Federal Maritime and Hydrographic Agency

RAVE FORUM#3:
FINO1, FINO2 and FINO3 platforms as a key source of research measurements in the North and Baltic Sea

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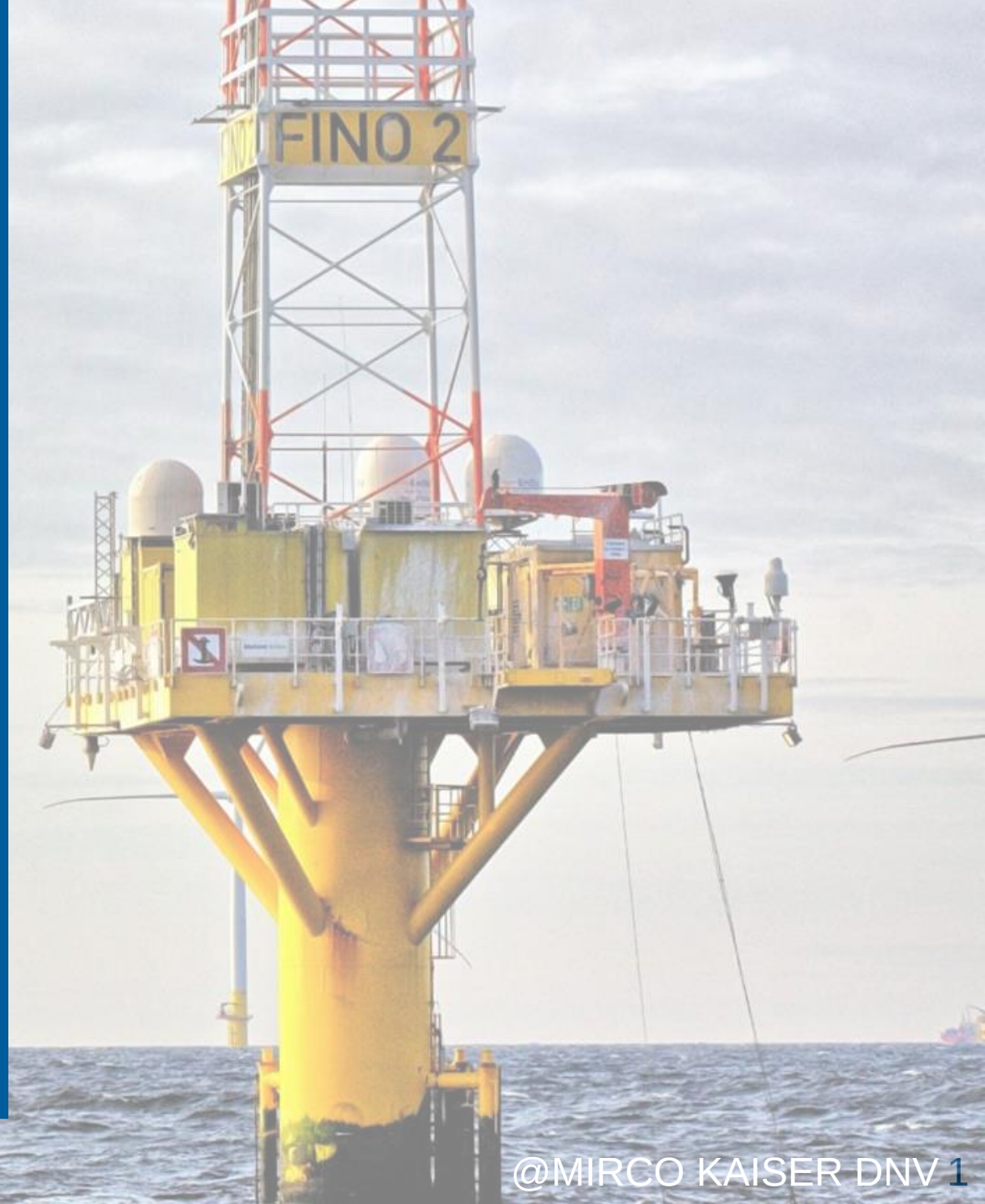

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Content

- Introduction: The FINO platforms
- Measurements on the platforms
- Access to the data
- Applications of FINO-Data

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

The FINO-Platforms

- **FINO → F**orschungsplattformen **i**n der **N**ord- und **O**stsee
  (Research platforms in the North Sea and Baltic Sea)
- **In 2002 increased funding for offshore wind energy research**
  - **FINO1 (2003)**
  - **FINO2 (2008)**
  - **FINO3 (2009)**
- **Constructed in areas suitable for offshore wind farms**

→ Meanwhile in immediate vicinity of wind farms

FINO-Platforms: Research goal

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Marine and atmospheric conditions and underlying processes

- Mean state
- Temporal scales
- Extreme events

Cost-effectiveness and safety

Enviromental change off Offshore Windparks (OWPs)

