

# Monitoring of Swedish sea surface currents with remote sensing data

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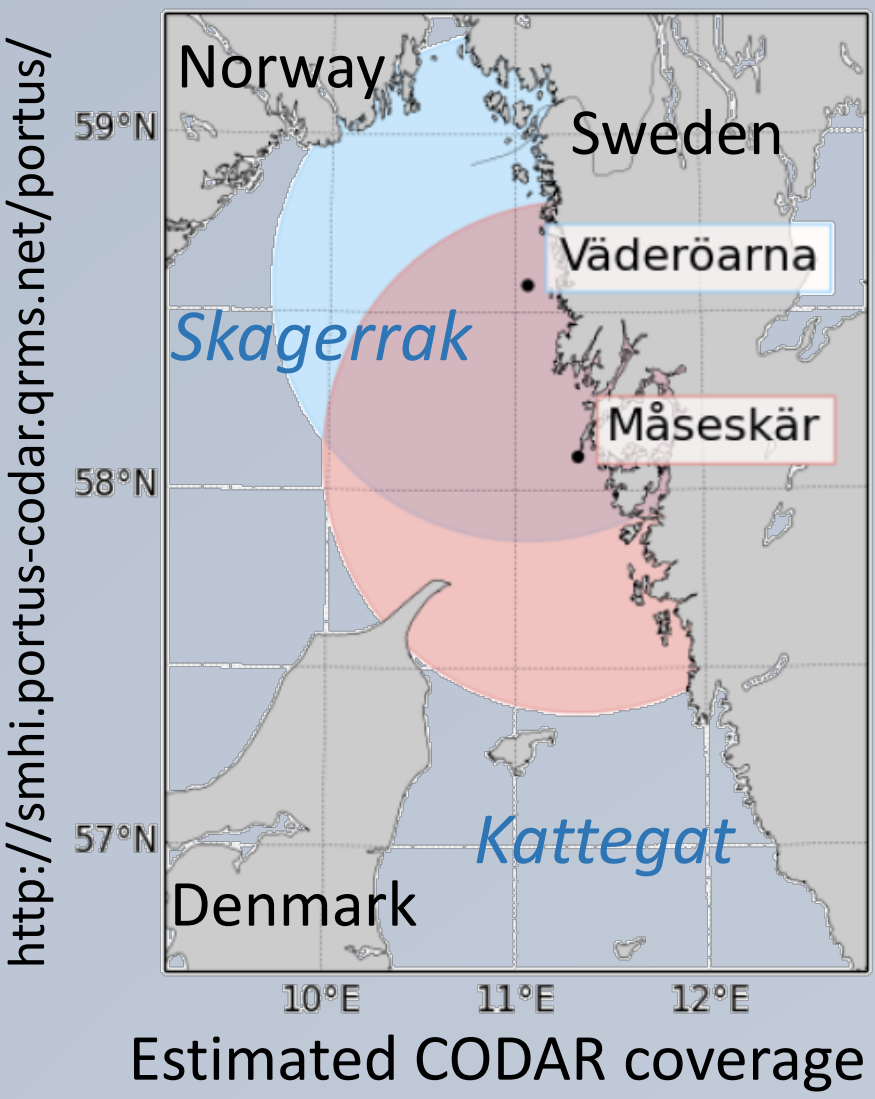
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## Motivation

- Forecasting drift of algal scum and warning the management office of coastal monitoring
- Estimation of the transport of nutrients and hazardous substances
- Forecasting drift of oil spills and tracking their source
- Finding and rescuing missing people in the water
- Finding lost containers and avoiding collisions

## Sources of surface current data



- CODAR:
  - land based HF radar
  - independent on weather conditions
  - continuous measurements
  - limited spatial coverage

