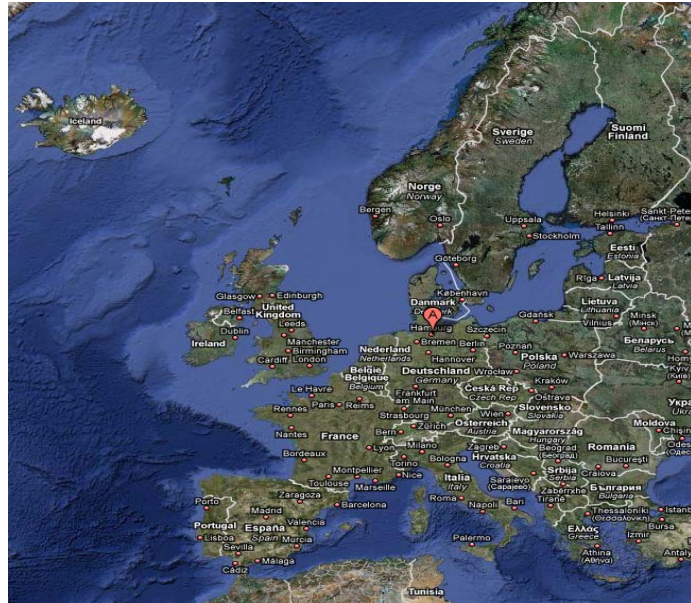


# MARNET

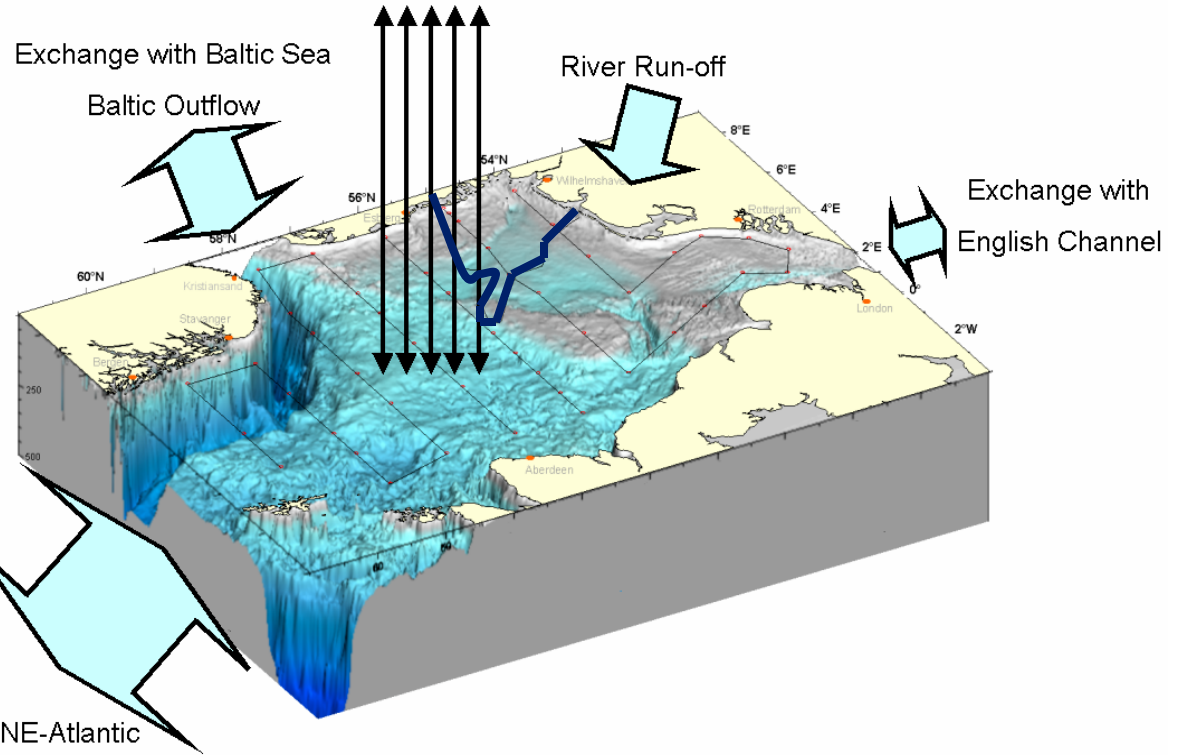
**MARine Monitoring NETwork in the North Sea and Baltic Sea**

**BSH Hamburg**

# Sea area



Precipitation, Evaporation,  
Heat Exchange with Atmosphere  
Solar Radiation, Wind Forcing etc.



## Tasks:

- ↓ Monitoring of physical and biogeochemical variables in German coastal waters
- ↓ Monitoring of the current state of the physical properties of sea water
- ↓ Monitoring of changes of marine climate
- ↓ Support of marine services (i.e. sea ice service, water level and storm surge forecast service )
- ↓ Support of operational models
- ↓ Calibration of remote sensing data