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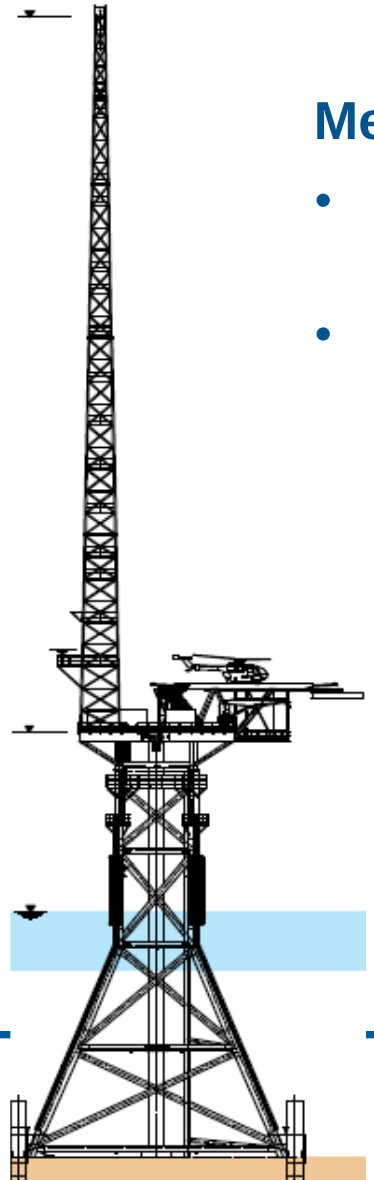
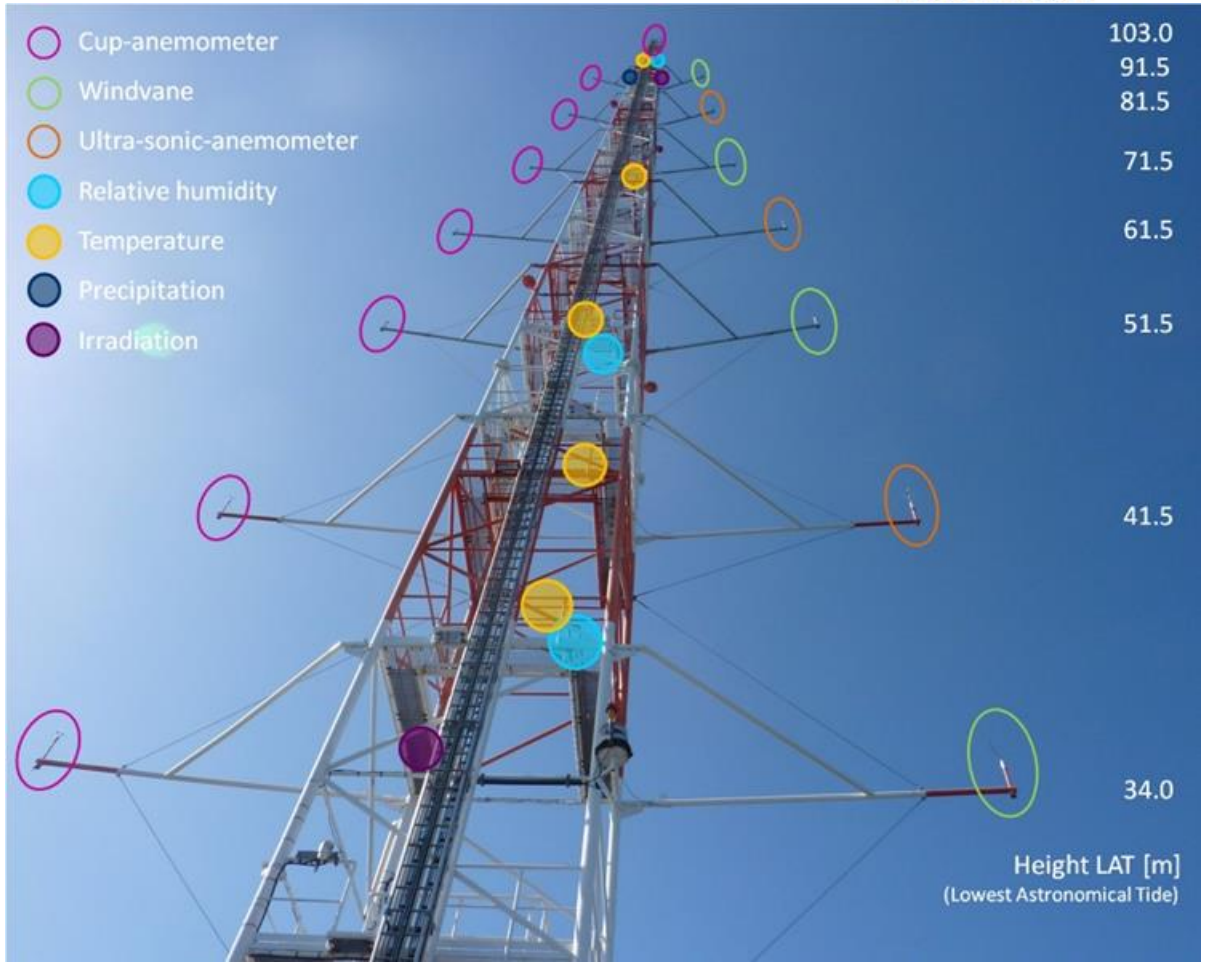
FINO1 and RAVE

Measurements

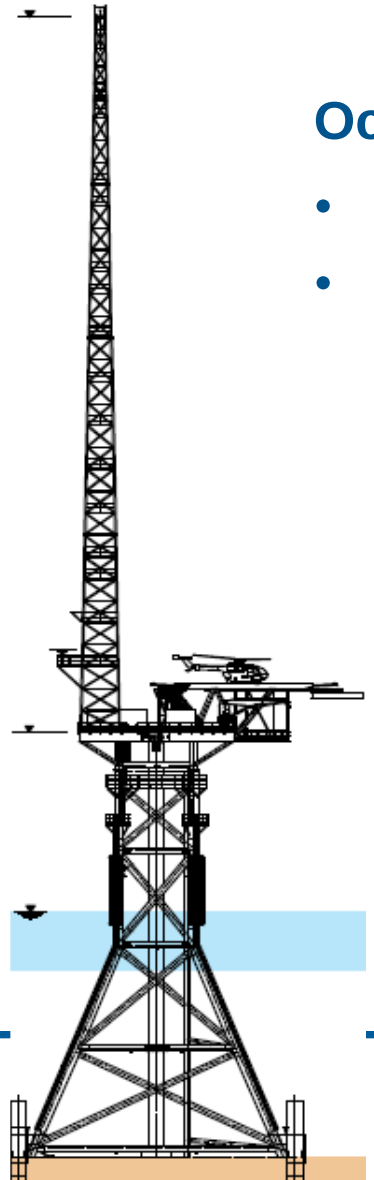


Meteorologigal measurements:

- 8 - 9 measuring heights (21 – 107 m altitude)
- Parameters:
  - Wind speed & wind direction
  - Air pressure, air temperature, humidity
  - UV-radiation
  - Precipitation

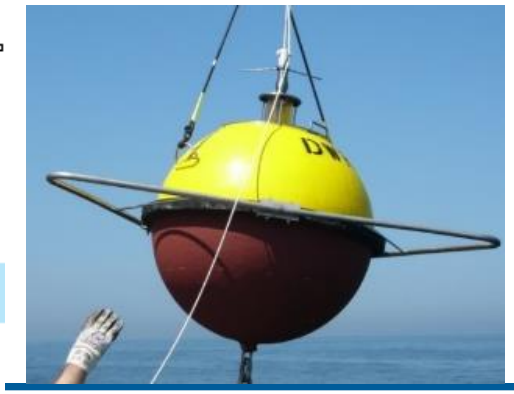


Measurements



Oceanographic measurements:

- up to 11 measurement depths (0–30 m depth)
- Parameter:
  - Sea state, water level
  - Current (as profiling measurement)
  - Water properties at various depths
  - (temperature, salinity, oxygen content, turbidity, fluorescence chlorophyll)



The FINO-DATA Collection

FINO1

Meteorology: iTUBS

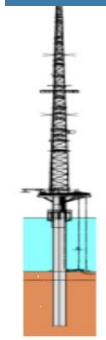
Oceanography: BSH

FINO3

Meteorology: DNV

Oceanography: BSH

FINO2



Meteorology: WIND-consult

Oceanography: Leibniz-Institut für Ostseeforschung Warnemünde (IOW), BSH

⇨ **Insida-Database:**
- Central archiving of metocean FINO data
- Central provision of data (real-time, delayed mode)

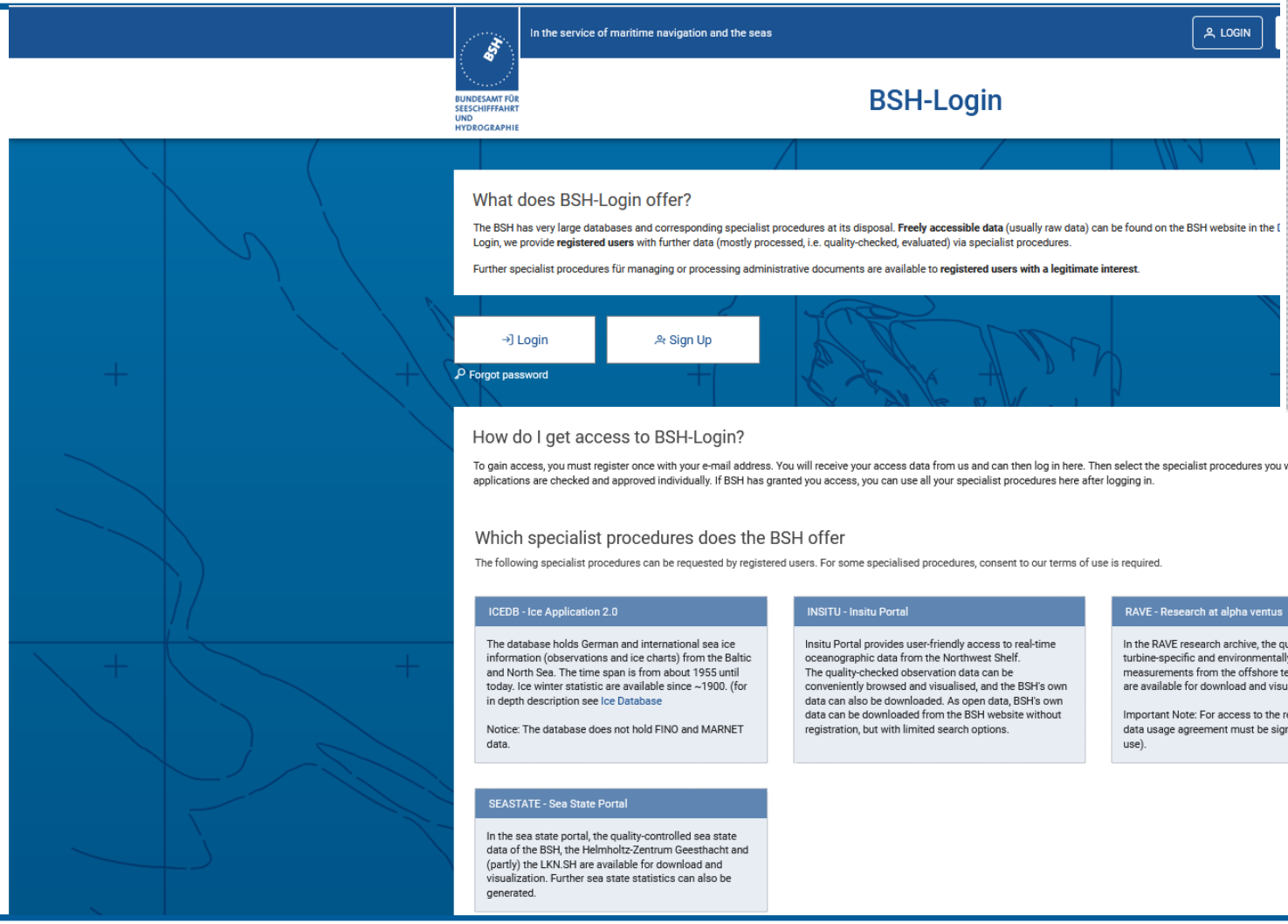
The Insida-Database

- Free access to metocean FINO data via the InSiTu-Portal and the SeaState Portal (https://login.bsh.de/fachverfahren/)
- Free access to metocean FINO data via Copernicus Marine Service (https://data.marine.copernicus.eu)

- Target group:
  - Offshore industry
  - Universities / research institutions
  - Authorities / Maritime sector (maritime transport, navy)

- Public access to a large, quality-controlled database with application-oriented representations and analyses

Access to the Insitu Data portal
https://login.bsh.de/fachverfahren/



INSITU - Insitu Portal

Insitu Portal provides user-friendly access to real-time oceanographic data from the Northwest Shelf.
The quality-checked observation data can be conveniently browsed and visualised, and the BSH's own data can also be downloaded. As open data, BSH's own data can be downloaded from the BSH website without registration, but with limited search options.

SEASTATE - Sea State Portal

In the sea state portal, the quality-controlled sea state data of the BSH, the Helmholtz-Zentrum Geesthacht and (partly) the LKN.SH are available for download and visualization. Further sea state statistics can also be generated.

