Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Methane distribution at high spatial resolution in North Sea estuaries

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MOSES
Modular Observation Solutions for Earth Systems

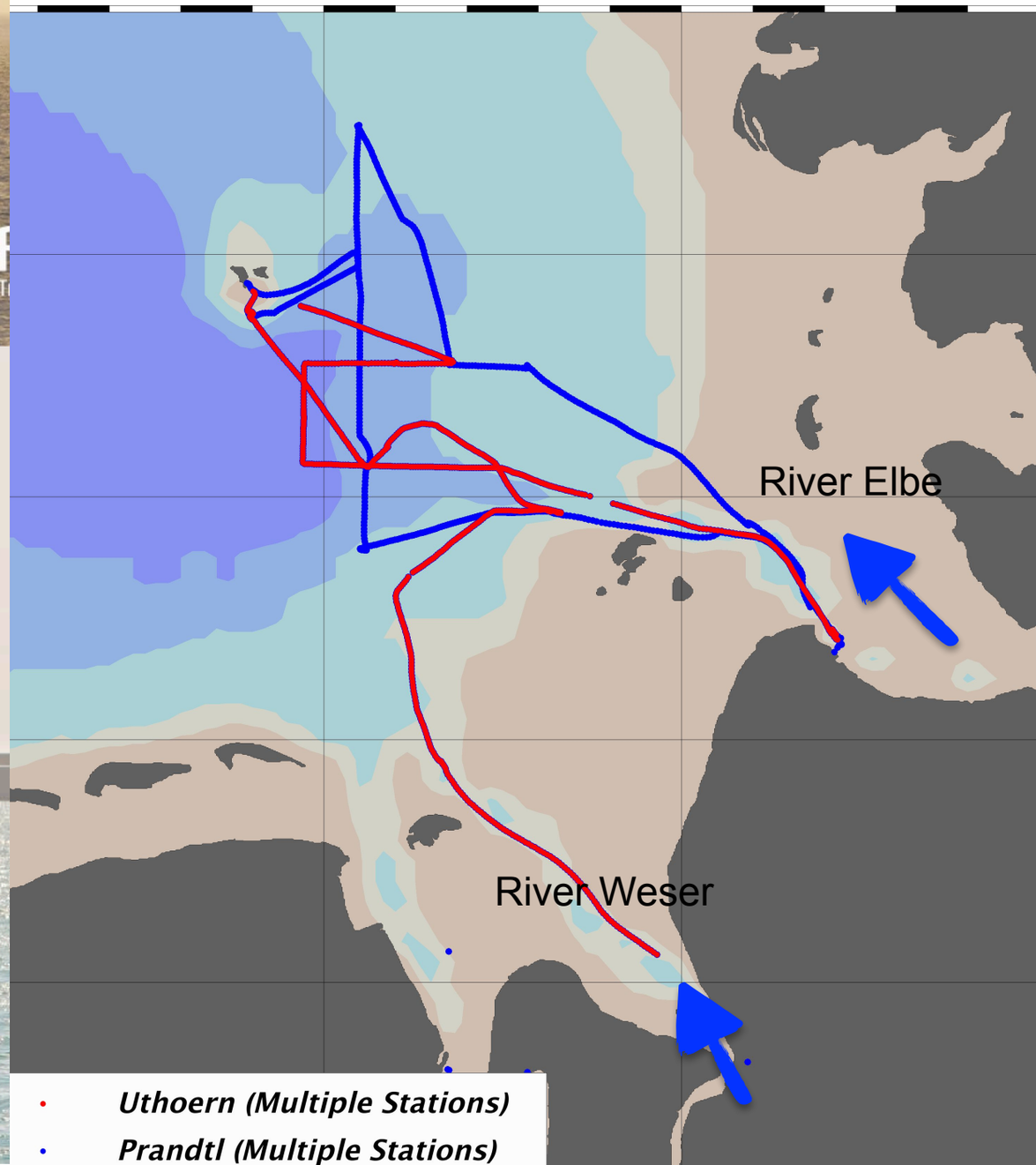
Modular Observation Solutions for Earth Systems

Two Research vessels

Ludwig Prandtl

Uthörn

On 25 and 26 June 2019



Material & Methods

Modular Observation Solutions for Earth Systems

- Continuous, underway measurements
  - Running water from board water pump
  - Hydrographic parameters with FerryBox
- Methane:
  - Gas extraction from water with a degassing unit
  - Gas analysis with cavity ring down spectroscopy
  - Determination of delay time(s)
  - Calibration with water samples analyzed with head space and GC
- **Intercalibration between ships !!**