# MARNET - Stations



# MARNET - Stations



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

## NORTH SEA BUOYS



NSB-3



NSB-2





Unmanned Lightship „German Bight“ and „TW Ems“

# FINO: Research Platforms in North- and Baltic-Sea



**FINO 1**



**FINO 3**



## Lighthouse „Kiel“



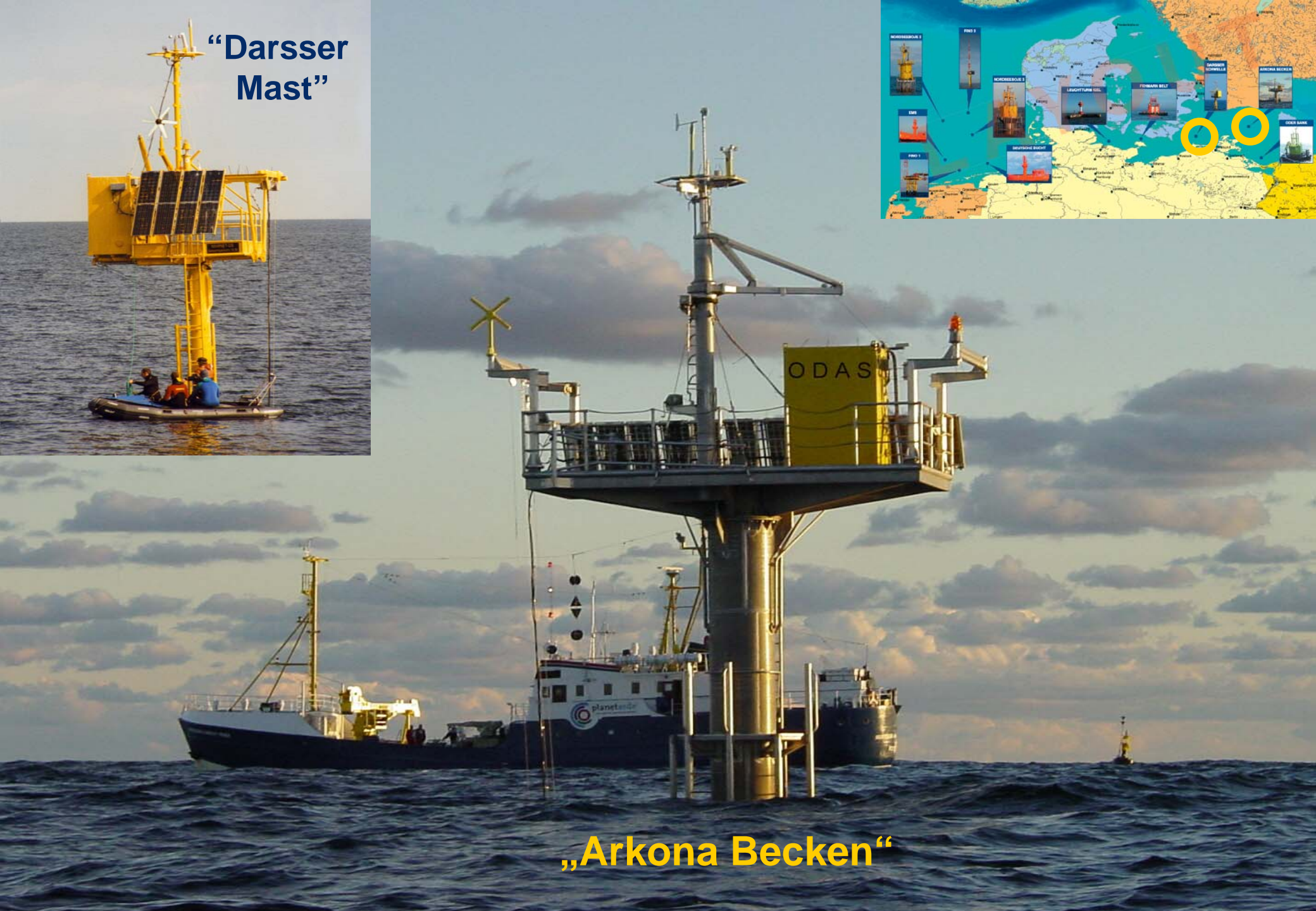


# „FEHMARN BELT“ Buoy



# “Oder Bank” Buoy

“Darsser Mast”

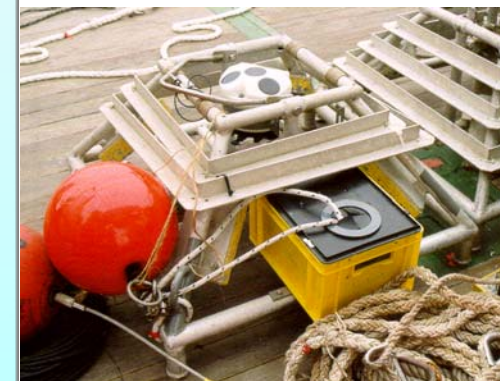
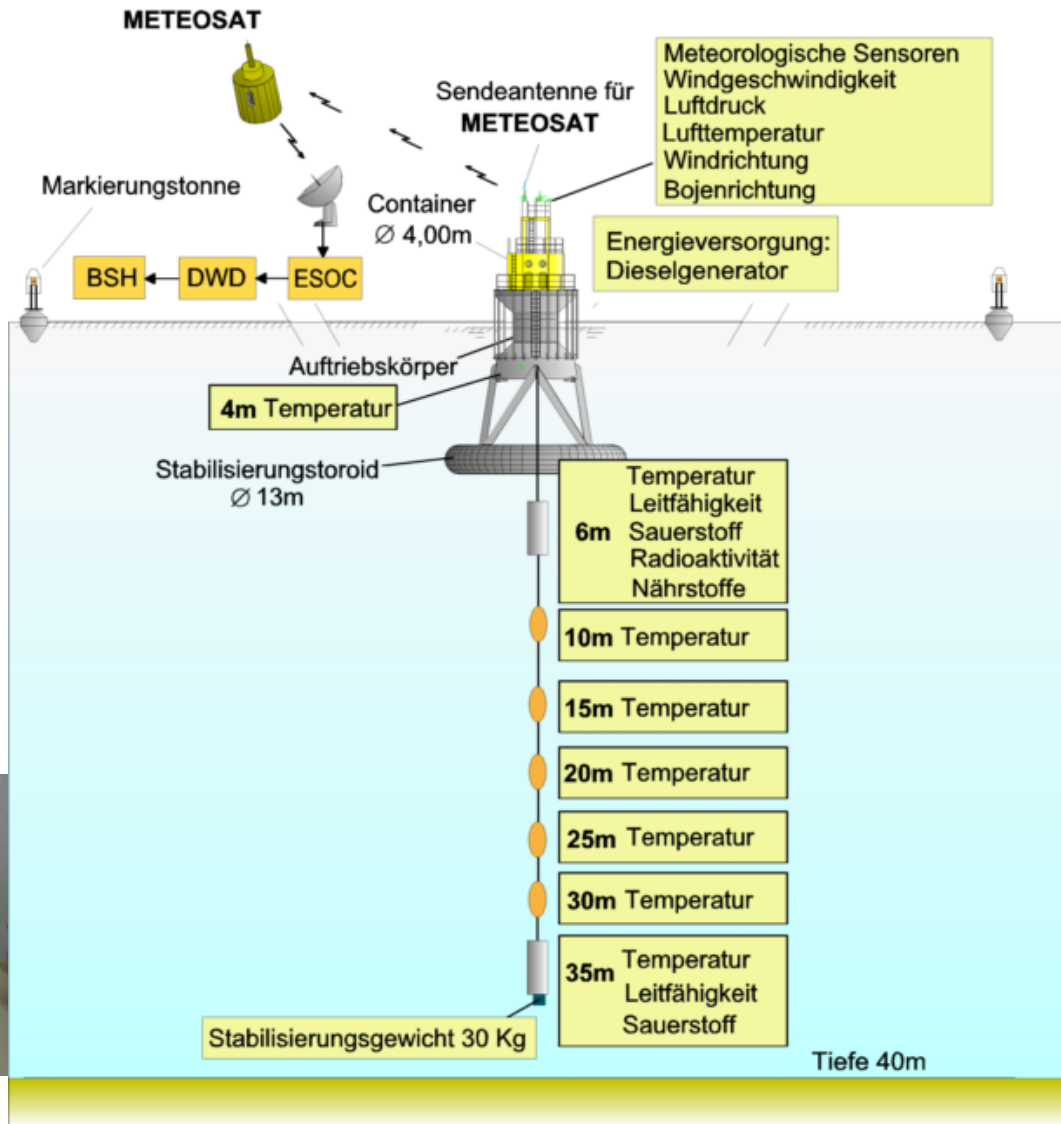


