

ODDRUN CHRISTIN MYKLEBUST AND MADELINE BRIEN

# Measuring ocean currents from commercial vessels with Nortek Speed Log

[nortekgroup.com](https://nortekgroup.com)



# Nortek instruments

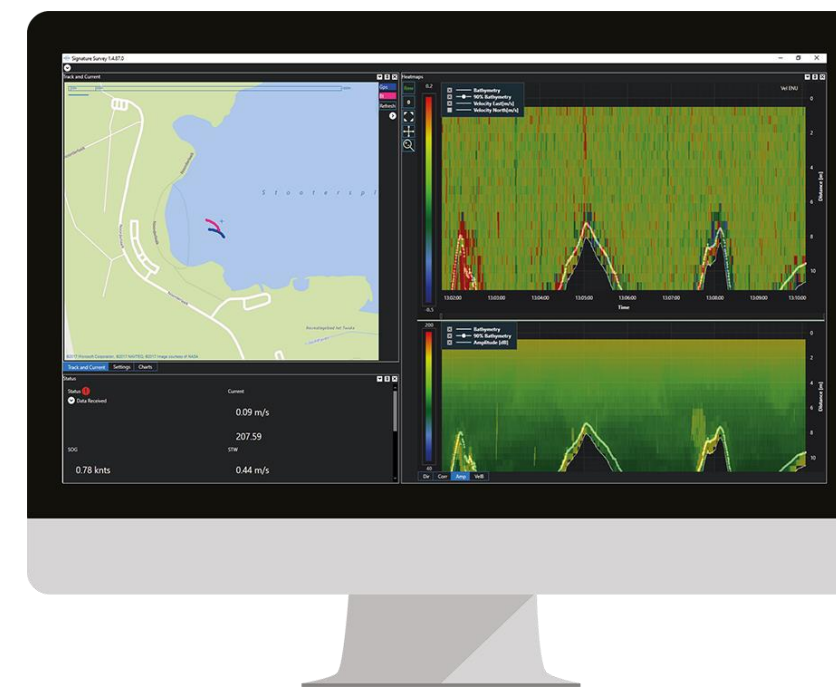
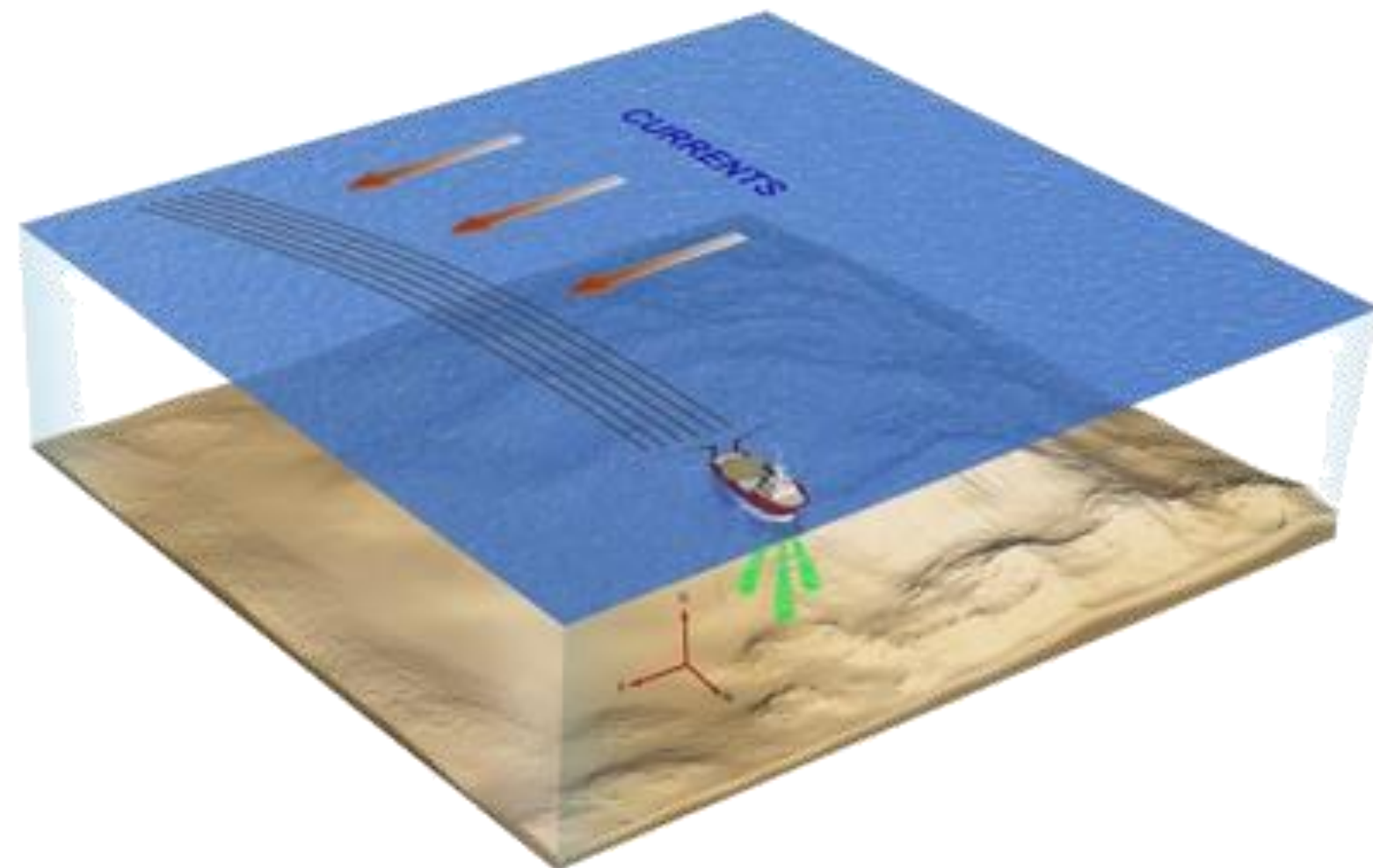
Established provider of scientific wave and current meters

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# Vessel-mounted current profiling

