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Monitoring of Swedish sea surface currents with remote sensing data

M. Woźniak^{1*}, G. K. Carvajal¹, B. Rydberg², L. E. B. Eriksson¹

*monika.wozniak@chalmers.se

¹Department of Earth and Space Sciences, Chalmers University of Technology, 41296 Gothenburg, Sweden ²Molflow, Möller Data Workflow Systems AB, Gråbo industriväg 8A, 443 40 Gråbo, Sweden

Motivation

- Forecasting drift of algal scum and warning the management office of coastal monitoring
- Estimation of the transport of nutrients and hazardous substances

Sources of surface current data



- CODAR:
- Iand based HF radar
- independent on weather conditions
- continuous measurements
- Imited spatial coverage
- External satellite products:
- coarse spatial resolution AVISO **OSCAR**

- Forecasting drift of oil spills and tracking their source
- Finding and rescuing missing people in the water
- Finding lost containers and avoiding collisions
- Maximum cross correlation (MCC):
 - uses satellite based infrared radiometer data
 - affected by weather conditions and cloud coverage
 - limited time resolution (few images per day)
 - large spatial coverage



- Numerical models:
 - Mercator Ocean
 - UK Met Office GloSea (50 km)
 - ➢ HBM (~ 5.5 km)
 - FOAM AMM7 (7 km)

Results



- Field measurements: buoys and scientific cruise
 - limited temporal & spatial coverage
 - relatively expensive



- The sea surface currents estimates were compared with different methods for three days The *in situ* data indicates a general counter clock wise circulation for the 21st April 2015 This is consistent with the CODAR retrievals, the MCC method, and modelled fields from Mercator, HBM and FOAM AMM7
- In general terms, the fine resolution data sets shows a similar distribution in the magnitude and direction of the surface circulation

MCC







Conclusions

- The installation of two HF radars at the west coast of Sweden allowed for continuous monitoring
- Data resolution affects the observed surface circulation
- The MCC current estimation is restricted by cloud coverage 3.
- For ideal weather conditions MCC estimation is consistent with CODAR measurements, Mercator, HBM and FOAM 4. AMM7 estimations

References

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