„Arkona Becken“

# Measurement concept and sensors



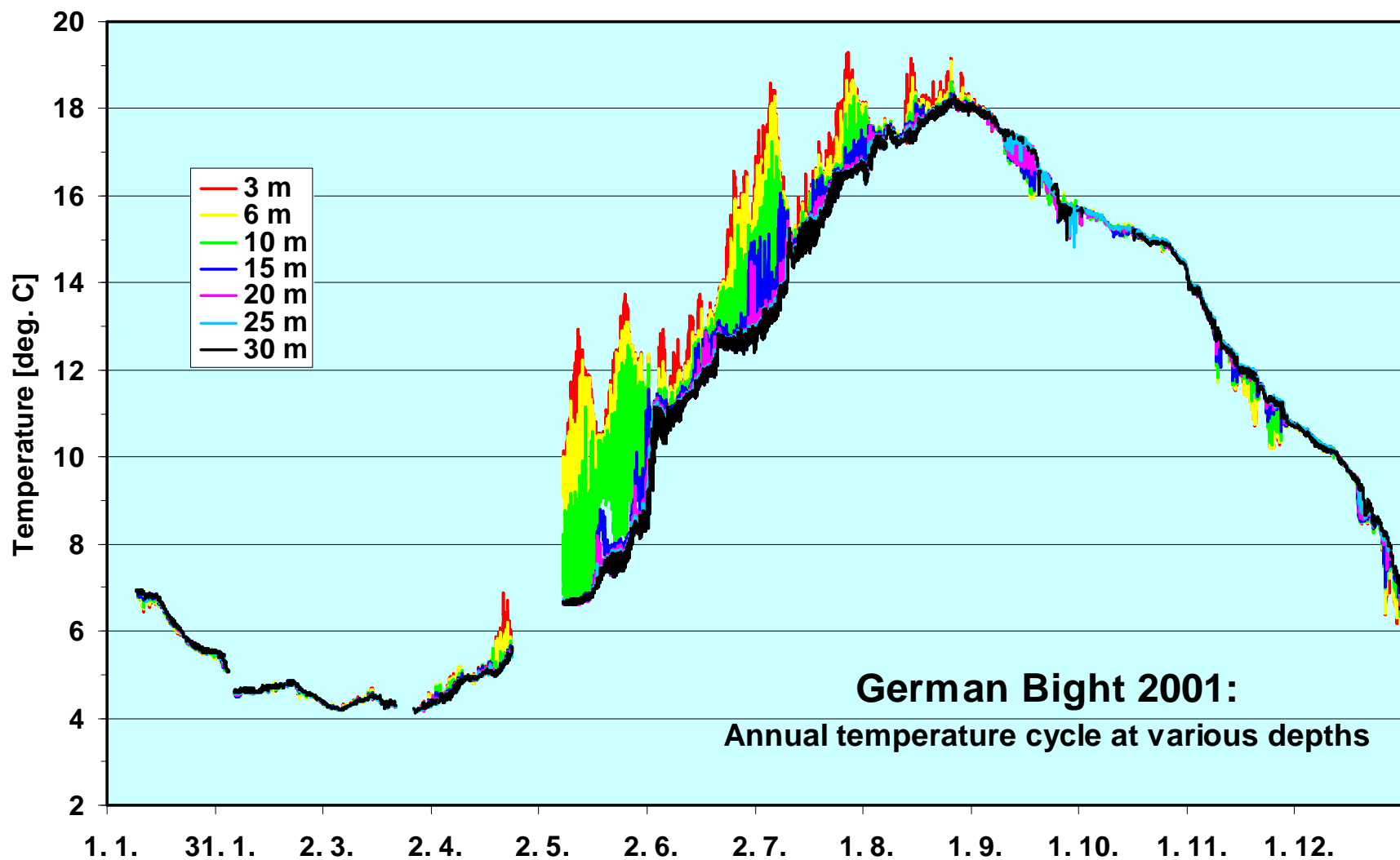
BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE





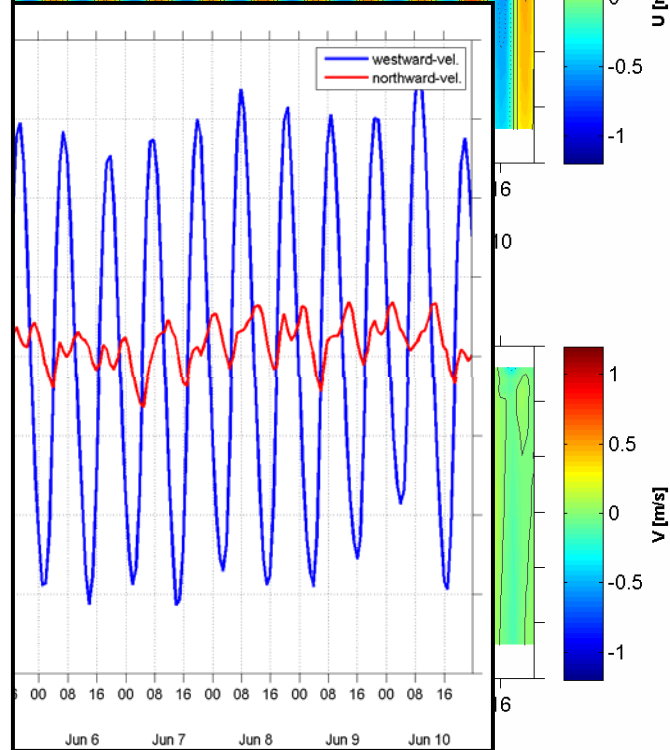
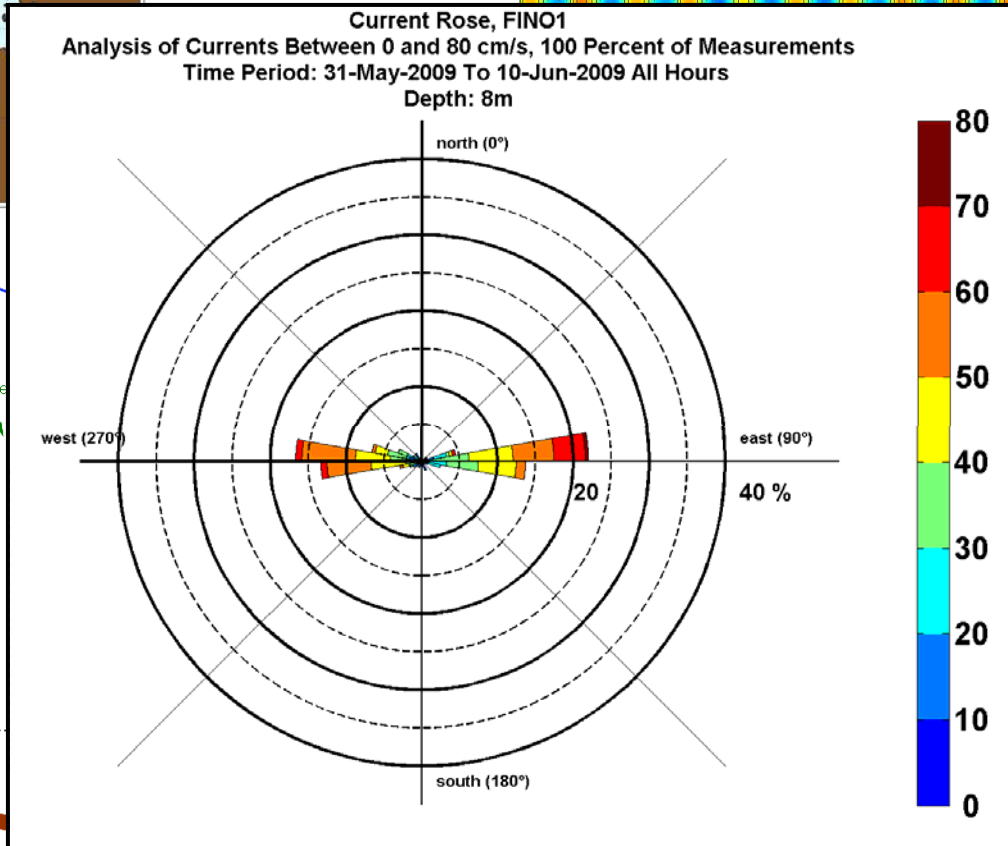
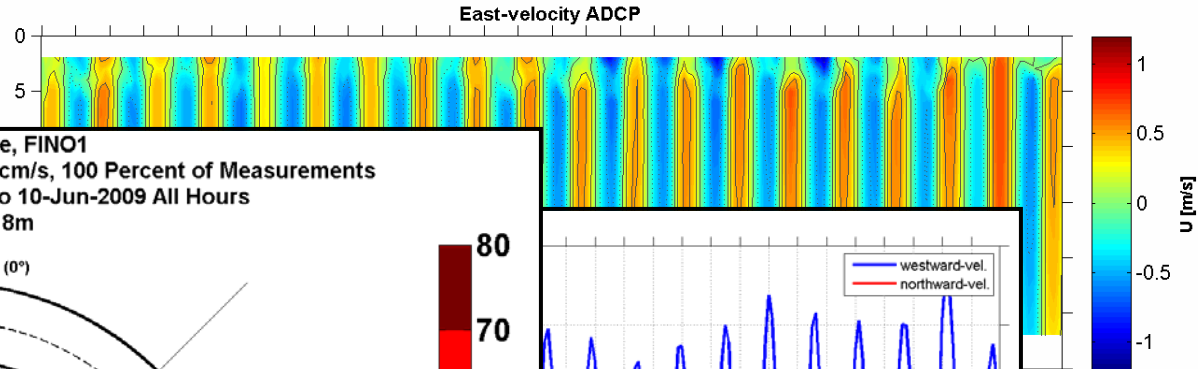
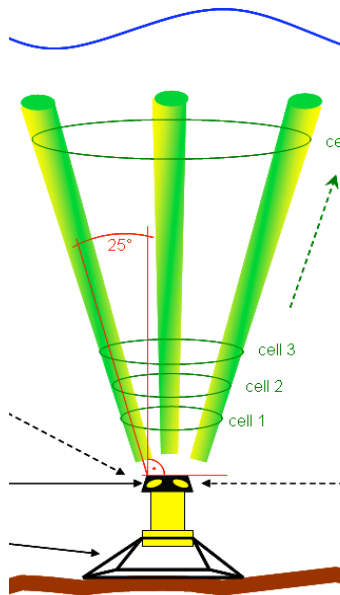
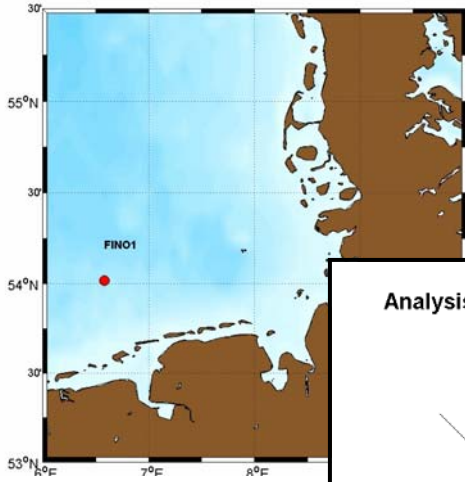
2004. 7. 20 11:29