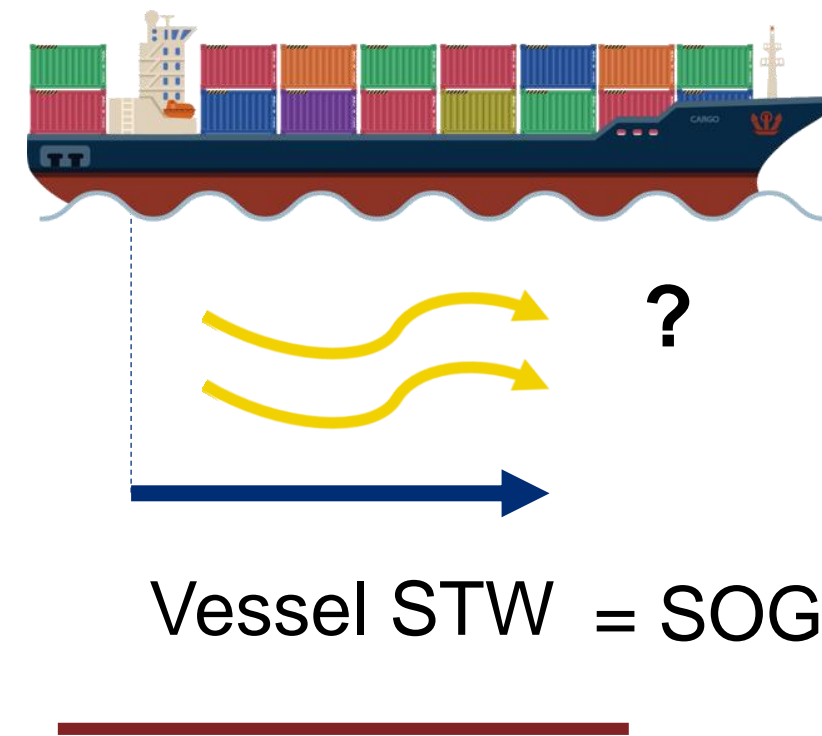
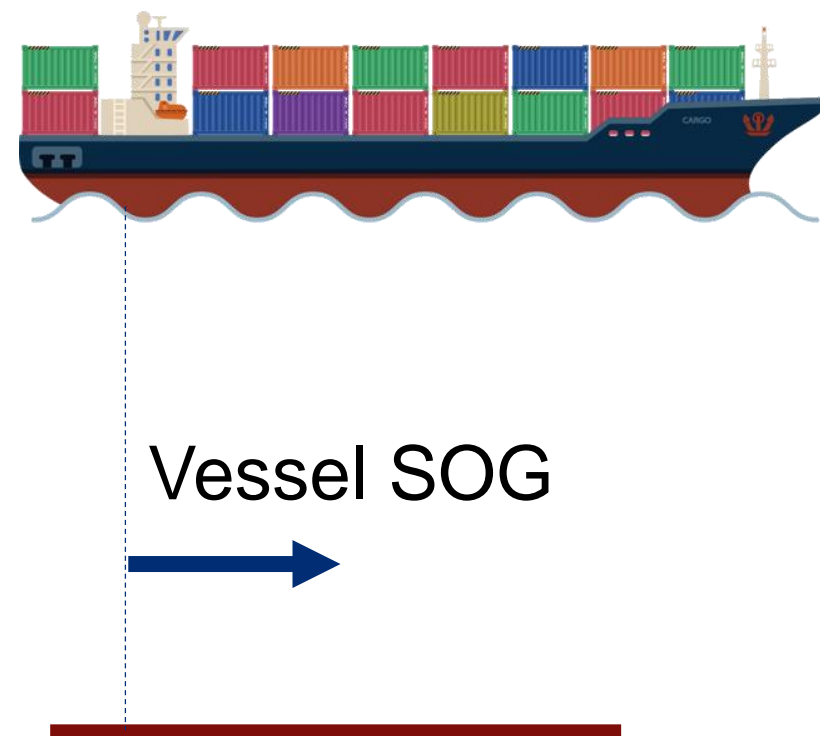
- Current profiler instrument used by seismic vessels
- Current profiler used for survey operations in port or coastal areas



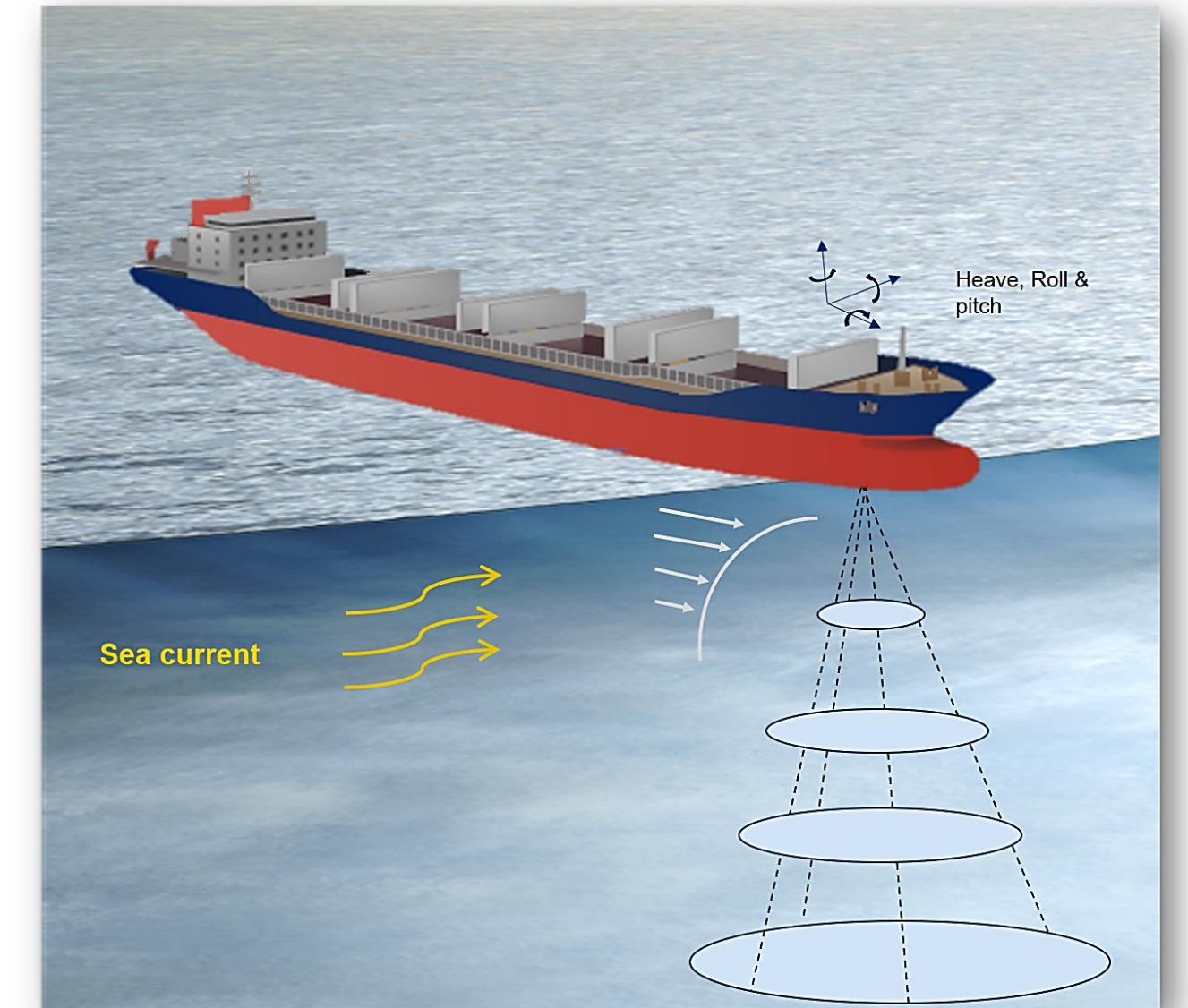


# What is a speedlog?

- Speed over ground (SOG)
- Speed log measures speed through water (STW)



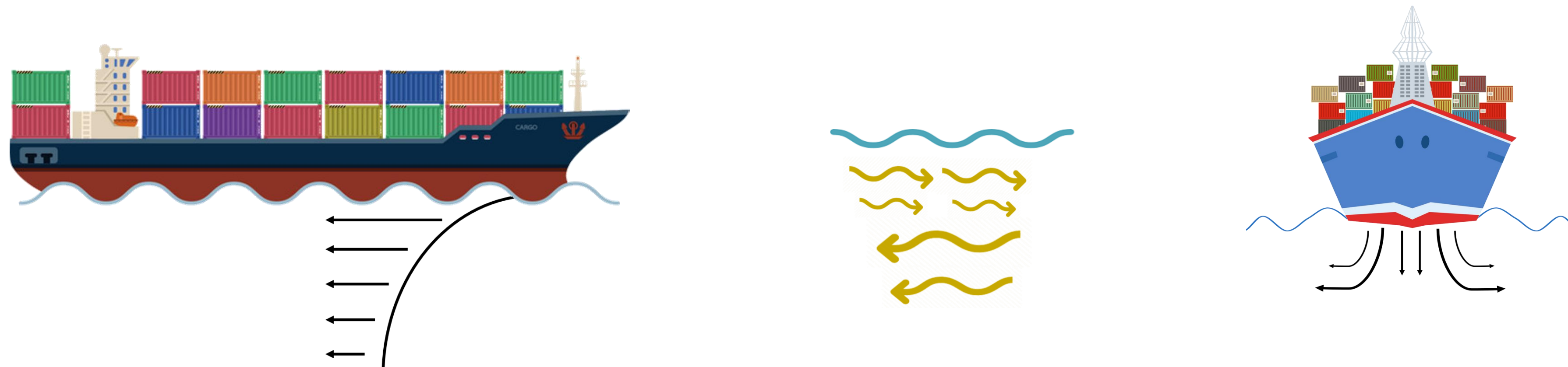
$$\text{Vessel STW} = \text{SOG} + \text{ocean current} - \text{other influences}$$