Access to the Insitu Data portal
https://login.bsh.de/fachverfahren/

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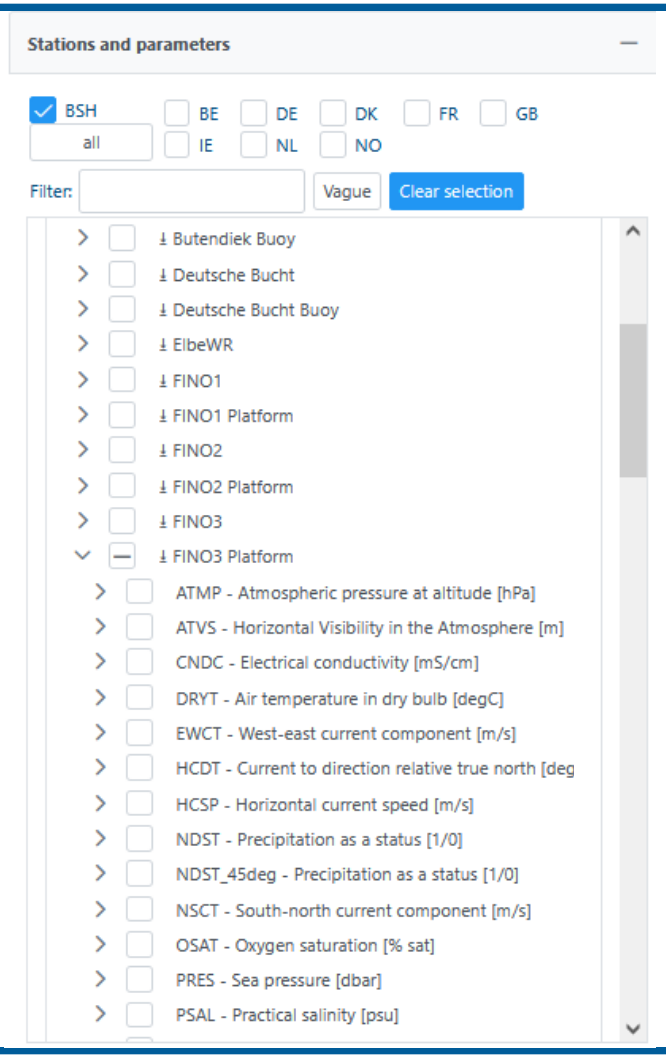
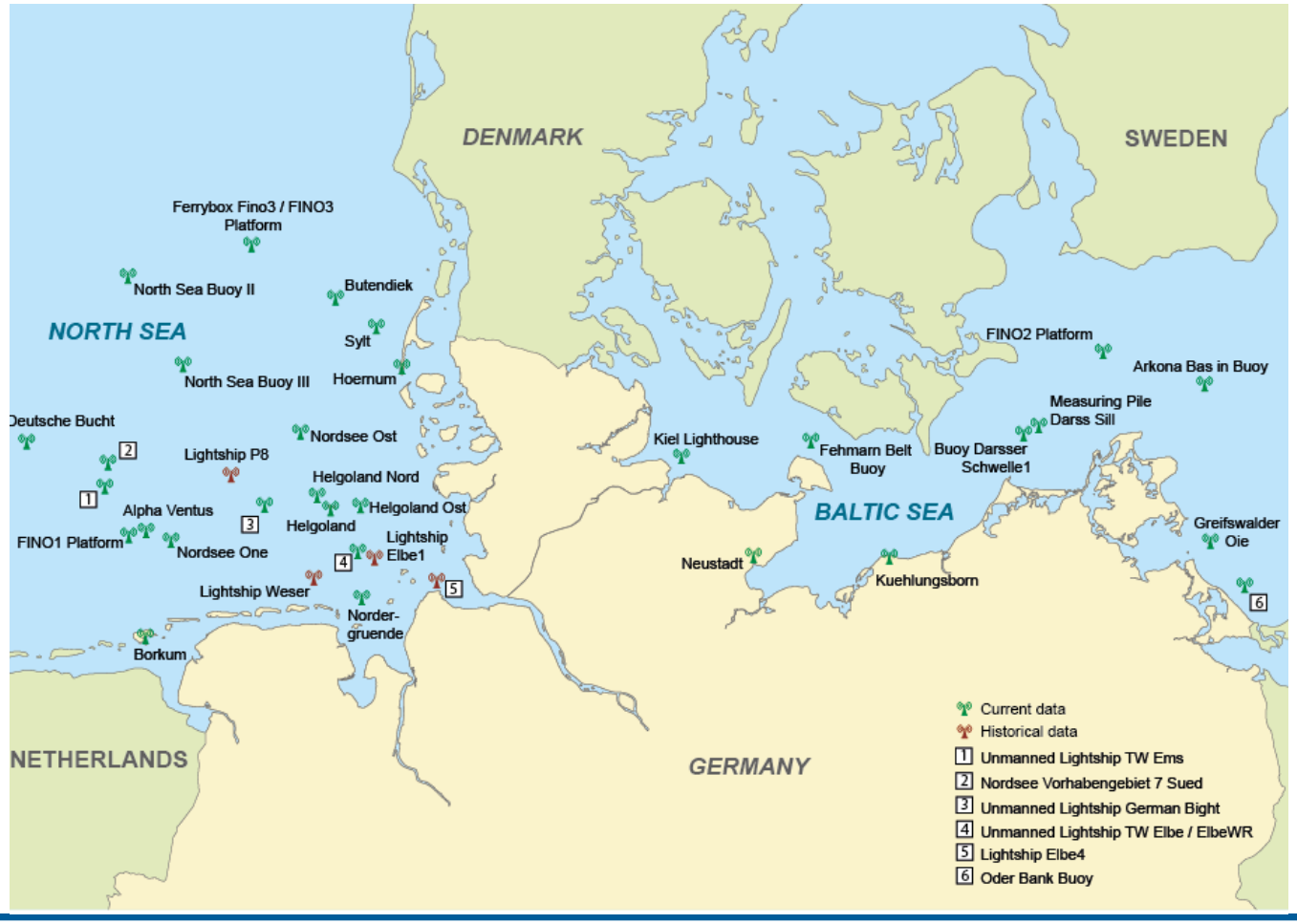