# Temperature



# Measurements: Current

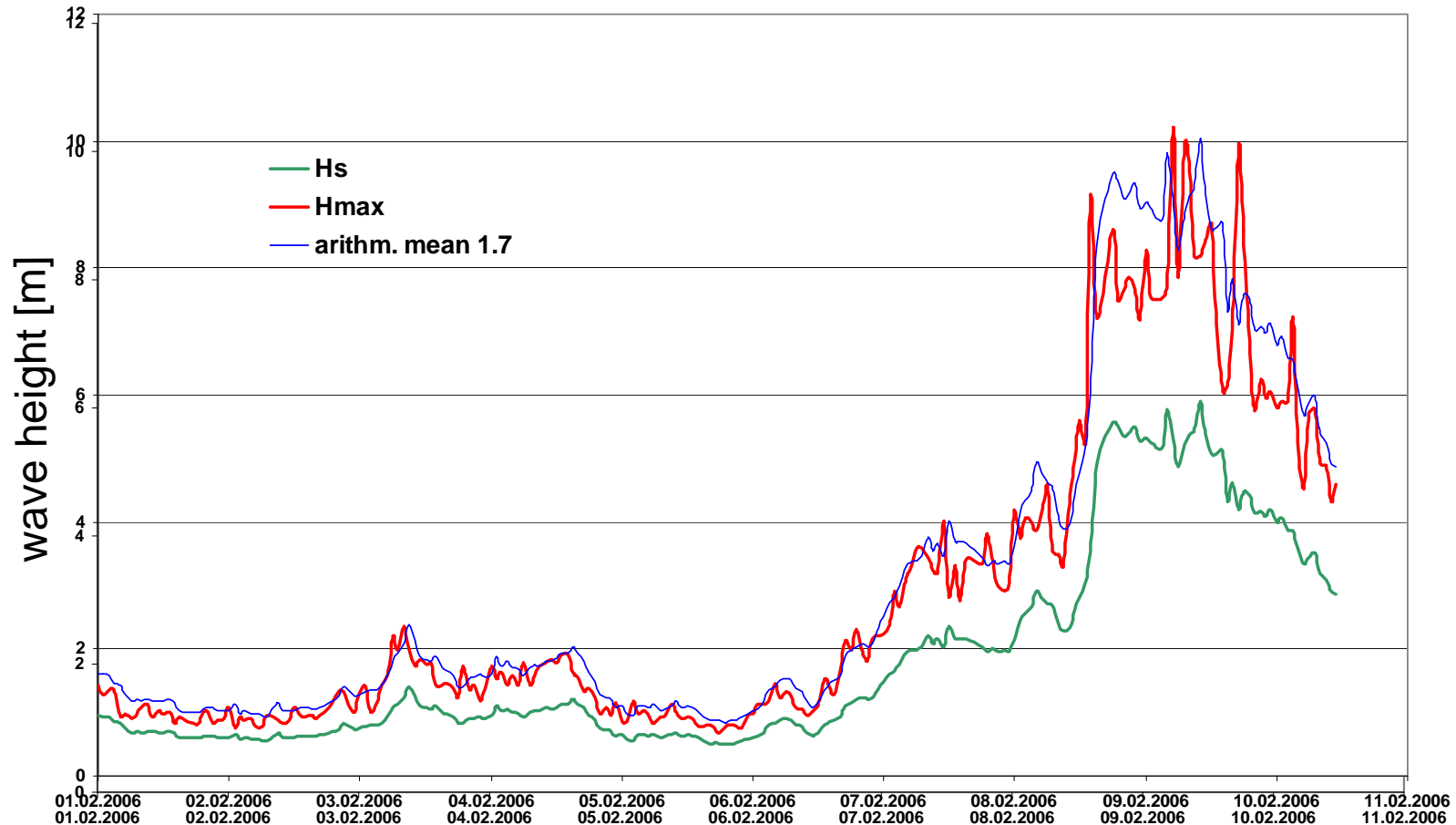
## Current Measurements with Acoustic Doppler Current Profiler (ADCP)-



