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# **MARNET**

## **Improving network measurements**

### **- Setbacks and success -**



# MARNET – improving network measurements



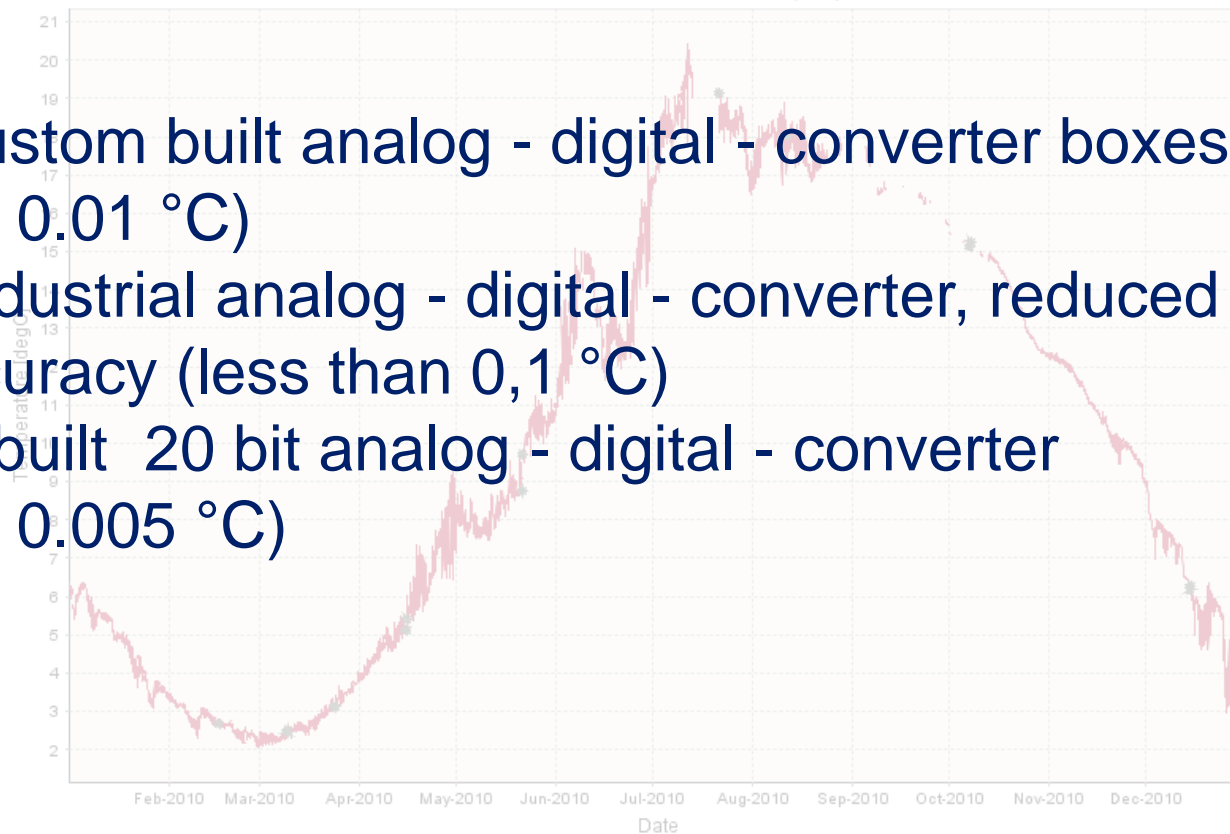
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## Temperature:

PT 100 sensor

Unmanned Lightship German Bight  
2010-01-01 00:00:00 - 2010-12-31 23:59:59 (UTC)

- custom built analog - digital - converter boxes ( $\pm 0.01$  °C)
- industrial analog - digital - converter, reduced accuracy (less than  $0,1$  °C)
- inbuilt 20 bit analog - digital - converter ( $\pm 0.005$  °C)