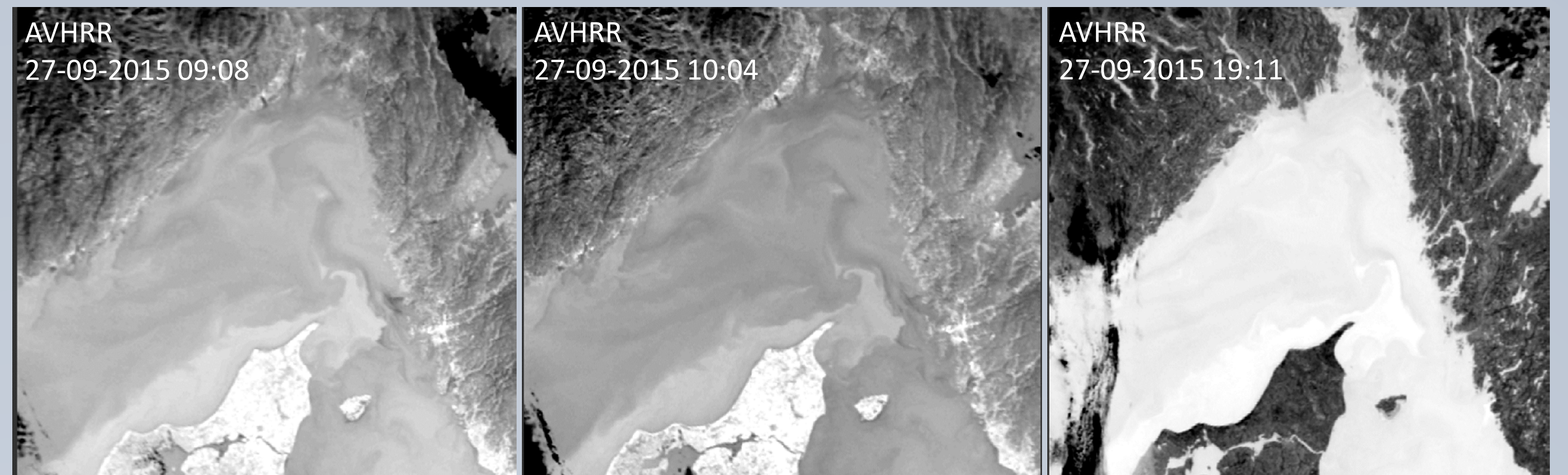
- External satellite products:
  - coarse spatial resolution
  - AVISO
  - OSCAR

- Numerical models:

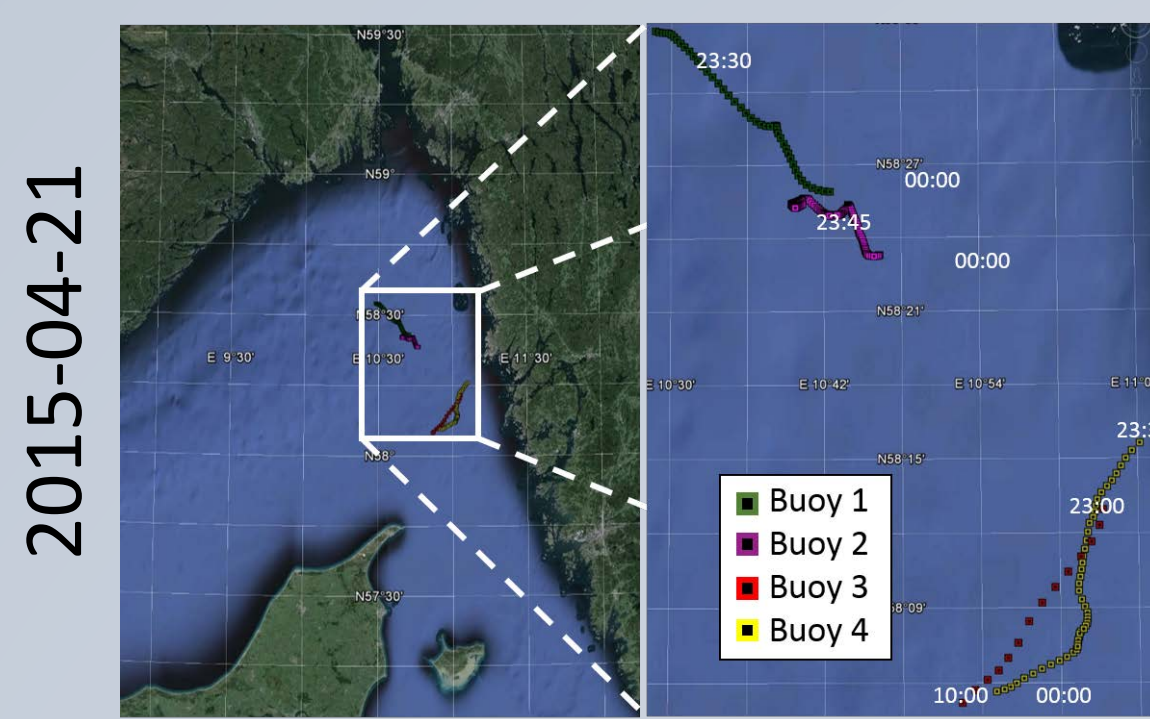
- Mercator Ocean
- UK Met Office GloSea (50 km)
- HBM (~ 5.5 km)
- FOAM AMM7 (7 km)