# Measurements: Waves



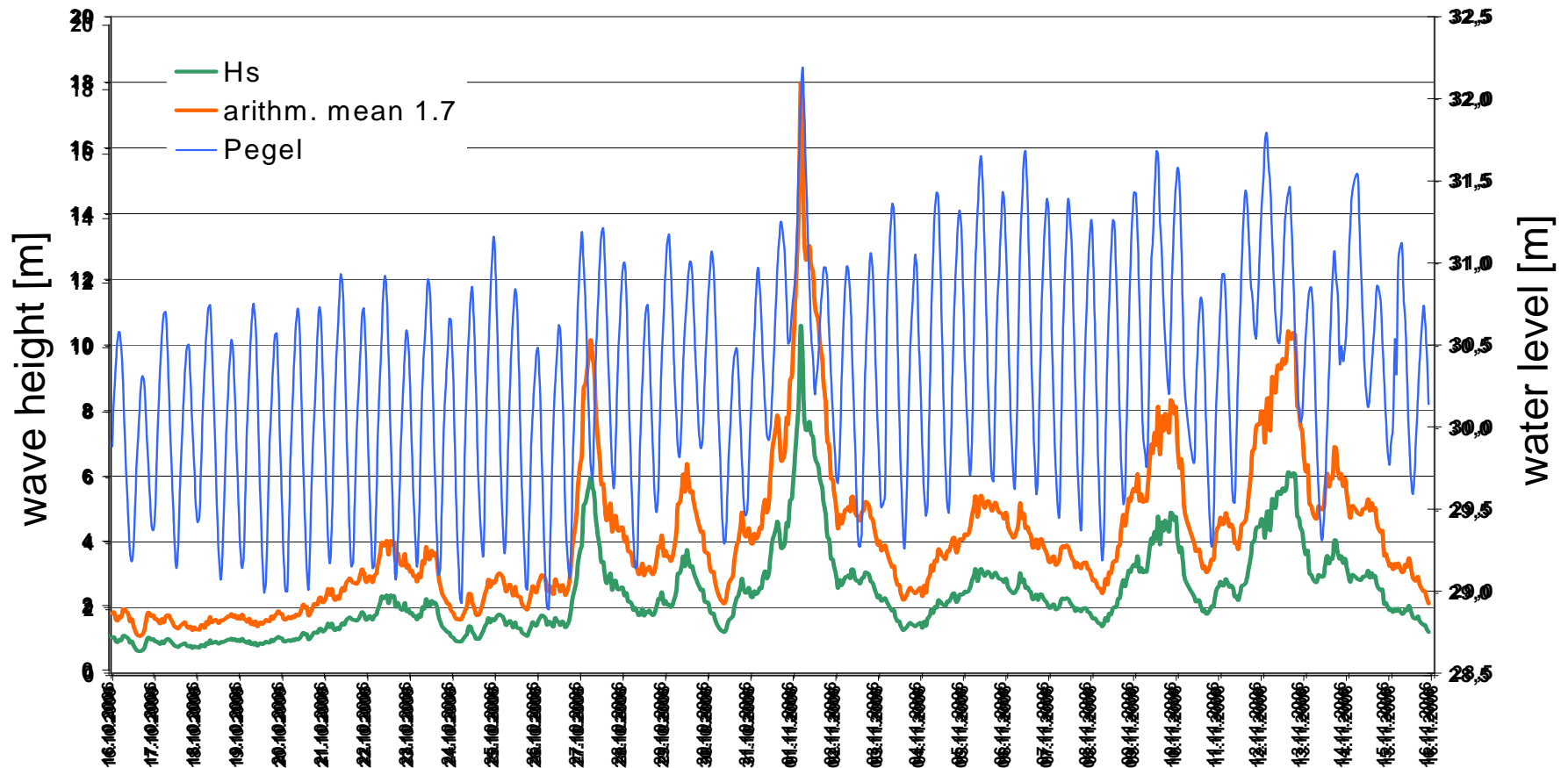
## Significant wave height - max. wave height FINO 1