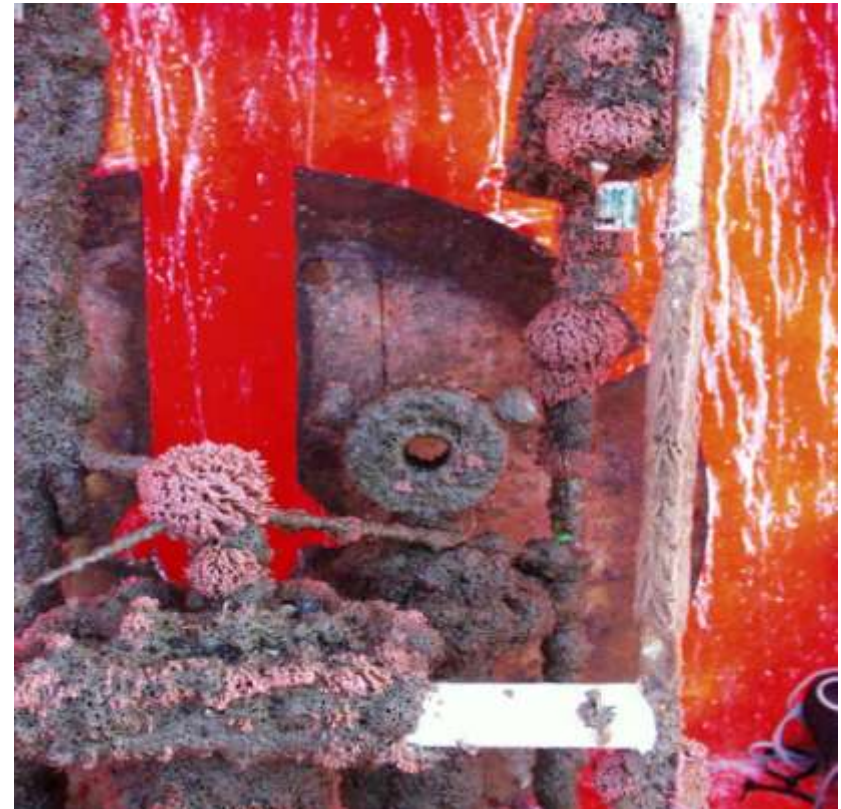
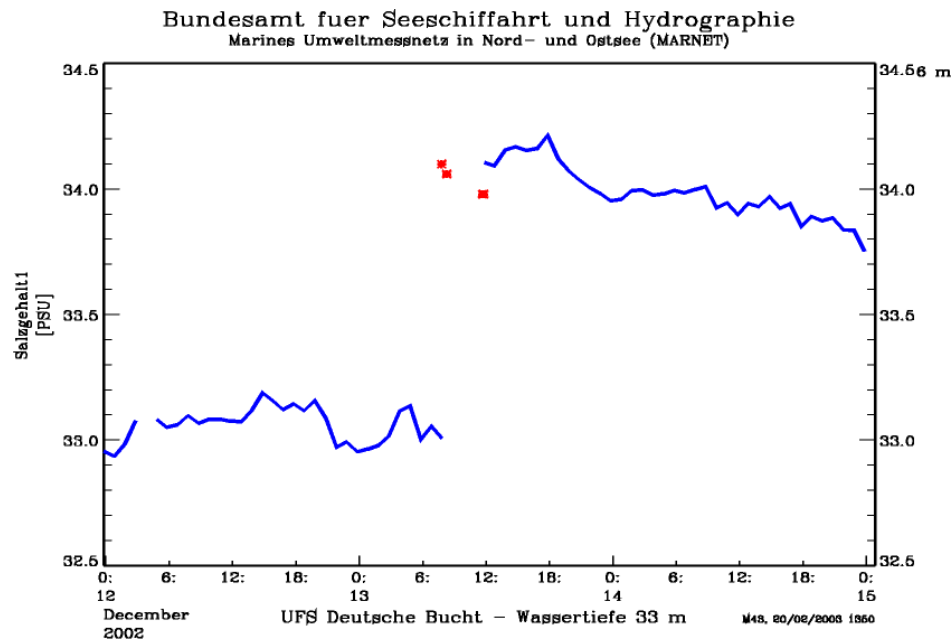
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## Salinity:

### Unprotected conductivity sensor



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**Salinity:**  
conductivity sensor, pumping system



Unmanned Lightship German Bight  
2011-01-01 00:00:00 - 2011-12-31 23:59:59 (UTC)

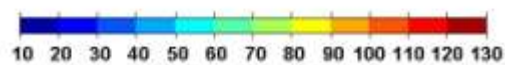
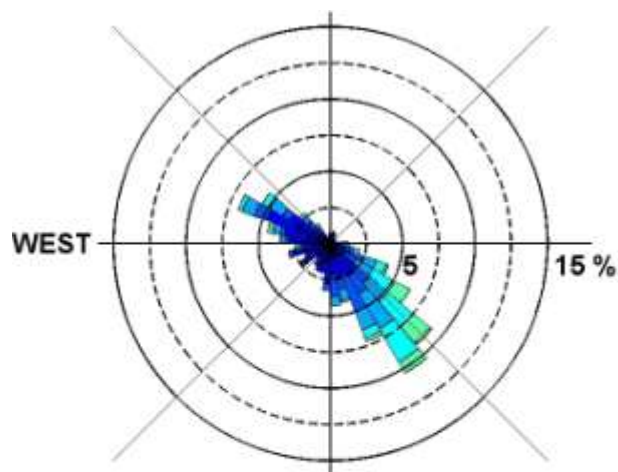


Unmanned Lightship German Bight  
2011-01-01 00:00:00 - 2011-12-31 23:59:59 (UTC)