# What influences the velocity measurements

Effect of the ship's induced flow field on measurement volume

Flow around the ship is highly dependent on the hull shape, speed and trim



# What influences the velocity measurements

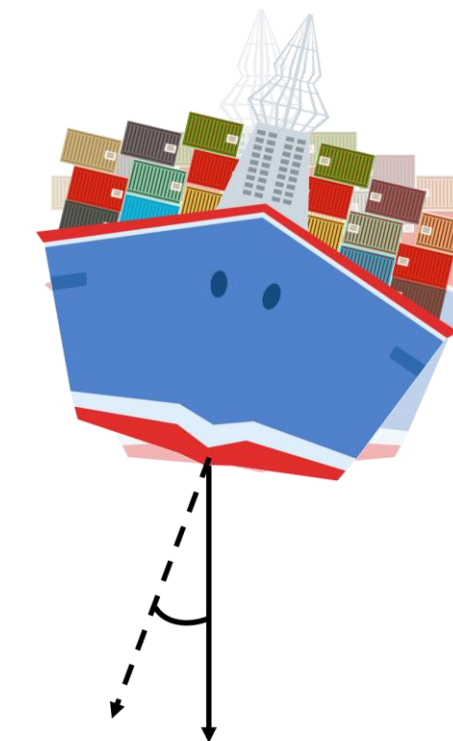
Effect of the ship's induced flow field on measurement volume

Flow around the ship is highly dependent on the hull shape, speed and trim

Ship motions



Pitch angle



Roll angle

# Nortek speed log – 500kHz

## Technical data

- Bottom track and profile measurements
- Inverted beams gives an interface flush with the hull
- Independent of salinity
- Pressure and temperature sensor
- AHRS sensor





# Pilot projects



## Pilot Project #1

- Nortek Speed log installed on Norwegian- Ro-Ro Cargo Ship
- Duration 2017 – NA
- Ongoing data analysis and data processing



## Pilot Project #2

- Nortek Speed log installed on Norwegian Cargo Ship
- Cooperation with Norwegian Research Council
- Duration 2018-2020



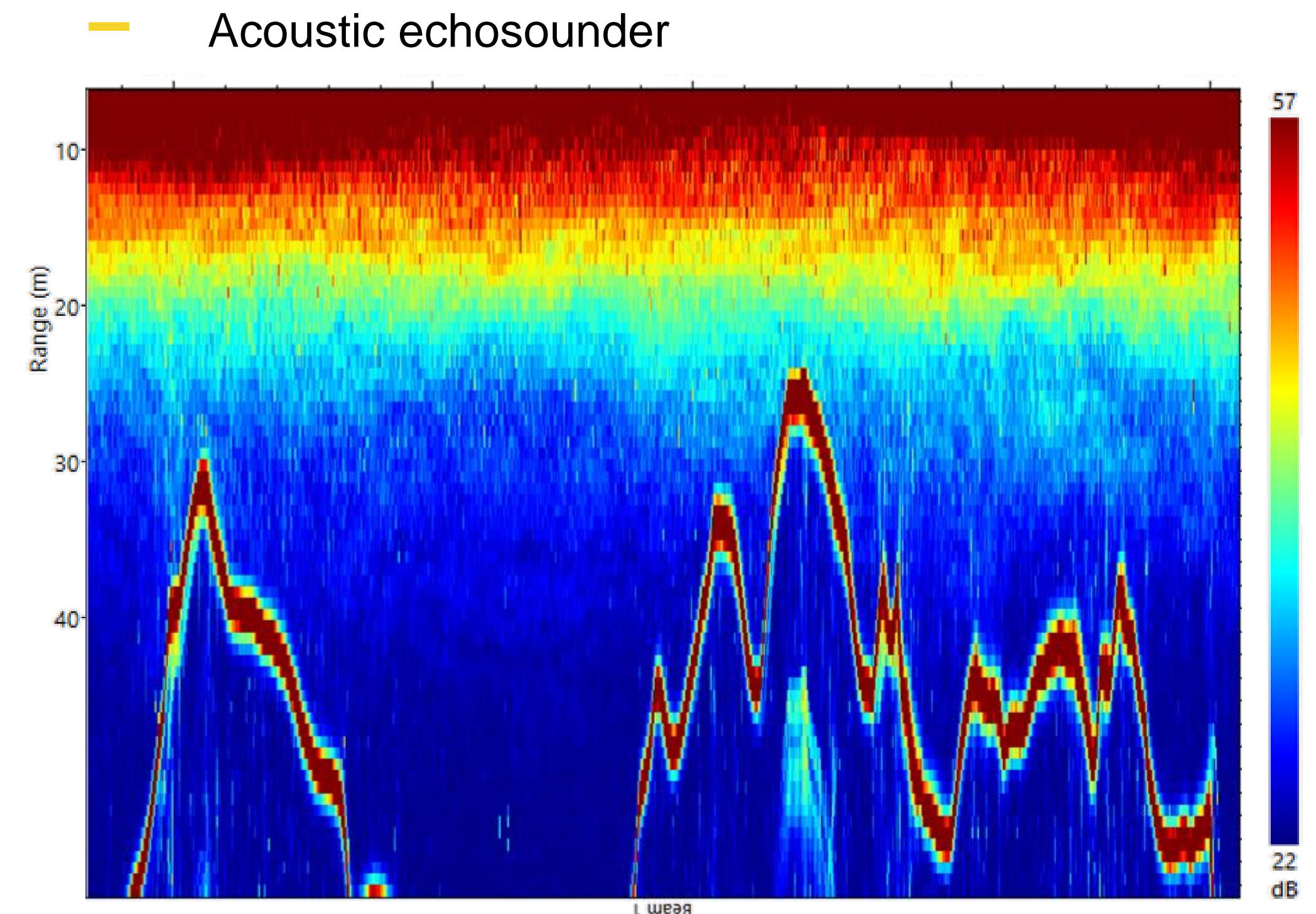
## Pilot Project #3

- Nortek Speed log installed on bulk carrier
- Vessel sails internationally
- Duration 2018-2022



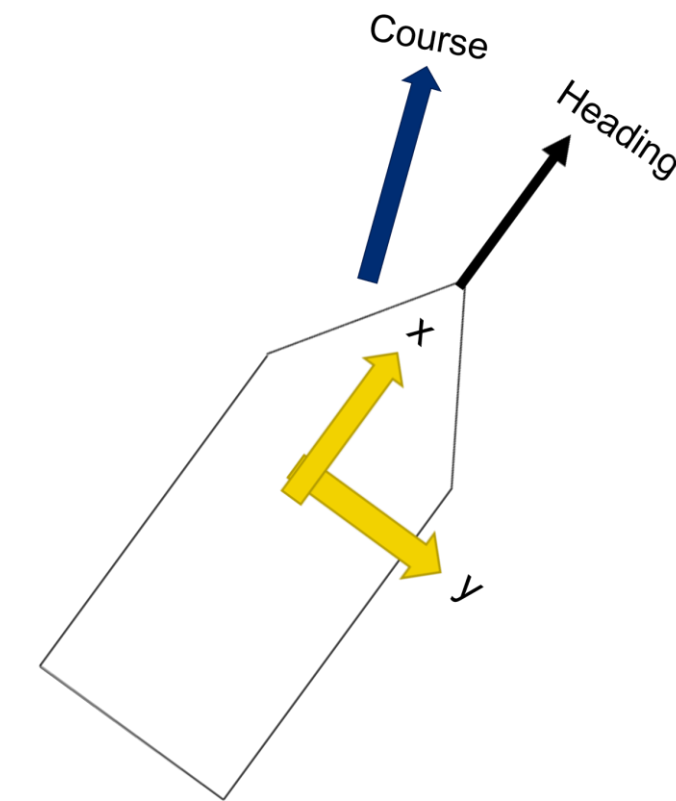
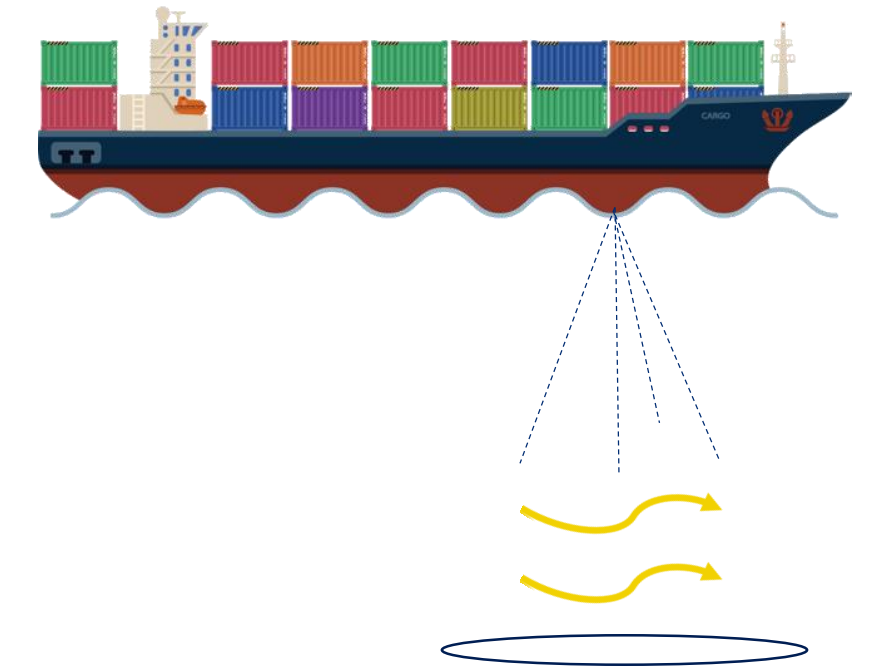
# Data collection