# Measurements: Waves



## FINO1 storm event 1st of November 2006





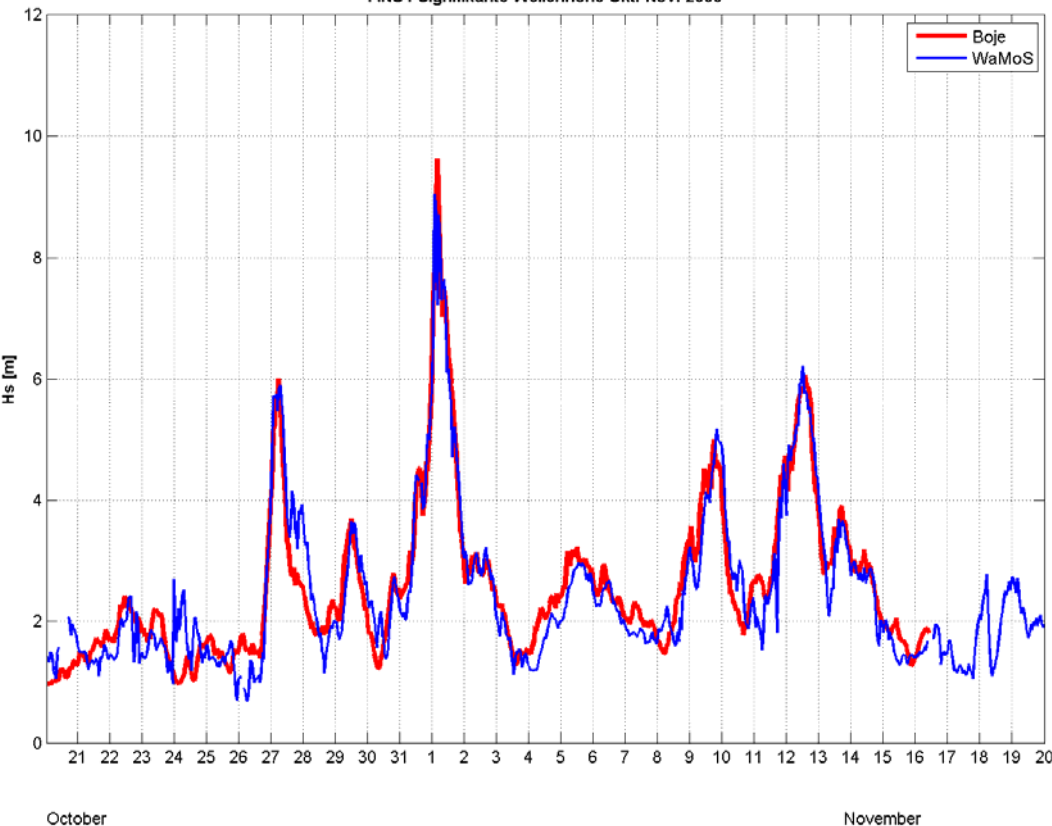
# Measurements: Waves



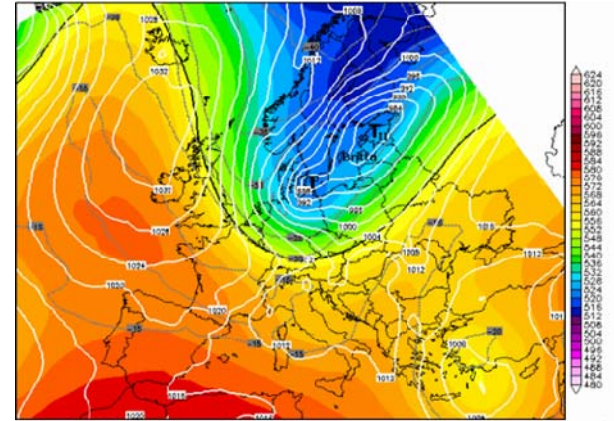
BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

Storm event: Orkan „Britta“ (Nov. 2006)

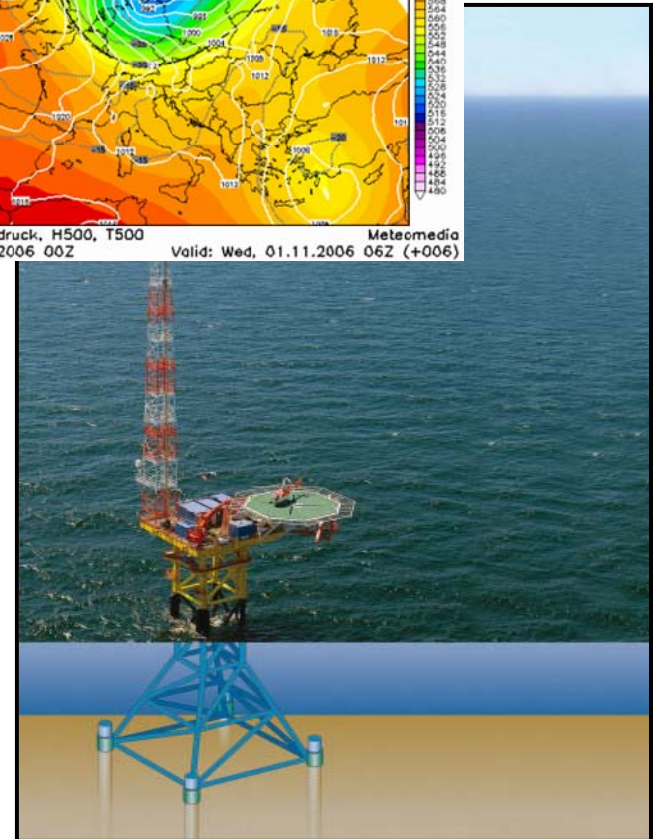
FINO1 Signifikante Wellenhöhe Okt.-Nov. 2006



Air Pressure (01.11.06)



ECMWF - Bodendruck, H500, T500  
Init: Wed, 01.11.2006 00Z  
Valid: Wed, 01.11.2006 06Z (+006) Meteomedia





