

New methods to detect extreme waves in quality controlled in-situ measurements

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HYDROGRAPHIE

- 1. Project background, BSH work packages
- 2. Data quality control
- 3. Detection of spikes and extreme waves preliminary results
- 4. Conclusion & next steps

 \rightarrow How to differentiate spikes from extreme waves?



Background RAVE Offshoreservice Project

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Sea state parameters which are tested:

- Wave data
- Sea state spectra
- Aggregated data
 - Significant wave height, peak period, ...



Data quality control (near real-time)



#	Wave data
1 – 3	Date, Location, Completeness
4	Buoy status
5	Spikes
6	Range
7	Gradient
8	Flat line
9	Offset
10	Wandering mean



New methods to detect extreme waves in quality controlled in-situ measurements

- Spike \rightarrow |value mean| \geq (4 + i*0.1) * std
- Moving window method

Detection of spikes

- window width 200 s
- step width 100 s
- Replace spikes with linear interpolated values
- While loop until spike free





SEESCHIFFFAHRT

HYDROGRAPHIE

UND



• Freak wave $\rightarrow a_C / H_S \ge 1.25$ (Haver, 2000)



Definition of geometrical wave parameters



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Dimensionless parameters

Wave steepness

 $S_7 = H/L$

Horizontal asymmetry $\mu_H = a_C/H$

Definition of Hilbert parameters





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Summary of preleminary results:

- Moving window method is a significant improvement to detect spikes, but it is not infallible
- Geometrical and instantaneous parameters are valuable additional information to distinguish between spikes and freak waves

Next steps:

- Further analysis and comparison with neighbouring sensors
- Developing and implementing longterm quality control tests
- Further development of web portal for sea state data centre

Thank you!





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