- The instrument collects data at 1Hz down to 40-70 m below the hull  
Bottom Track data down to ~200m.
- Results shows stable and good data during high speeds



# Data collection

- The instrument collects data at 1Hz down to 40-70 m below the hull  
Bottom Track data down to ~200m.
- Results shows stable and good data during high speeds
- Calculation of speed through water (STW) and current profile
- Quality indicator output
- External sensors, GPS and gyro





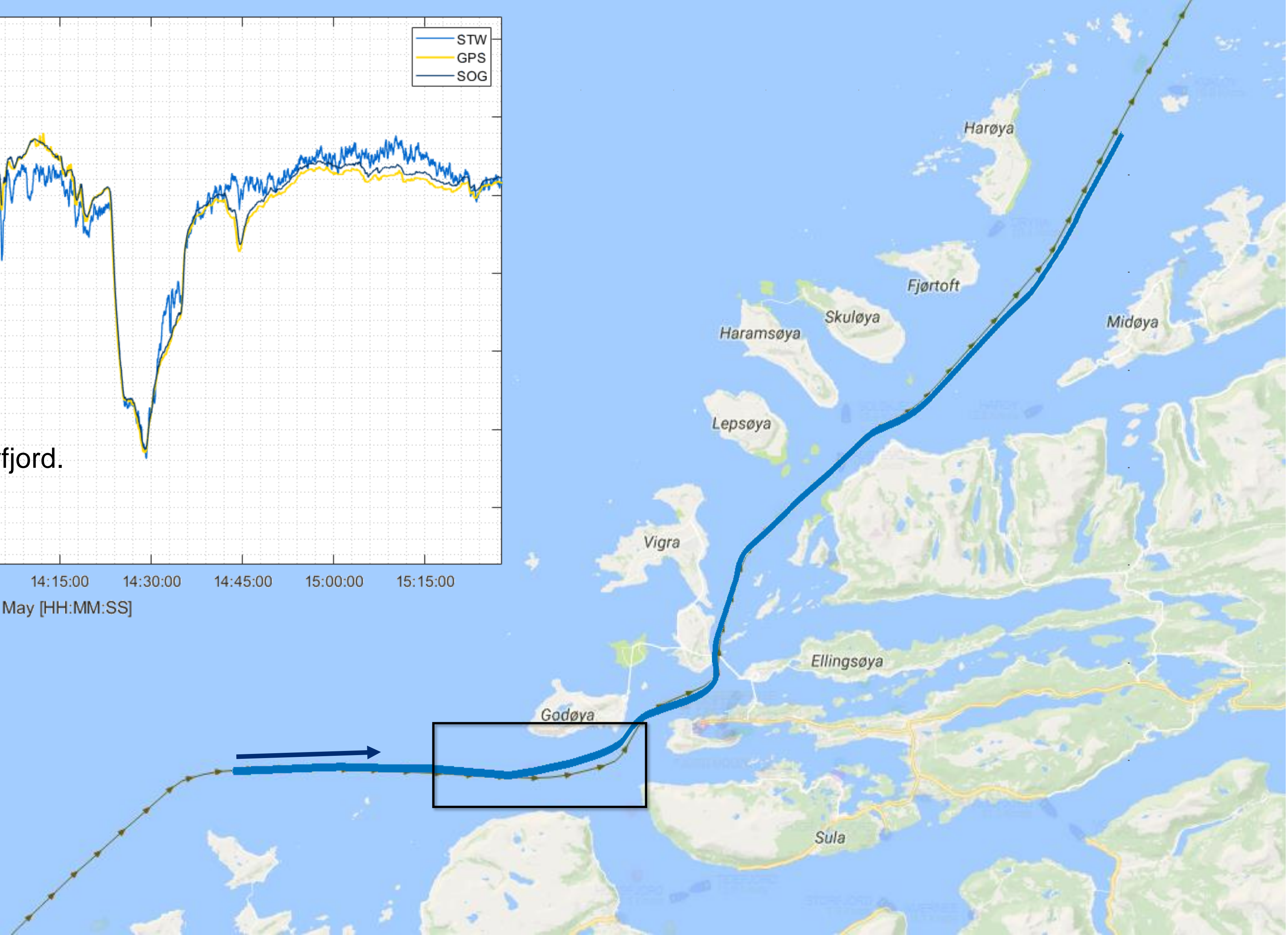
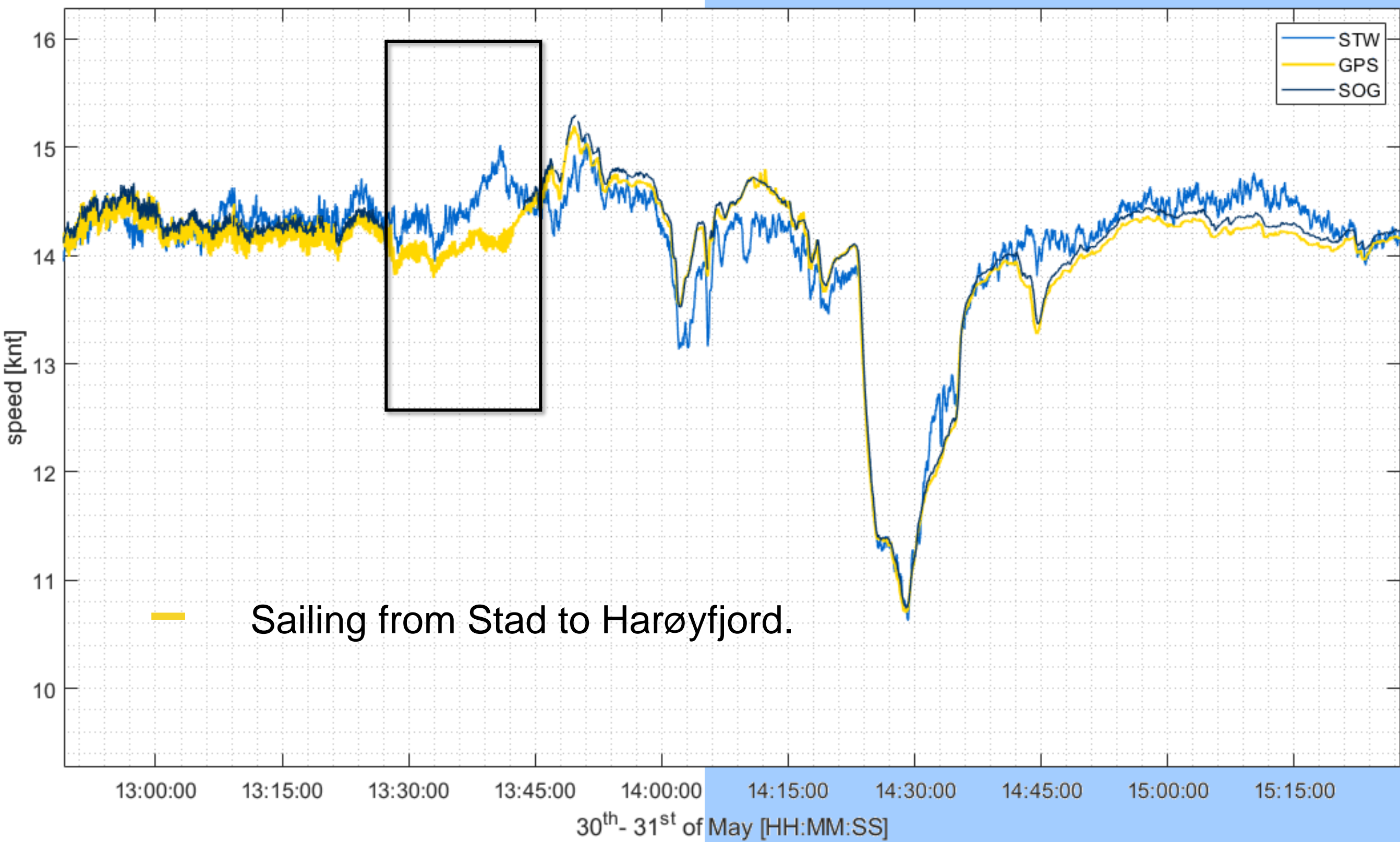
# Pilot project I