# Measurements: Waves



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

## Storm event November 2009



# Project: alpha ventus



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

„far away, deep water, high turbines“



## alpha ventus:

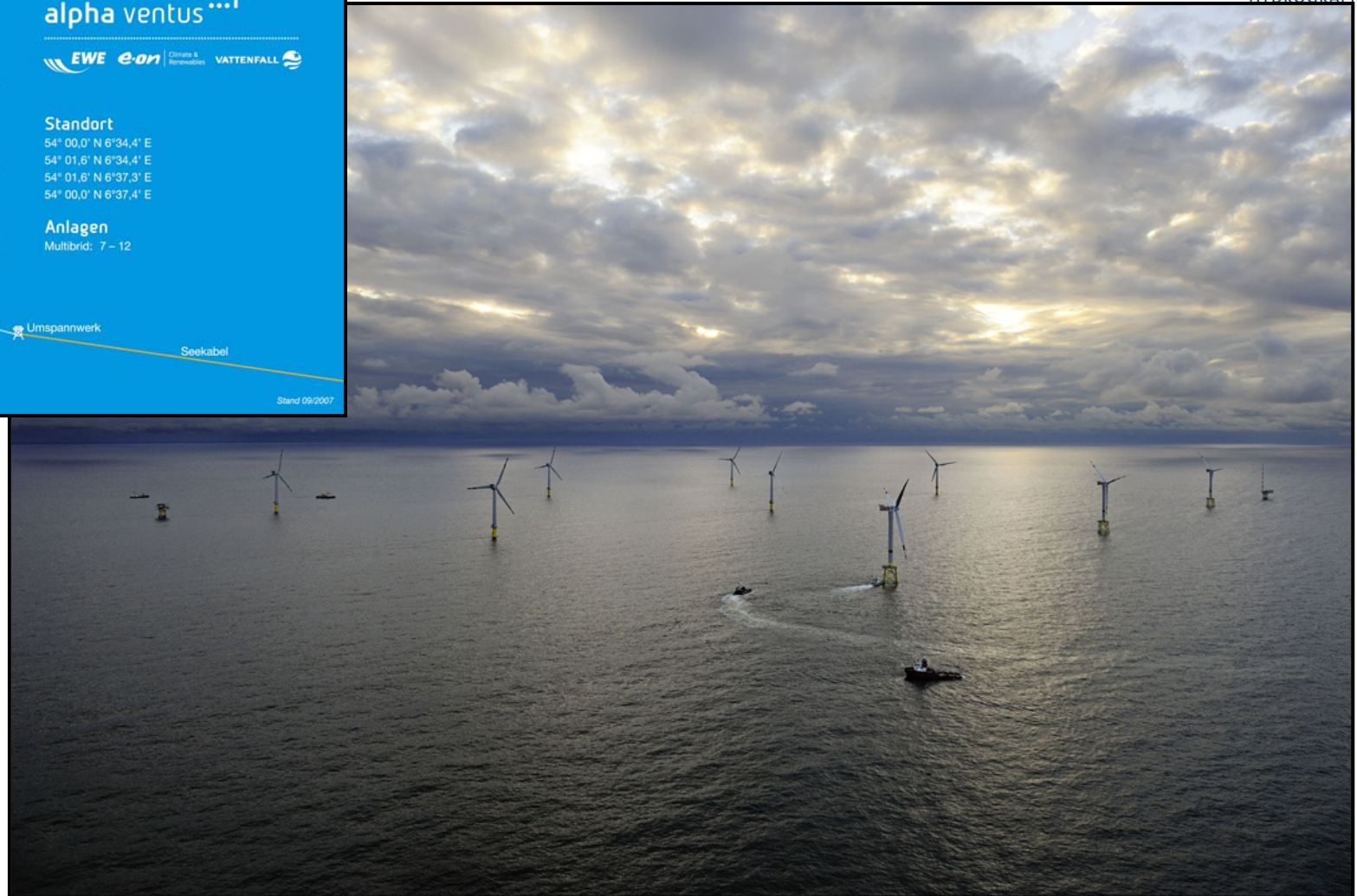
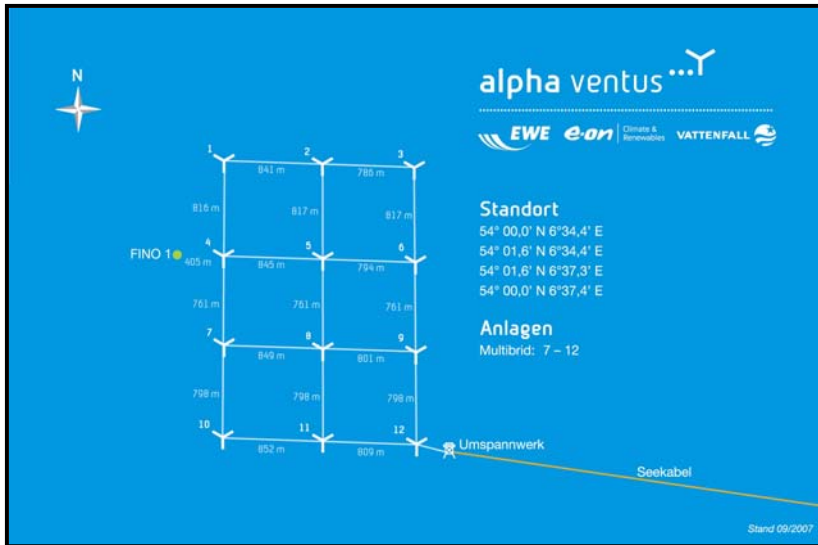
- Germans first Offshore Windfarm
- 45 km north of Borkum in th EEZ
- Depth of 30 m
- 12 Offshore Wind Turbines each of 5 MW
- Manufacturer: Multibrid-Areva & REpower (6 each)

Owner: Germans Offshore Testside- and Infrastruktur GmbH & Co. KG (DOTI)  
-> Co-operation of three of the main energy suppliers

# alpha ventus



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

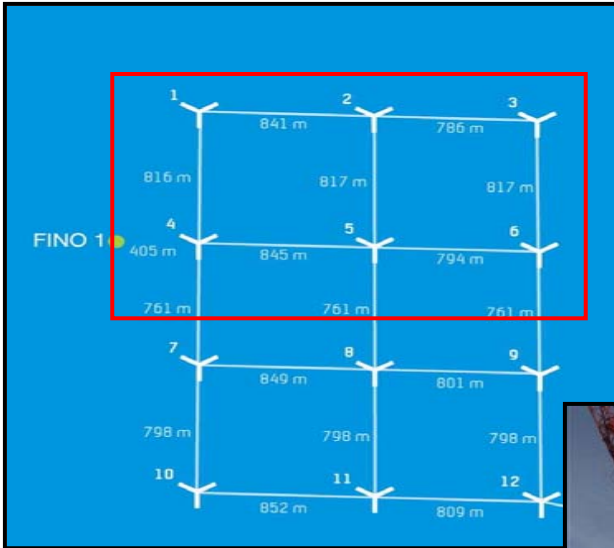


Construction side  
11/11/09;  
view to the west

# alpha ventus

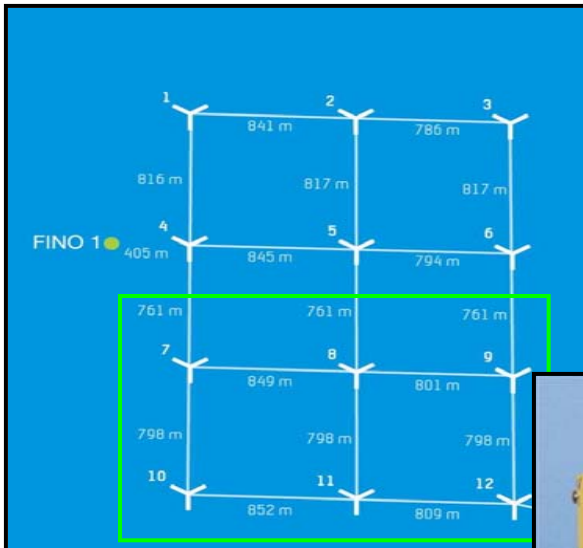


BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE



## REpower M5

# alpha ventus



## Multibrid-Areva M5000

# Impressions



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE



Thanks for your attention