Access to the Insitu Data portal
https://login.bsh.de/fachverfahren/

BUNDESAMT FÜR SEESCHIFFFAHRT

Insitu | Download | Documents | Info | Usage tips

English | Logout

Stations and parameters

BSH | BE | DE | DK | FR | GB | all | IE | NL | NO

Filter: | Vague | Clear selection

- FINO3
- FINO3 Platform
  - ATMP - Atmospheric pressure at altitude [hPa]
  - ATVS - Horizontal Visibility in the Atmosphere [m]
  - CNDC - Electrical conductivity [mS/cm]
  - DRYT - Air temperature in dry bulb [degC]
  - EWCT - West-east current component [m/s]
  - HCDT - Current to direction relative true north [deg]
  - HCSP - Horizontal current speed [m/s]
  - NDST - Precipitation as a status [1/0]
  - NDST_45deg - Precipitation as a status [1/0]
  - NSCT - South-north current component [m/s]
  - OSAT - Oxygen saturation [% sat]
  - PRES - Sea pressure [dbar]
  - PSAL - Practical salinity [psu]
  - RELH - Relative humidity [%]
  - SIGT - Sea Water Sigma-T [kg/m**3]
  - SINC_180deg - Shortwave/solar incoming radiation [W/m**2]
  - SLEV_H1 - Average height over last 1 minute [m]
  - SLEV_H10 - Average height over last 10 minutes [m]
  - TEMP - Sea temperature [degC]
    - AWAC - Height: -25.0
    - MicroCAT - Height: -18.0

Queries

Start date: Oct 2025

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

End date: Oct 2025

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Plot

Plot measurements

Export

Format: NetCDF

Filename:

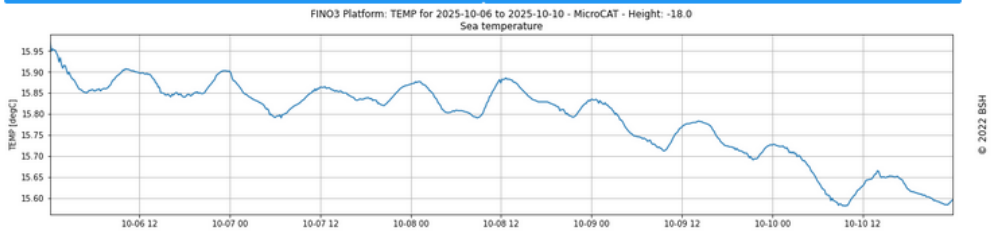
Email notification:

Request data

Hide all finished requests | Show all finished requests

Plot

Download of plot as PNG | Download of plot as SVG



Dataset

#long_name: Sea temperature			
#standard_name: sea_water_temperature			
#units: degC			
#TEMP_QC.MicroCAT.-18.0:			
#long_name: Sea temperature quality flag			
#conventions: Copernicus Marine In Situ reference table 2			
#_FillValue: -			
#valid_min: 0			
#valid_max: 9			
#flag_values: 0 1 2 3 4 5 6 7 8 9			
#flag_meanings: no_qc_performed good_data probably_good_data bad_data_			
#Time	TEMP.Micro	TEMP_QC.MicroCAT.-18.0 [WT_QC]	
06.10.2025 00:08	15,97	1	
06.10.2025 00:18	15,95	1	
06.10.2025 00:28	15,955	1	
06.10.2025 00:38	15,952	1	
06.10.2025 00:48	15,952	1	
06.10.2025 00:58	15,945	1	
06.10.2025 01:08	15,939	1	
06.10.2025 01:18	15,924	1	
06.10.2025 01:28	15,934	1	
06.10.2025 01:38	15,917	1	

- Dataformat: netcdf or csv
- Resolution: 10-min to hourly
- Data:
  - Time Stamp
  - Value
  - (Minimum)
  - (Maximum)
  - (standard deviation)
  - Qualityflag

FINO-Platforms: Why are the platforms so valuable?

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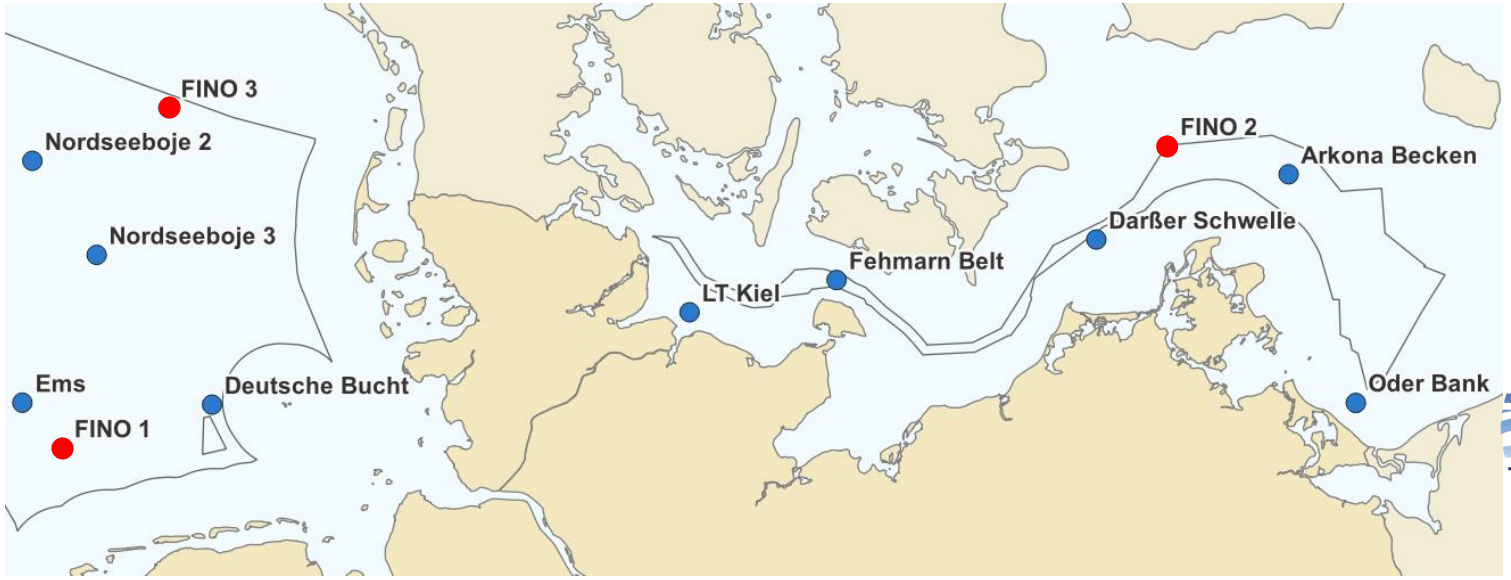
- **Built before the windfarms were constructed**
  → Already measuring over 20 years
- Part of the German federal MARNET monitoring system
- Part of the Global and European Ocean Observing System