- RoRo cargo ship



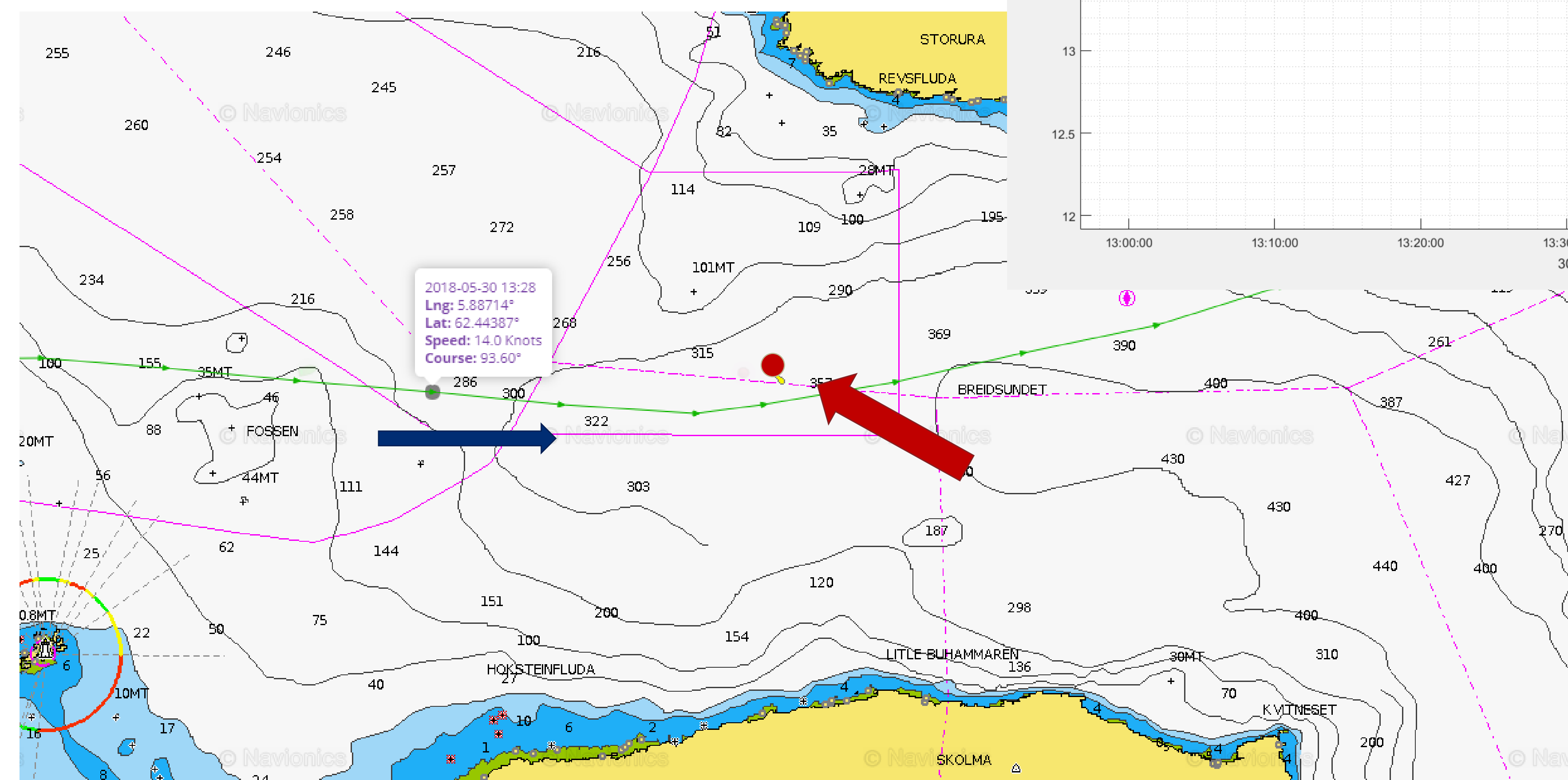
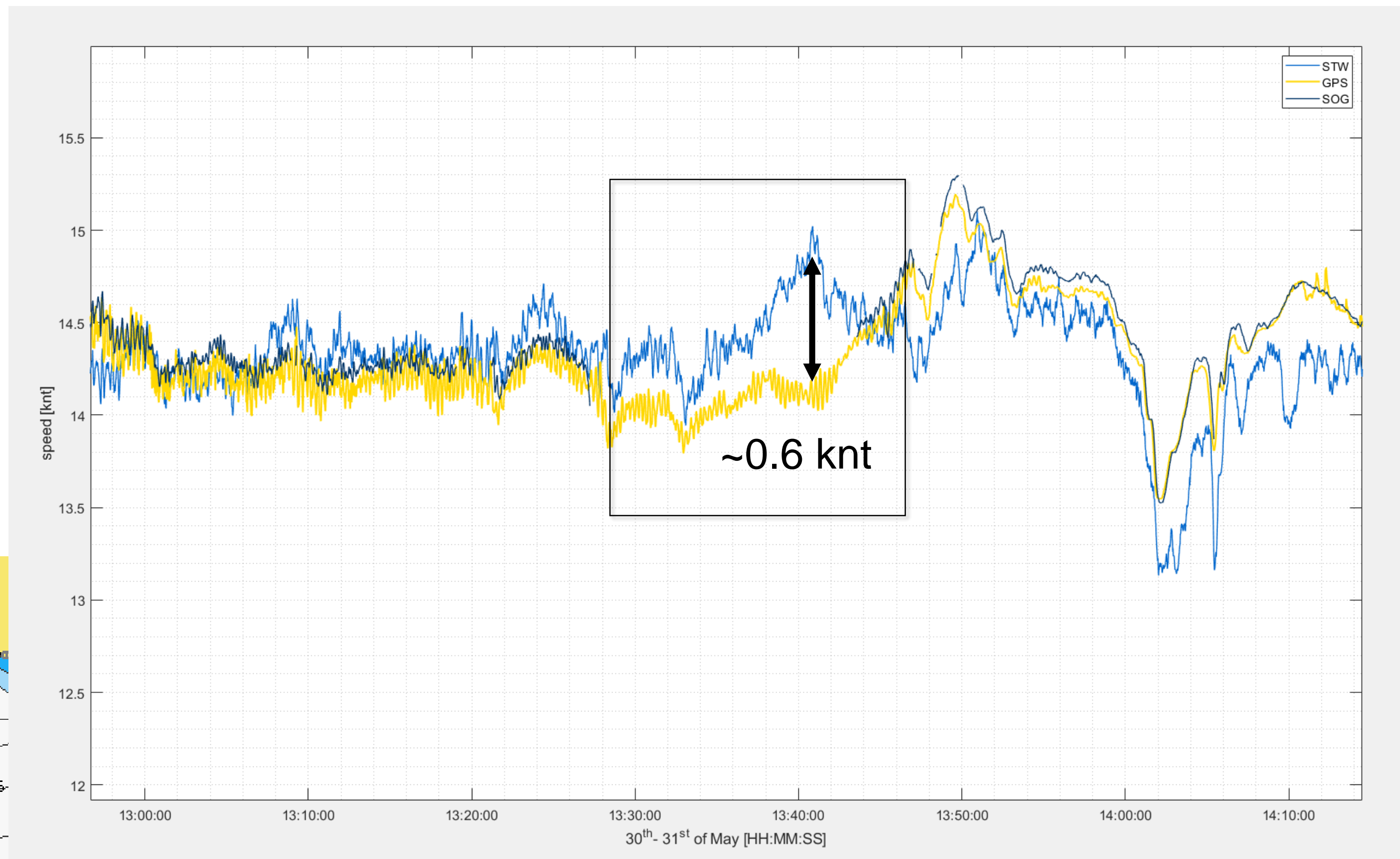


