Additional information on data collected with DOBIE wave recorders

Additional details about DOBIE wave recorders, the settings and formulas used can be found at http://www.niwascience.co.nz/rc/instrumentsystems/dobiedoc

Recording settings

The DOBIE reorders were set to record every 30 minutes (first period at Telscombe was 20 minutes) for 2048 bursts at a sample interval of 0.2 seconds (ie for almost 7 minutes). These settings allowed for a battery replacement interval of ~4 weeks. All times are in GMT. Data gaps are due to one of the following reasons: battery ran out, sudden battery discharge, maintenance and repair periods.
Initially the onboard processing was used to convert the recorded pressure time-series into summary statistics for each sample. Later on, only the raw pressure data was recorded.

Sites

Sites were chosen in proximity to beach survey work being carried out and at elevations that would allow access not just at the spring tides. The locations at Cooden and Cuckmere were also determined largely by the availability and location of structures to which the DOBIE could be fastened.

Telscombe

A hole measuring 30cm x 50cm and 25 cm deep was excavated into the platform which took x = 539146.931, y = 101391.797 and z = -1.482m OD. The recorder is 39m seawards of the beach toe and 80m seawards of the cliffs backing the beach. The recorder was always

submerged in the hole, providing a rather stable pressure when the tide was not covering the recorder.
In April 2006 the recorder was relocated to Cuckmere Haven.

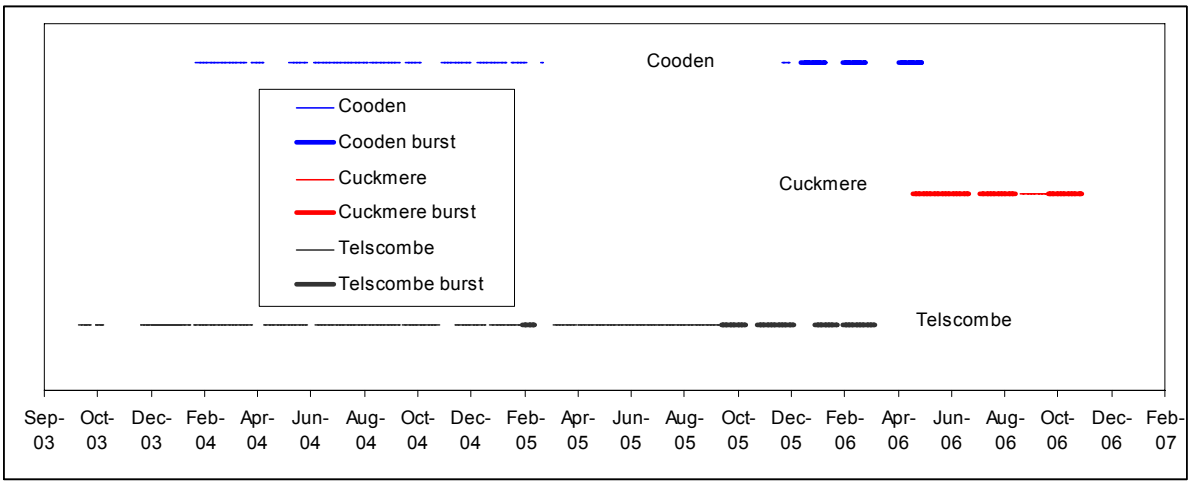
Cuckmere Haven

The recorder at Cuckmere Haven was installed upside down on the first suitable groyne pile at the end of the western groyne at Cuckmere Haven. The coordinates are x= 551515.256, y= 97610.388, z=-1.21 m.

Cooden Bay

The coordinates of the pressure transducer opening are x = 571206.9, y = 106370.8 and z = -1.397m OD. The recorder is secured to the end on the terminal groyne and is ~40m seawards of the beach toe. From November 2005 the recorder was changed from a horizontal position to a vertical position with the pressure sensor at –1.18m OD. The recorder had always performed poorer that the one at Telscombe and had to receive a new pressure transducer in 2005, though still not working satisfactorily after that.