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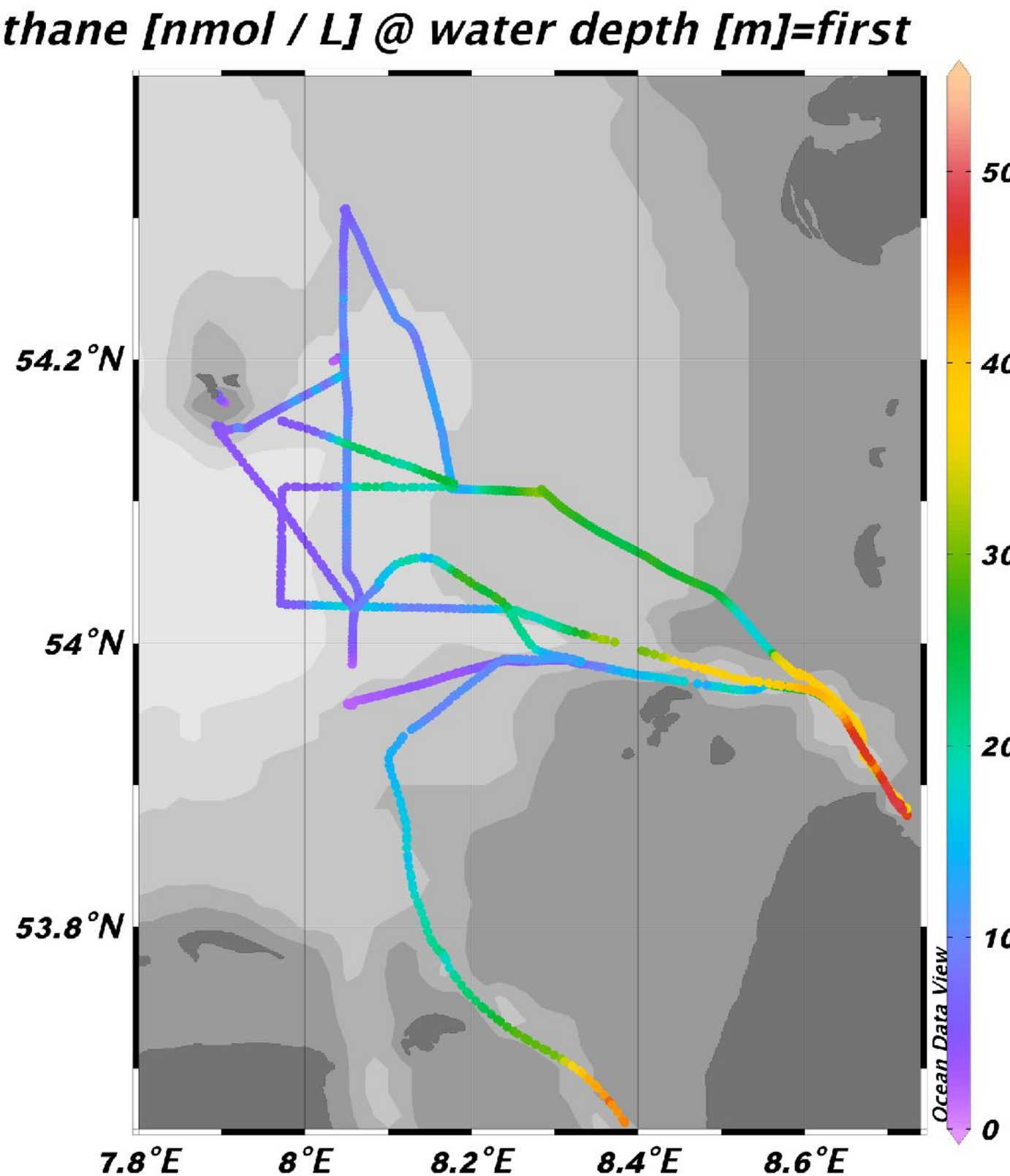
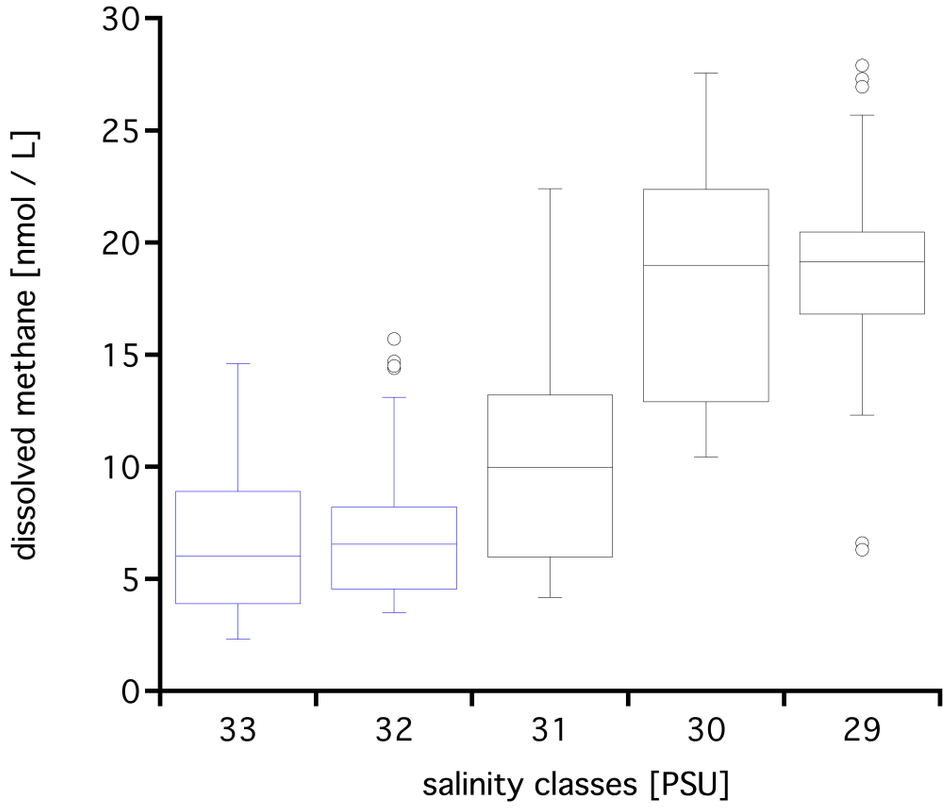
Overall Methane distribution in surface waters