# I: Buoy and speed log data collected 30<sup>th</sup> – 31<sup>st</sup> of May

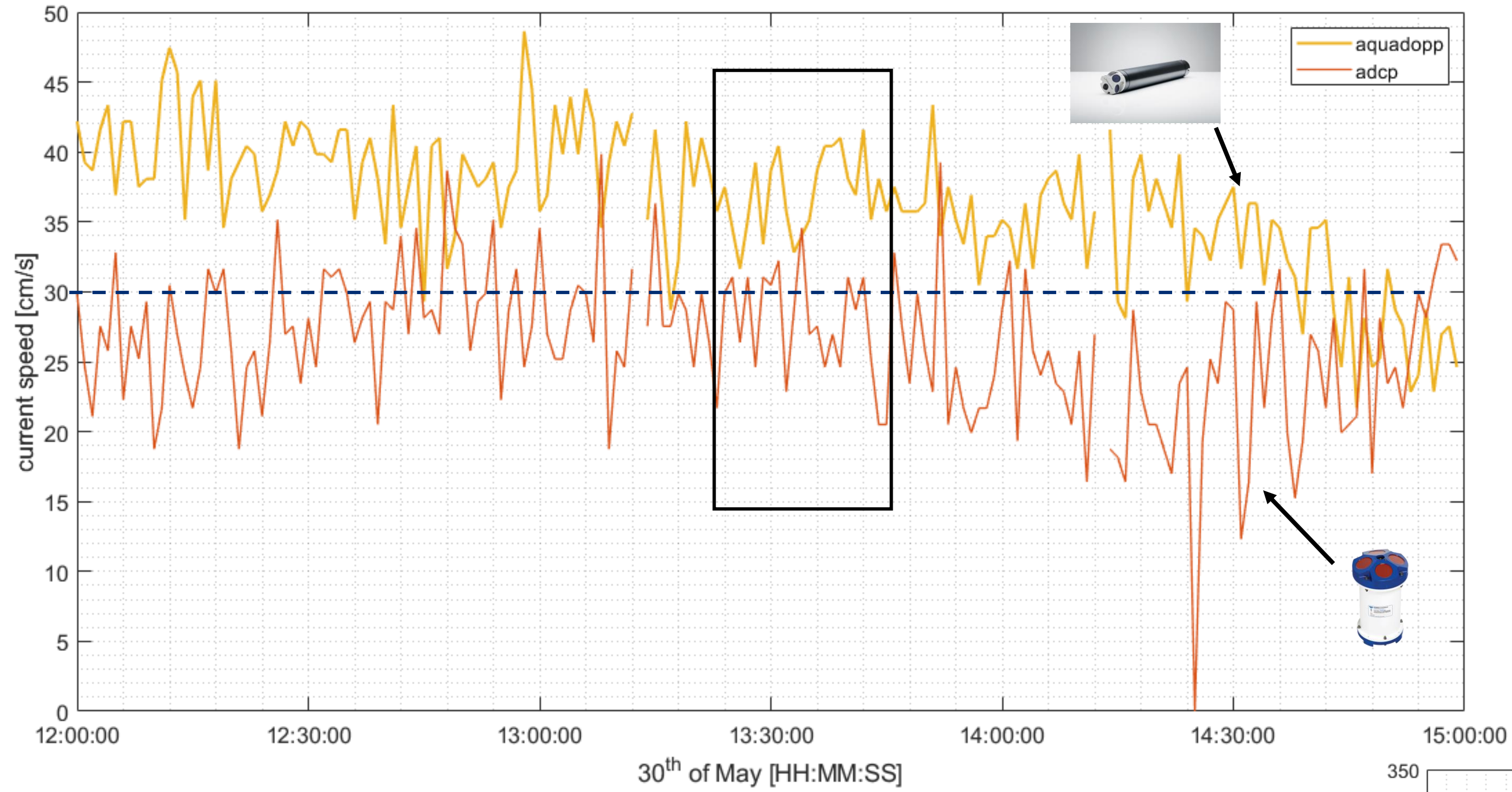




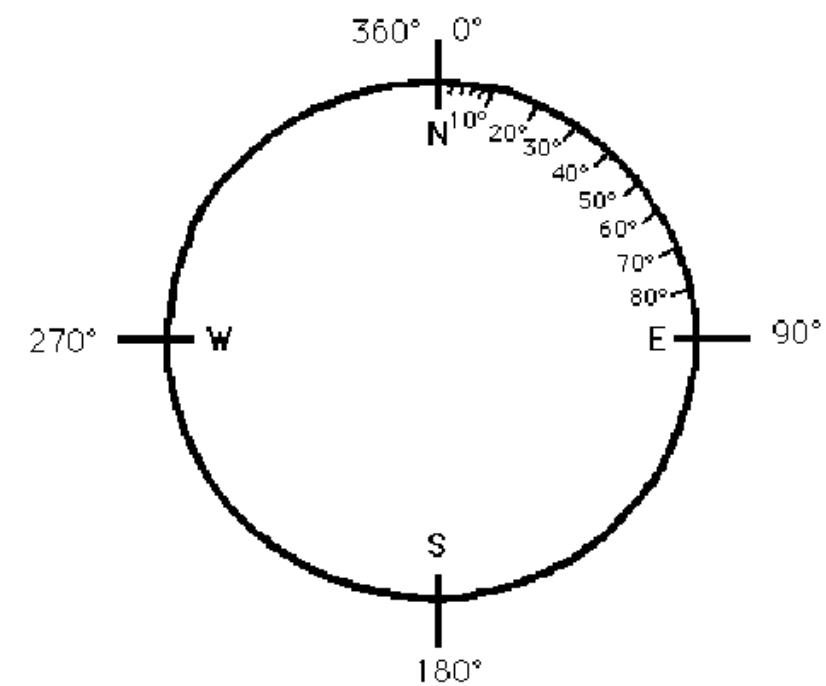
— Current measuments when sailing through Breisundet 13:35 hrs.