Global Ocean Observing System

EuroGOOS
European Global Ocean Observing System

Applications of FINO-Data

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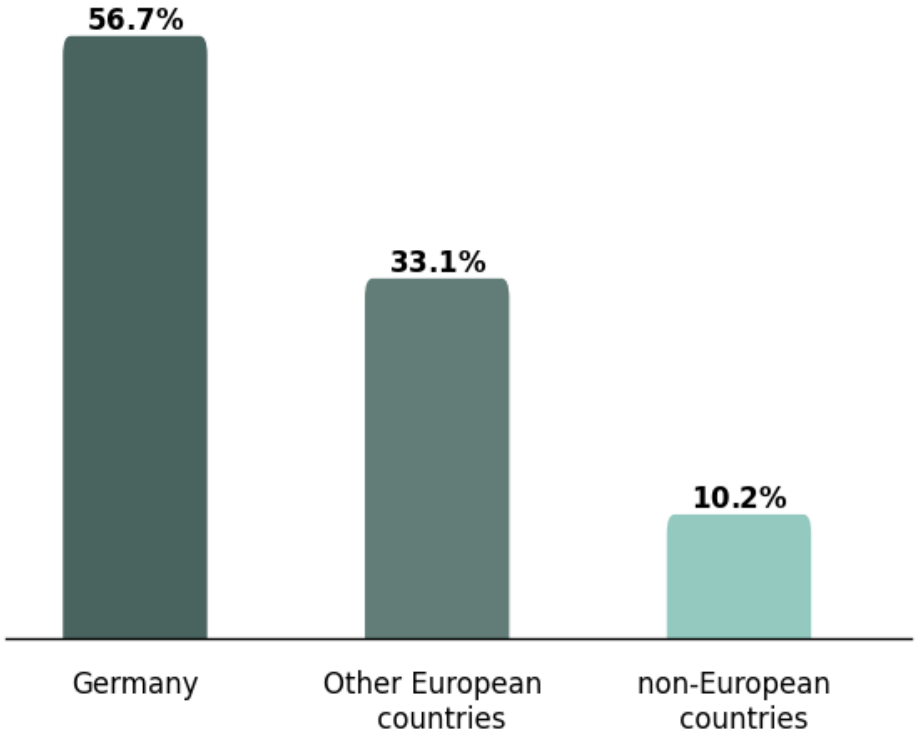
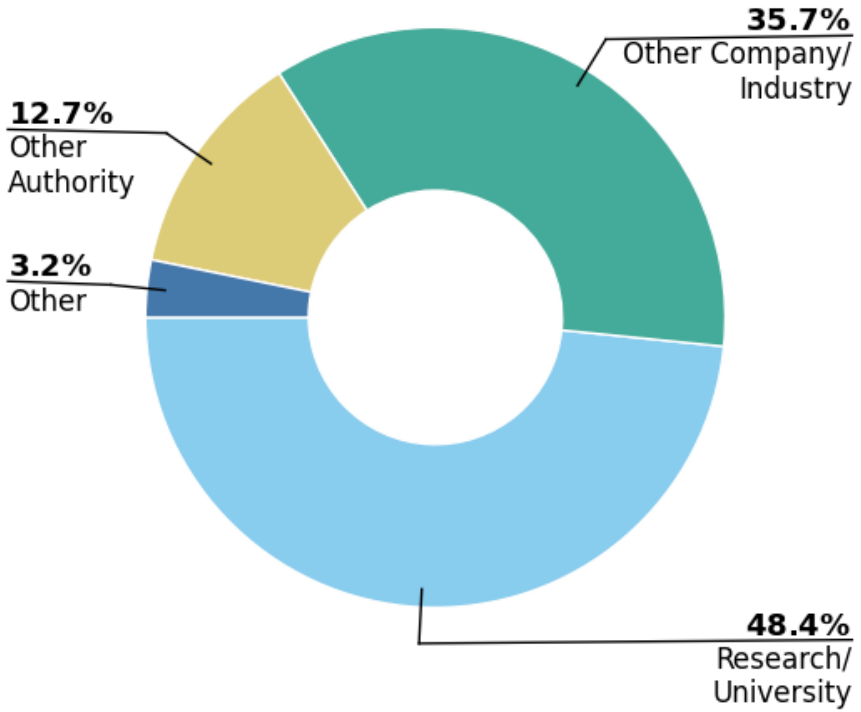
(a)

