

## PP-WMD report to ETWS

The Panel had agreed at its previous session to support a Pilot Project for Wave Measurement from Drifters (PP-WMD) with the aims of reporting inexpensive deep ocean 2D wave spectra in support of satellite and model cal/val activities. A draft workplan and start-up funding had been agreed, and a Steering Committee (SC) appointed to make progress with the project during the intersessional period. The terms of reference for the project, the draft workplan and SC membership are available on the pilot project website: <http://www.jcomm.info/wmd>.

The first meeting of the Steering Committee (SC) was held at Scripps in May 2009, kindly hosted by Julie Thomas, Peter Niiler and Luca Centurioni, alongside an SC meeting for its sister project for the improvement of wave measurements from moored buoys (PP-WET). The meeting had discussed a number of issues. These included:

- The composition of the SC – a small number of new members was suggested;
- A review of the workplan and the assignment of tasks to individual SC members;
- The creation of new tasks deemed essential for successful progress.

The current list of tasks, many of which remain uncompleted owing to work pressures on SC members, is attached as Annex 1.

The meeting also reviewed a number of presentations made by its members on the feasibility of good quality 2D wave spectral measurements from drifters, and the ways in which these spectral data might be represented. It concluded that wave spectral measurements based on the processing of raw GPS observables such as pseudo-range and carrier phase were eminently feasible, provided that the drifter hull proved to be a good wave-follower, such as was anticipated for an undrogued SVP hull. If this were not the case (as in the case of a drogued SVP drifter), then additional sensors, possibly expensive, would be required in order to quantify the buoy transfer function.

It also reached the conclusion, shared by the PP-WET SC, that the so-called 'First 5' representation of spectral components as a function of frequency band was the minimum reporting requirement to aim for. In terms of other objectives, the SC undertook to

- Investigate the communications costs associated with the 'First 5' spectral representation;
- Investigate way of minimising these costs, both by negotiating favourable rates and by examining the effects on data fidelity of compressing or truncating the spectral components;
- Submit a proposal for a session on wave measurements from buoys during the AGU Ocean Sciences meeting in Portland, Oregon in February 2010 (this had been successful);
- Present the outline of the project to the 11th International Workshop on Wave Hindcasting and Forecasting to be held in Halifax, NS, in late October 2009.

In terms of a practical evaluation of inexpensive GPS-based measurement techniques, the SC had not met its objectives, although plans were afoot for one if its members (Meldrum, SAMS) to acquire suitable components for the construction of a 2D arbitrary-waveform test rig for the detailed investigation of GPS techniques for 2D wave-spectral recovery. Nonetheless, a proposal for wave measurements from a drogued SVP drifter had been tabled by Dr Sergey Motyzhev of Marlin-Yug Ltd, and the SC had invited its members to carefully review this as-yet uncosted proposition.

The Panel thanked the SC for its work to date and urged it continue with its work as quickly as possible, and to interact with other groups, such as ESA, who were pursuing initiatives to improve

the quality of in situ data in support of cal/val activities for a number of Essential Climate Variables (ECVs).

## Annex 1

### PP-WMD to-do list

	What	By when	By whom	Progress
1	To document technical requirements and progress - publish through PP-WET/DBCP/JCOMM websites	ASAP	???	
2	To revise Work Plan - to identify available resources for intercomparison exercise, and required scale of resources → report to DBC-25 - to decide on time frame / milestone	May2009	DM (to circulate to members)	
3	To review and augment Membership, including: - invite Ian Young, Graeme Ball, Diane Greenslade (Australia) - invite all manufacturers in the PP-WMD SC (DM) - identify Japanese wave drifter manufacturers	May2009	DM (HV to provide Japanese contact)	(June2009) Done except for Japanese
4	To further investigate suitable buoy hull designs for accurate wave following, e.g. CODE, undrogued SVPB, 'ice-cream ball'	Jan2010	PN, DM	
5	To present results/progress on summer exercise with 'ice-cream balls'	End October 2009	ET	
6	To investigate the negative impacts of progressive compression and/or truncation of the wave spectral message on the usefulness of the data	Jan2010	HG	
7	To establish a closer interaction with those setting the requirements for offshore <i>in situ</i> wave data	Oct2009	DM, HG, OO09 attendees	
8	To establish a means for securing bulk Iridium (DISA) rates for Iridium usage	Sep2009	BJ	

9	To publish a 'strawman' minimum message format for wave spectral data from drifters	Sep2009	DM, VS	
10	To recruit speakers on scientific value of wave obs to the DBCP-XXV workshop	Jul2009	DM, HG, PN	
11	To draft simultaneous science proposals for submission to the US funding bodies and the EU (need to stimulate appropriate call) for a concerted programme of research into wave observation and interpretation	Feb2010	PN, DM, Peter Jansen (ECMWF)	
12	Submit proposal to Ocean Science program committee for a special session on <i>in situ</i> wave obs	May 2009	DM, HG	(June2009) Done

BB: Bill Burnett

BJ: Bob Jensen

BL: Boram Lee

BO: Bill O'Reilly

DM: David Meldrum

ECh: Etienne Charpentier

ET: Eric Terrill

HG: Hans Graber

HV: Hester Viola

JB: Jean Bidlot

JTo: Julie Thomas

JTu: Jon Turton

PN: Peter Niiler

VS: Val Swail

## **PP-WMD Workplan**

### **Year 1 - analysis of available technologies**

1. Establish what potentially low-cost technologies (GPS or otherwise) exist for making wave measurements from drifters, and establish links with the developers of these technologies
2. Undertake lab and field trials of selected systems; field trials to take place at an established wave measurement facility (e.g. Scripps or Duck)
3. Analyse intercomparison data in terms of quality, reliability and performance limitations
4. Examine options for improving data quality, reliability and performance envelope
5. Present results to DBCP-XXV
6. Decide if the technology is good enough to warrant a more extensive trial in Year 2, or if further development is needed

### **Year 2 - proceed to larger deployment if results are encouraging**

1. Engage with buoy manufacturers and the HMEI to develop a common specification for prototype drifters
2. Develop a cost-sharing mechanism for the construction and deployment of up to 50 wave drifters within available resource limitations
3. Consult with end users to draw up a deployment strategy that might best demonstrate the viability of the technique or otherwise
4. Commence deployments
5. Analyse results and present to DBCP-XXVI and other fora
6. Decide if modifications are needed to the plan or the technologies for year 3

### **Year 3 - continue with development and deployments**

1. Invoke any technology changes deemed desirable
2. Continue with deployments within funding limitations
3. Analyse and publish results as widely as possible
4. Decide if a case can be made to continue the pilot project for a further year and investigate follow-on mechanisms
5. Report to DBCP-XXVII