Ålesund 30th:  
High tide: 1126  
Low tide: 1737

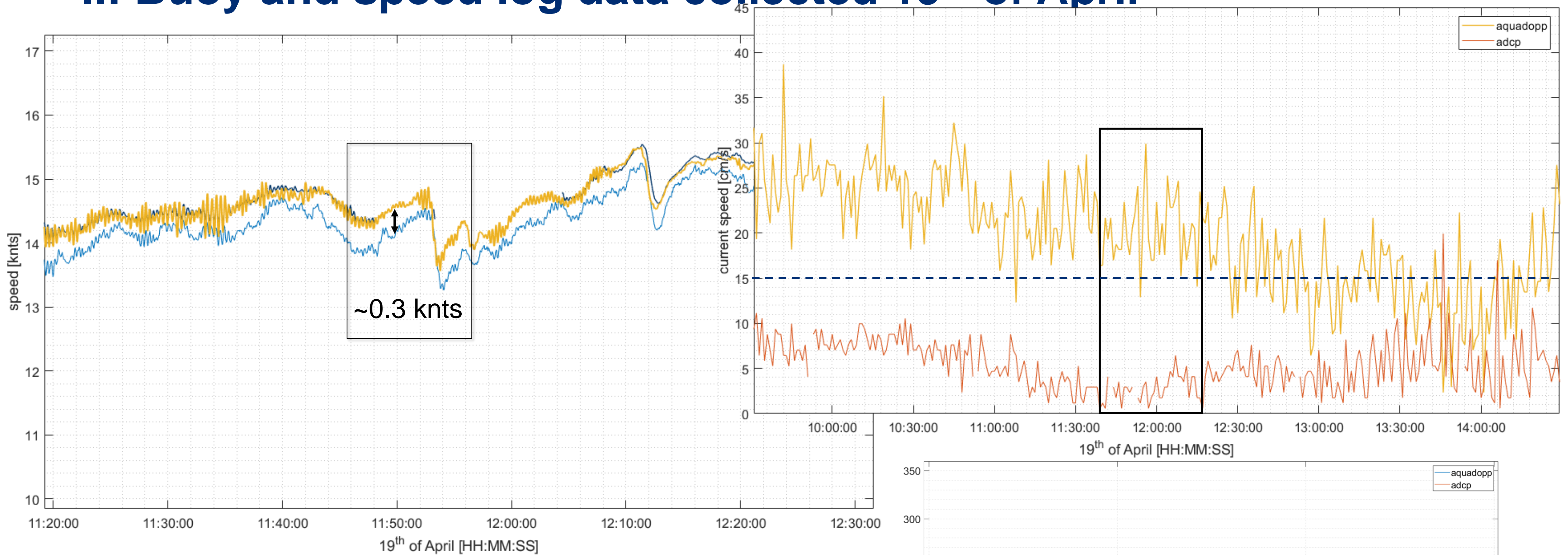


- Data from buoy 30th of May during the period when the ship passed the area.
- ~ 30cm/s = ~ 0.6knots
- Current in west direction





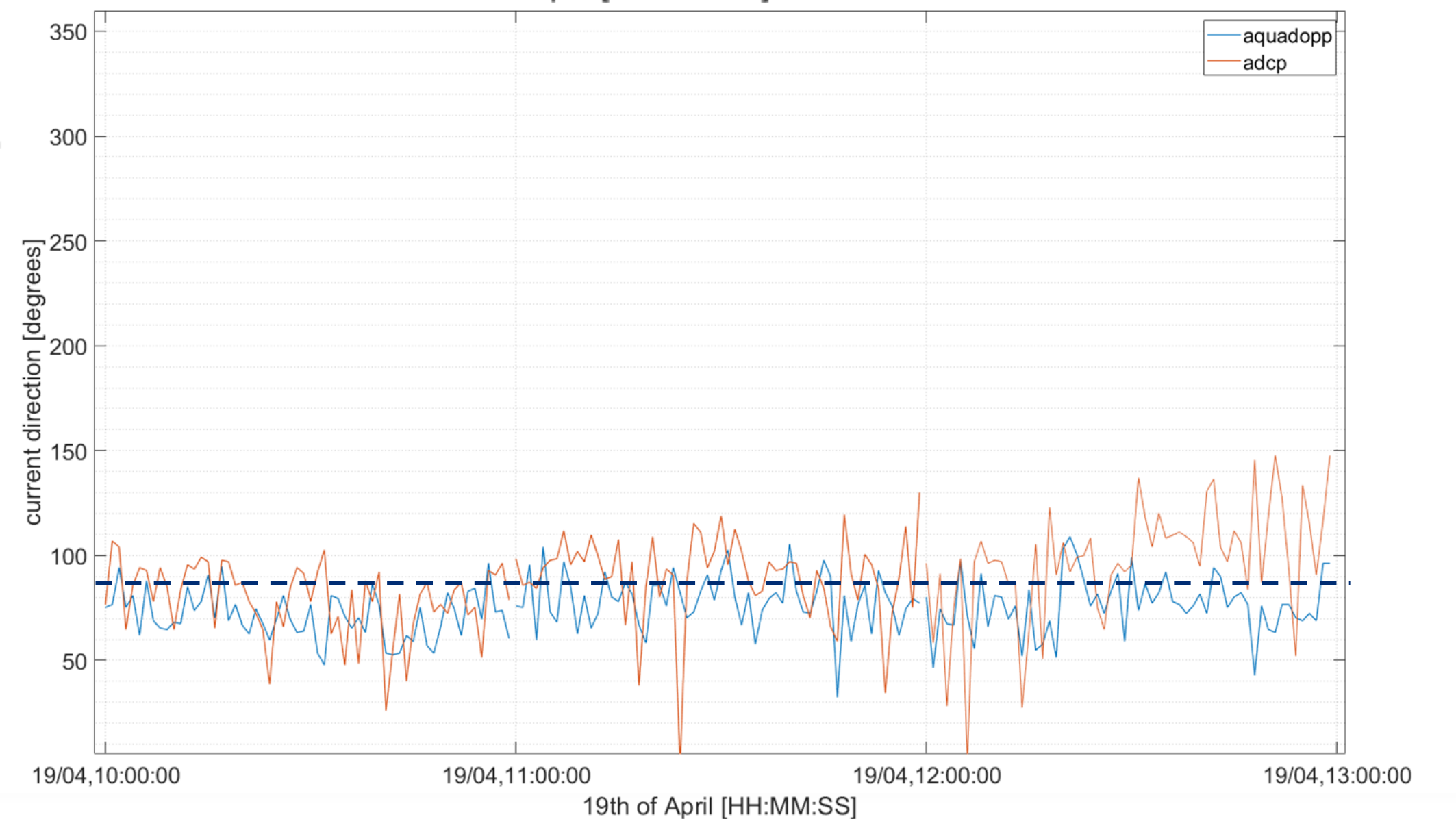
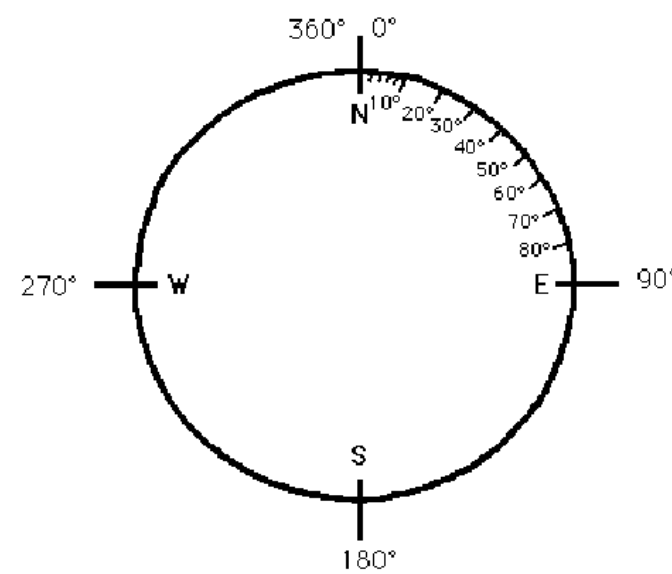
# II: Buoy and speed log data collected 19<sup>th</sup> of April



— Sailing through Breisundet 11:50 hrs.