Registrations by region



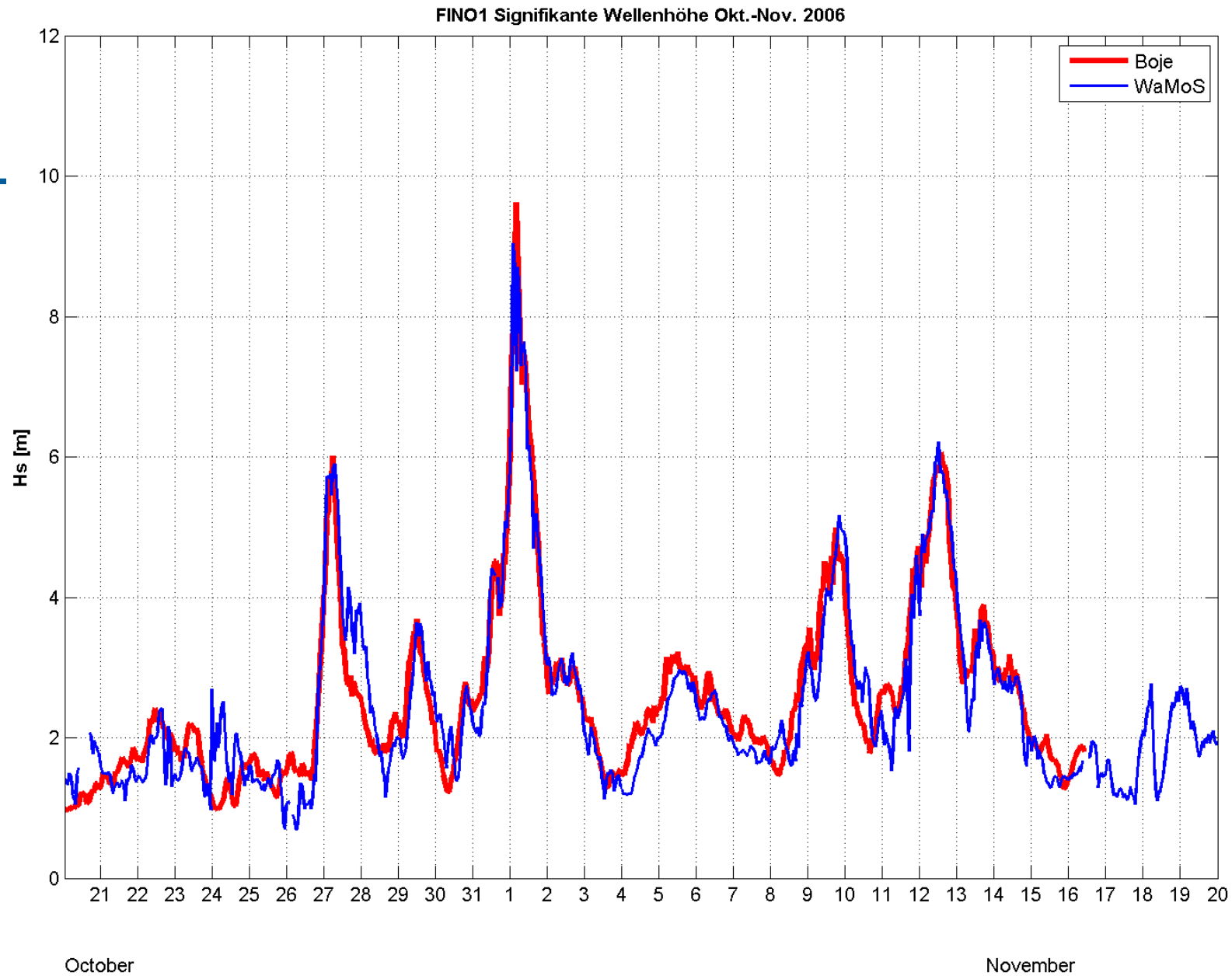
(b)

Registrations by professional affiliation



Applications of FINO-Data

- Basic information on local metocean conditions
- Real-time monitoring for offshore logistics
- Identification of extreme events
- Long-term observation of key metocean parameters
- Validation data for models
- Basis for load calculations


FINO1 Signifikante Wellenhöhe Okt.-Nov. 2006
Boje
WaMoS
Hs [m]
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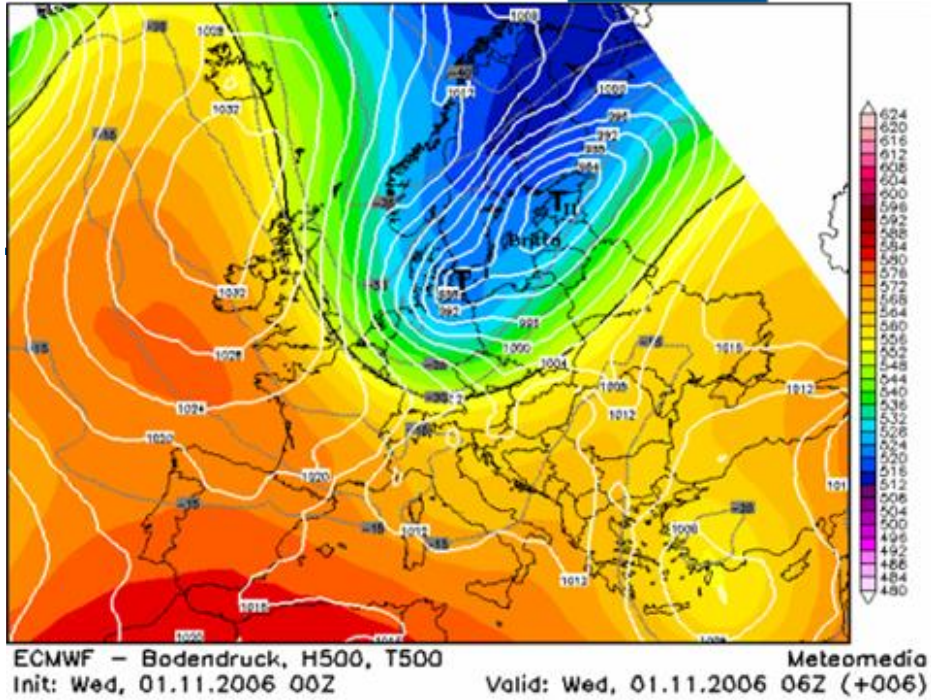
21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
October
November