Data and processing



Graph showing data available for the three locations differentiated to the type of recording. For period with bold bars data for each burst exist.

Initially, all data was processed on board the DOBIE to produce summary statistics from the pressure time series (thin line in graph above). No other data than the summary statistics remains and these are combined into the 'total file' for each location.
Later in the collection, a switch was made to record the pressure time series. These are post processed using DOBIE software to produce burst files for each sample (see below). These burst files have then been processed using software obtained from Tony Dolphin (Tony.Dolphin@uea.ac.uk) who was involved with the development of the DOBIE in New Zealand. The resulting summary statistics are combined into one file for each location.

Total file

This relates to the files cuckmere-total.txt, telscombe-total.txt and cooden-total.txt.

The total file for each location contains the following columns:

- DATE is the date and time corresponding to the burst start time.
- QUALITY is 0 if the data and calculations passed all checks – see Error FLAG.
- Error FLAG is the error flag. It will be 0 if QUALITY is zero. If QUALITY is 1 then EFLAG signifies which data or calculation check failed. See below.
- MEAN WATER DEPTH is burst-averaged water depth in metres.
- STANDARD DEVIATION is standard deviation of the water depth in metres.
- MEAN SPECTRAL PERIOD is the mean spectral period of the waves in seconds.
- SPECTRAL WIDTH is the dimensionless width of the spectrum.
- SIGNIFICANT ORBITAL SPEED is in metres per second and is the maximum orbital speed at the bed corresponding to the significant wave height and the mean spectral period.
- SIGNIFICANT WAVE HEIGHT is the average height of the highest 1/3 waves, in metres.
- PENETRATION is the fraction of the total pressure signal that has penetrated down from the surface to the level of the DOBIE.
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The number in Error FLAG indicates:

1	Pressure sensor dead
2	Not used
3	Not used
4	Wild-point tolerance exceeded
5	Interpolation to replace wild points in raw pressure time series failed
6	Mean spectral period not in range defined by user
7	Iteration to solve linear-wave dispersion relationship for wavelength failed
8	DOBIE out of water
9	Spectrum moment calculation failed
10	Exception in QCHECK or WCALC
11	Exception in top-level control code
12	Intrinsic noise level of sensor exceeded signal level
13	Maximum wave steepness exceeded
14	Maximum ratio of wave height to water depth exceeded

Burst files

Sum files

This relates to the files telscombe-sum.txt, cooden-sum.txt and cuckmere-sum.txt.
The sum file for each location contains the following columns:

- Time: is the date and time corresponding to the burst start time.

- Burst number: is the burst number corresponding to the number in the burst files
- Peak period: is the peak period in seconds based on 50 spectral estimates (30sec period cut off)
- Mean spectral period: is mean period in seconds based on 50 spectral estimates (30sec period cut off)
- Spectral width: is the dimensionless width of the spectrum.
- Mean depth: mean water depth adjusted for variations in air pressure based on ***-pres.txt in the burst-zip file (pressure taken from Sovereign Light Ship)
- Hrms (cm): Wave height (rms) in centimetre
- Hsig (cm): Significant wave height in centimetre

Zip files

Zip files exist for the periods for each location when individual burst files were generated. Each zip file name includes the location and the start date for each sampling period. Each zip file contains:

- a large number of files with a three-letter prefix that each contain the pressure time series for each sample. The first column is the burst number (corresponds to the number in the ***times.txt file) the second the original pressure in psi and the third the water depth based on the assumption of 14.7psi atmospheric pressure.
- a time file ***times.txt that provides the link between the burst number and the time (date is only give as the day so needs to be related to the file name of the ZIP file)
- a pressure file ***-pres.txt containing the burst number, the date and the atmospheric pressure based on observation from the Sovereign Light Ship.

Uwe Dornbusch 25-11-2006