— Current in east direction

—  $\sim 15\text{cm/s} = \sim 0.3\text{knots}$





# Pilot project II

## RoRo cargo ship



### Sensor inputs

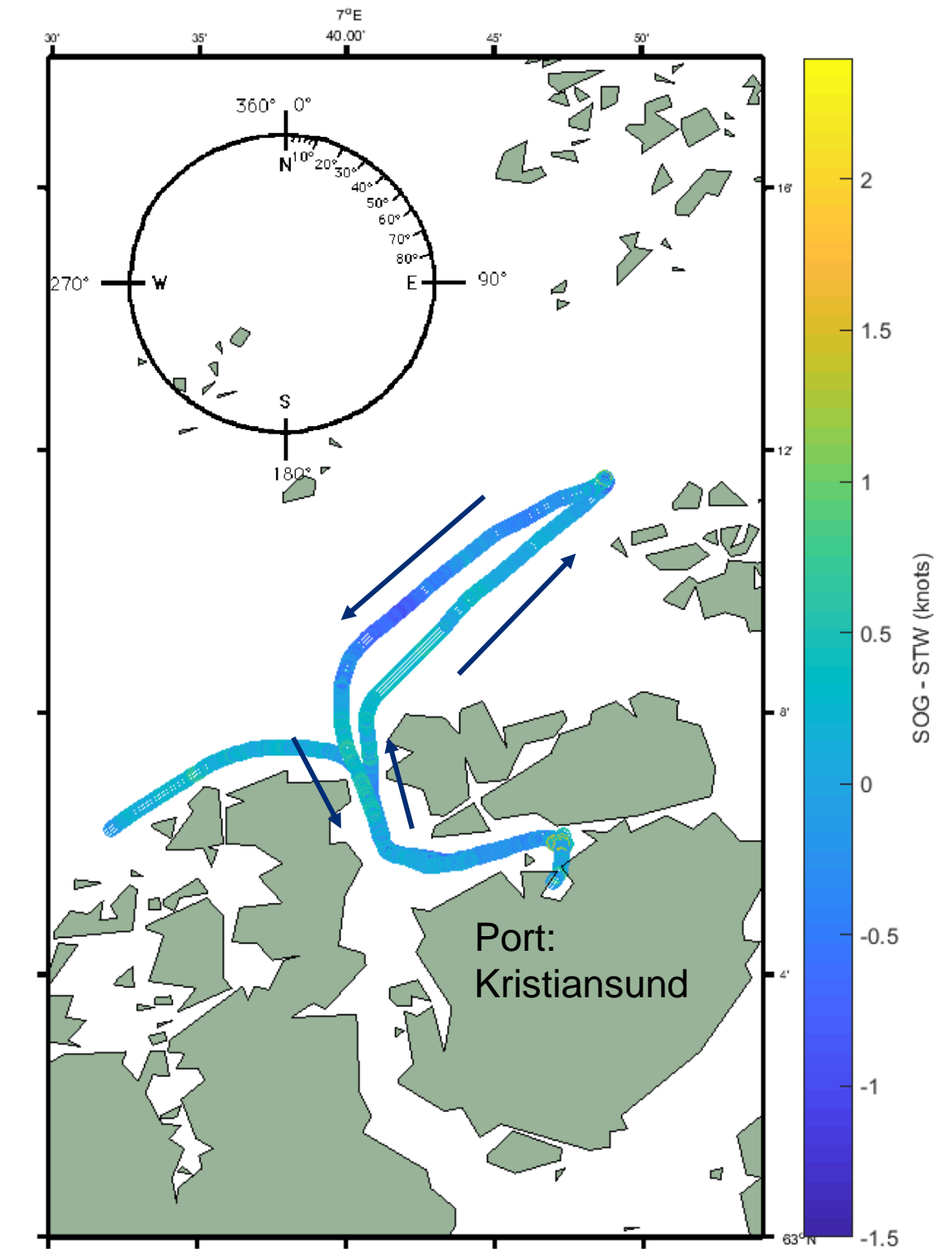
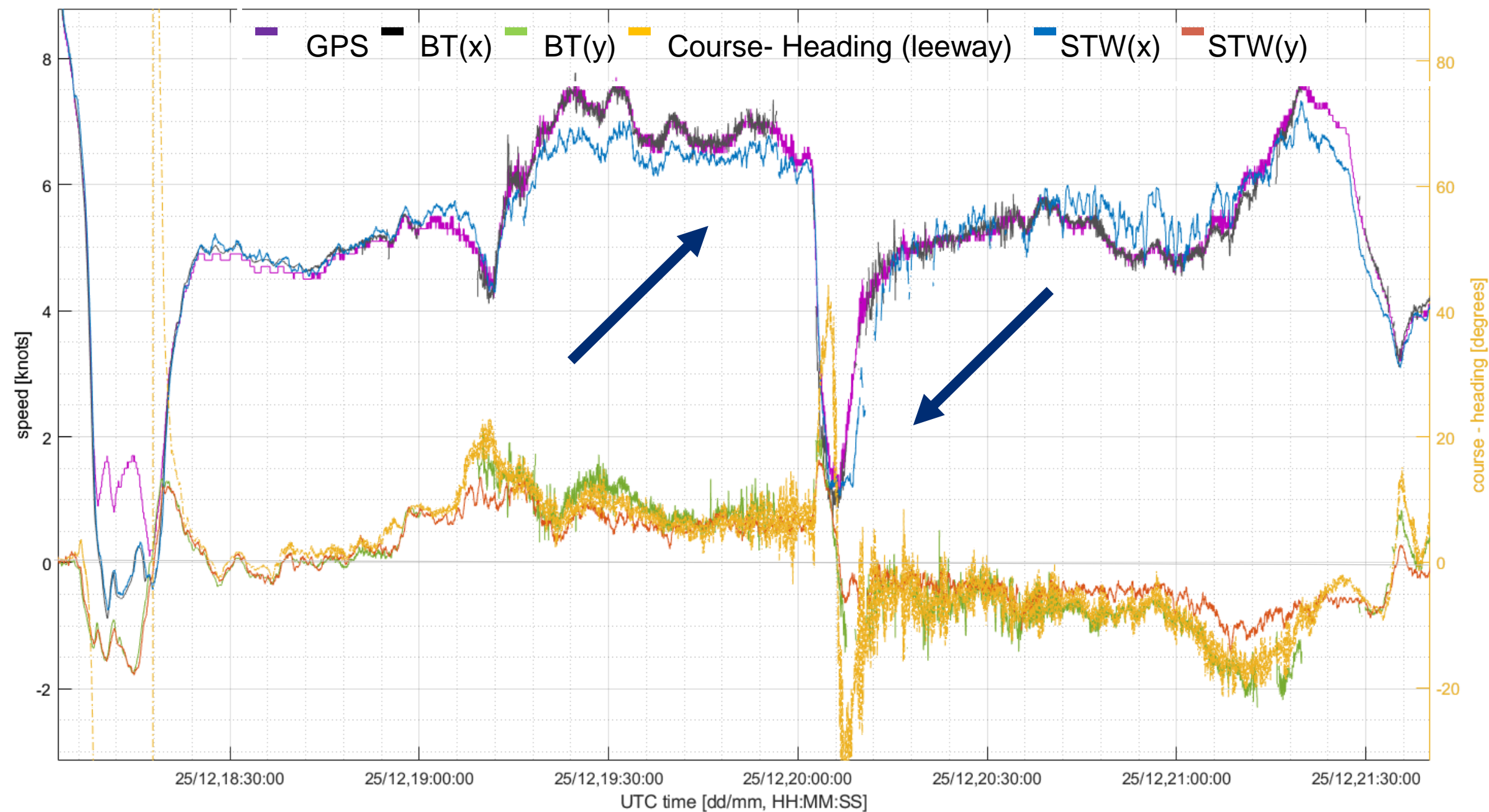
- Nortek Instrument
- GPS and gyro
- Draft/pressure sensor





# Additional data measurements

- Wind and rudder angle data shows challenging weather conditions
- Analysed sensor data clearly shows drift
- Nortek instrument data senses the size and direction of current during the storm





# Nortek speed log – way forward

- Commercial speed log IMO approved in Q2 2019
- The NSL are suitable also for current measurements
- Continued development
  - Optimize instrument calibration
  - Long time validation of current measurements





**Thank you**