset(burst)	vertical accelerometer offset (m/s <sup>2</sup> )
ax_offset(burst)	x-axis accelerometer offset (m/s <sup>2</sup> )
ay_offset(burst)	y-axis accelerometer offset (m/s <sup>2</sup> )
buoy_orient(burst)	buoy orientation (deg)
mag_incln(burst)	magnetic field inclination (deg)
badwords{n}	indices to bad data in word n
contents	description of this structure
sys_params(burst)	trans_no, mk2_fmt, tp, gps_on, gps_fix, gps_qual

Note: The wave height spectrum  $Sh$  (m<sup>2</sup>/Hz) can be computed as  
 $Sh = \text{spc.psd} .* \text{repmat}(\text{sys.Smax}', \text{length}(\text{spc.f}), 1);$