High Resolution Wave, Current and Bathymetry Fields Retrieved by Nautical Radar Imagery

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Contents

- WaMoS II Intoduction
- High resolution current & bathymetry measurements
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- Summary and Conclusion

WaMoS II – History

10 years: Pre- WaMoS II development at the research centre GKSS 1994: Technology transfer to commercialise WaMoS II 1997: First Prototype of WaMoS Technology – deep water/ shallow water 1998: Since then continuous participation in international research projects 2000: Set-up of OceanWaveS GmbH in Lüneburg 2001: Type approval by Germanischer Lloyd and Det Norske Veritas 2001: MaxWave – beginning of individual wave analysis 2005: Cooperation with Proudman Oc. Lab. - Bathymetry/Currents 2006: Validation of individual wave analysis - ONGOING 2011: Release of High Resolution Current and Topography Algorithm 2011: Release of 4th generation hardware: TCP/IP technology Ongoing: R&D projects – currents on ships, individual waves, wave groups, digital radar, detection of small targets (in waves)

Components and Applications of WaMoS II

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WaMoS II Sea State Analysis

Radar Image Sequence



According to the local conditions 2 Analysis areas $\sim 2 \text{ km}^2$

For each individual box wave spectrum is calculated



Frequency Direction Spectrum, Directional Wave Number Spectrum

- Wave Length Peak Swell Wind
 Sea
- Wave Direction Peak
 Wave Period Peak
- Significant Wave Height Total
 Sea

SwellWind SeaSwellWind SeaSwellWind

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Speed Direction

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Depth and Current Dependence



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WaMoS II High Resolution Measurement Water Depth – Radar intensity

Helgoland, German Bight, North Sea



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WaMoS II High Resolution Measurement

Water Depth – Surface current

Helgoland, German Bight, North Sea





Extension of HRC Wave heights and Wave periods

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WaMoS II Application: Duck, North Carolina, USA



Source: OceanWaveS

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WaMoS II Application: Duck, North Carolina, USA









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WaMoS II at Point Lonsdale – Melbourne





- Shipping channel
- WaMoS II range: 4 km
- Waves approaching from South-West



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Summary and Conclusion

- WaMoS II delivers directional wave spectra and current parameters in real time on an operational basis
- Add-on spatial high resolution analysis (HRC) for current fields and in shallow waters for bottom topography
- HRC opens up a new field of applications
 - Spatial current data is important offshore
 - Tracking of small scale topography changes moving sandbanks close to shore
- Extending the HRC to include spatial wave data
- Extending the HRC to ship application which will be a major change in the data processing suit

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