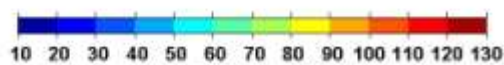
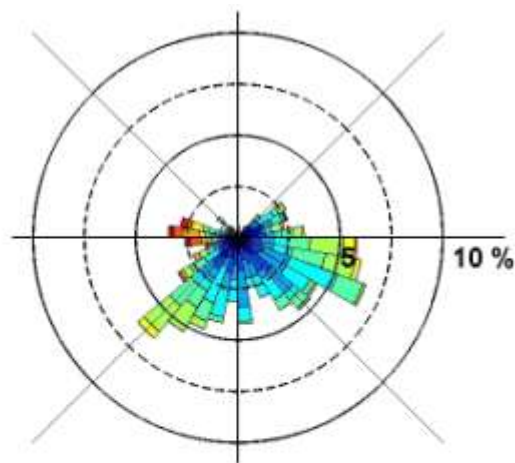


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Current:  
ADCP



Current Rose, FINO3  
Layer: Upper-Layer



Current Rose, FINO1  
Layer: Upper-Layer



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## Automatic chemical measurements and sampling:



**Nitrate+Nitrite, Phosphate,  
Silicate**



**Ammonium**

**PAHs, CHCs, PCBs,  
Pesticides**

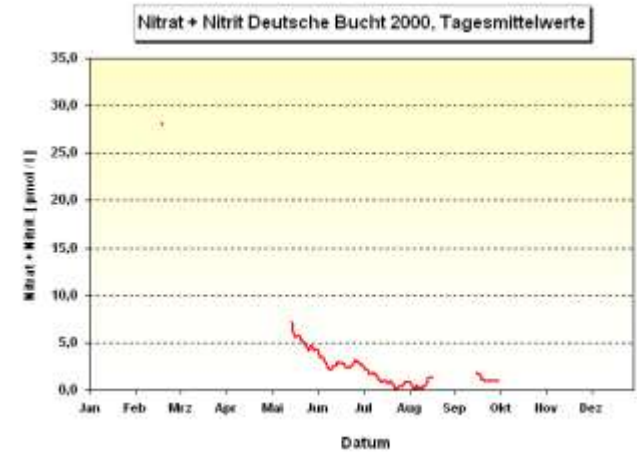


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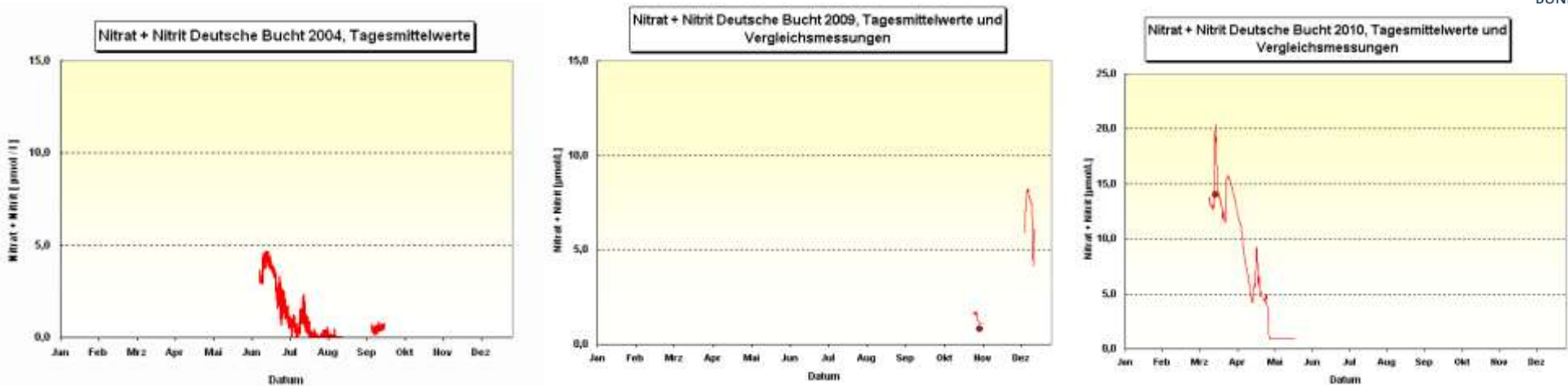
Nitrate/Nitrite [ $\mu\text{mol/l}$ ], 1998, 1999, 2000, 2001, 2002, 2003, daily mean values

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## Nitrate/Nitrite [ $\mu\text{mol/l}$ ], 2004, 2009, 2010, daily mean values

- 1998: 6 maintenance visits
- 1999: 9 maintenance visits
- 2000: 7 maintenance visits
- 2001: 11 maintenance visits
- 2002: 9 maintenance visits
- 2003: 9 maintenance visits
- 2004: 7 maintenance visits
- 2009: 7 maintenance visits
- 2010: 9 maintenance visits



## Automatic water sampler:



Automatic Water Sampling device

- only 6 probes
- external timing impossible
- not applicable because of weight (app. 50 kg)