

Quality assurance and control issues for HF radar wave and current measurements

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30°S

30'

31°S

30

32°S

30'

30'

30°S

30'

31°S

30'

32°S

30'

SeaSonde current maps



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12'

48'

153°E

24'

36'

WERA wind map

1.8











(†)



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Quality assurance (QA) and control (QC) - my definitions

- QA
 - making sure the radars perform to spec and the software is fully operational using best methodology.
- QC
 - identifying problems with the data due to radar hardware or software performance issues and flagging these in the provided data streams.









- Automatic emails reporting on changes in status of stations and computer systems.
- Daily (during the working week) manual (at the moment) monitoring of all sites using mix of manufacturers and ACORN-developed web interfaces.
- Web-based database of incidents and actions.
- Site caretakers with varying levels of expertise, first port of call for problem solving.
- 3-4 monthly site visits for routine maintenance and calibration and data download.
- Trouble-shooting visits as needed and resources allow.







ACORN processing for currents

	Radials	Vectors	
Realtime WERA FV00	Standard WERA processing of 5 min averaged data	eMII generated 1 hour averaged	
QC WERA FV01	ACORN 5min processing using specialised peak tracking (swarm analysis)	eMII generated 1 hour averaged	
Realtime and reprocessed SeaSonde FV00	Standard CODAR processing with 8.53 min CSS every 15 min, radials averaged over 80 mins output every 60 minutes	Standard CODAR processing with 10km averaging circle output every 60 minutes.	





ACORN QC for WERA current measurement

QC flag	Radial SN	GDOP	U,V thresh	Calibration	Swarm analysis
1	All ≥ 10dB	> 30º	≤ 2 or 3m/s	FV00	
2	All ≥ 8dB at least one < 10dB	> 30º	on location	10/2013	FV01 only
3		Between 20° and 30°	> QC1	FV01 all	
4		< 20º	Intestioid		



7



IMPACT FV00





IMPACT FV01



FV01 with flags 1,2 and additional thresholding using standard deviations



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SeaSonde – no ACORN-specific QC currently applied

QC flag	N Radials	GDOP	Speed threshold m/s	U,V std m/s	Isolated points
1	Both > 2	> 30º	≤ 2.5	≤ 0.5m/s	No
2	Either ≤ 2	Between 20° and 30°	Between 2.5 and 3	Between 0.5 and 1	Yes
3		< 20º	Not used	> 1	Not used
4	Either = 0	Not used	Not used	Not used	Not used









30'

32°S

30' -

113°E

30'

114°E



QC 1



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115°E

30

116°E

30'

0.8

0.6 0.4

0.2



Wave validations - normalised Taylor diagrams





radar/buoy standard deviation rms difference correlation coefficient





Reasons for wave measurement performance variations

- Radar configurations not always optimised for waves
- Separation of wave from current signal in noisy environments.
- Theoretical limitations linked to frequency of operation and waveheight – require theoretical solutions, the subject of ongoing research.
- Radar performance issues require more robust radars with improved, more automated calibration methods.

Testing signal/image processing methods to ameliorate.





Wave QC Impact





AUSTRALIA



Thank you for your attention.

For more information: http://www.lucy-wyatt.staff.shef.ac.uk/ http://imos.org.au/acorn.html http://www.seaviewsensing.com

IMOS is a national collaborative research infrastructure, supported by Australian Government. It is led by University of Tasmania in partnership with the Australian marine and climate science community.









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