- Field measurements:

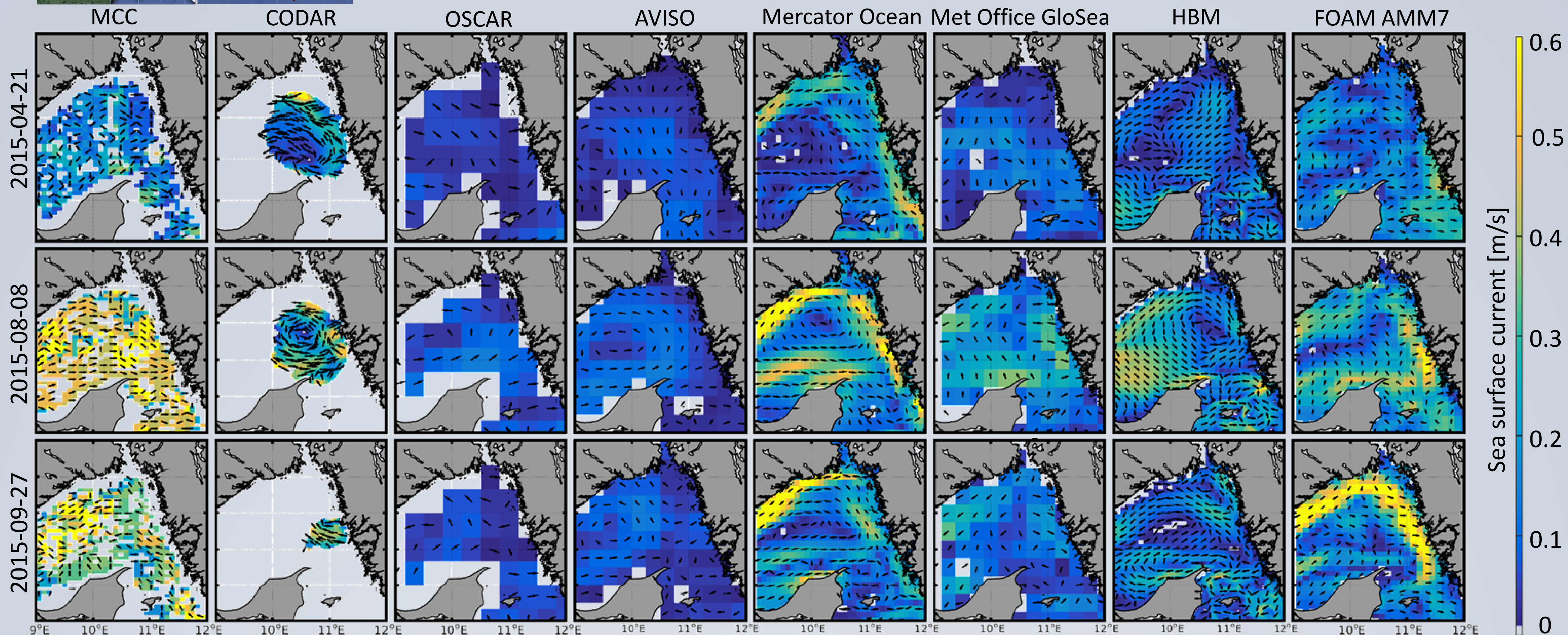
- buoys and scientific cruise
- limited temporal & spatial coverage
- relatively expensive



## Results



- 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 21<sup>st</sup> 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



## Conclusions

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

References  
 Carvajal G. K., 2013, Retrieval of ocean surface winds and currents using satellite synthetic aperture radar and infrared radiometry, PhD thesis, Chalmers University of Technology  
 Garcia C.A. E. & Robinson I. S., 1989, Sea surface velocities in shallow seas extracted from sequential CZCS satellite data, Journal of Geophysical Research, vol.94, no. C9