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

Applications of FINO-Data: Extreme events

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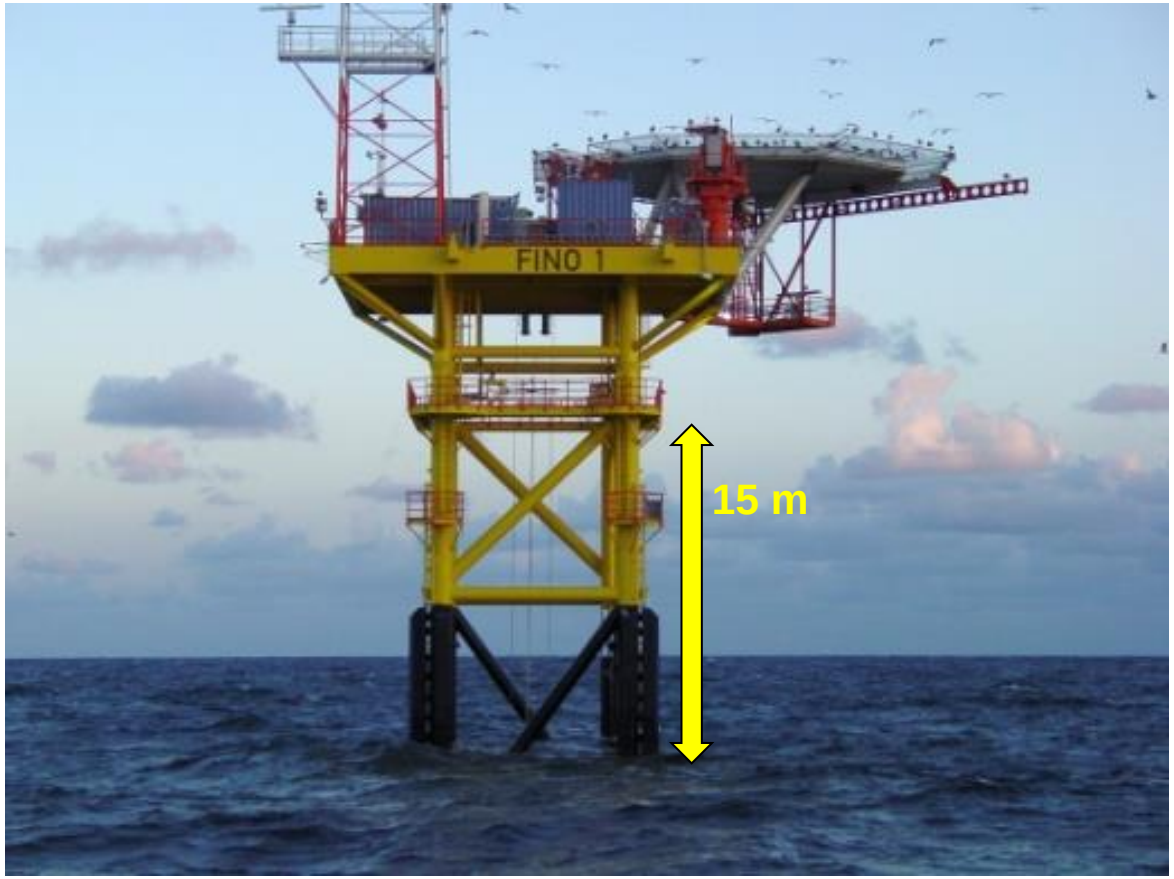
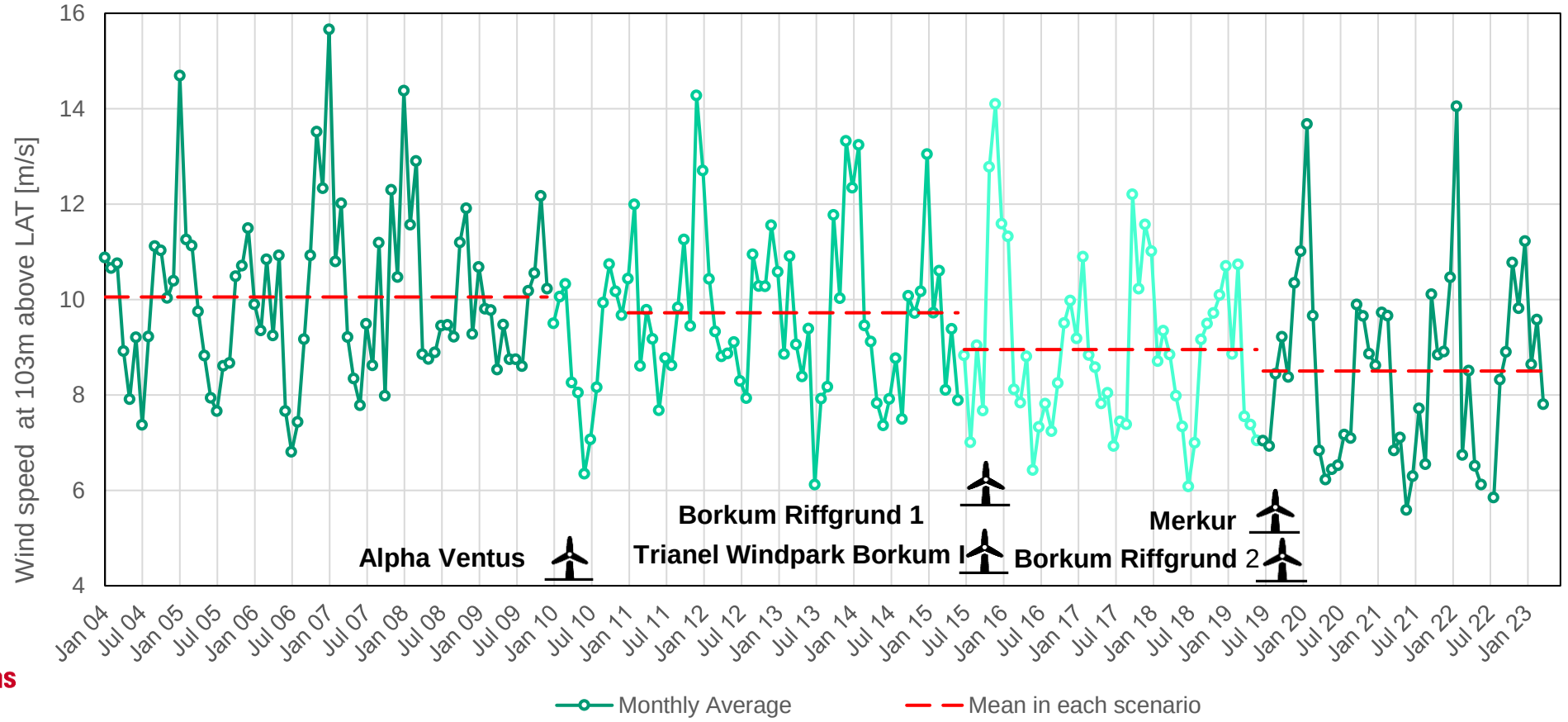


Applications of FINO-Data: Extreme events

Rogue waves affect the stability and service life of offshore facilities and measuring installations

Applications of FINO-Data: Longterm observations

Development of average wind speed, 103 m LAT, FINO 1



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https://lucillakrohn.limesurvey.net/541424?lang=de&newtest=Y

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