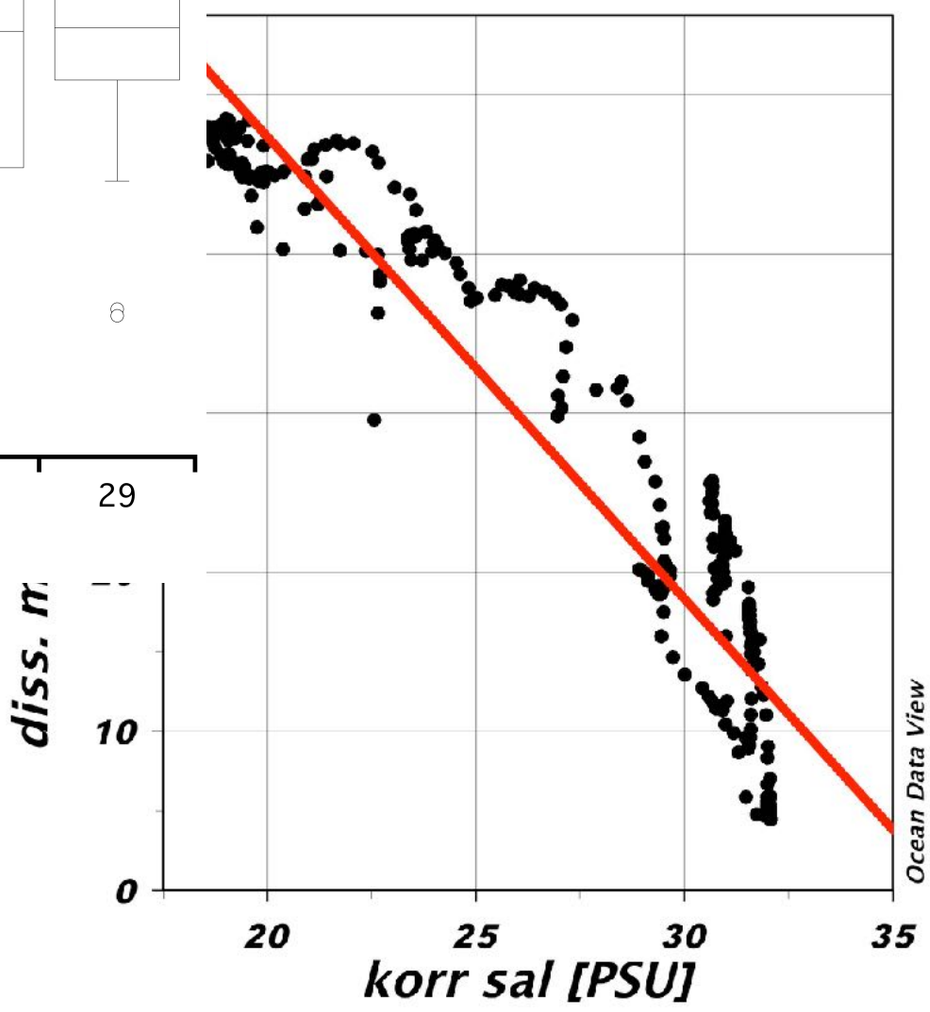


Dilution of river water with marine end member

Marine end member at S > 32 with 6.5 nM



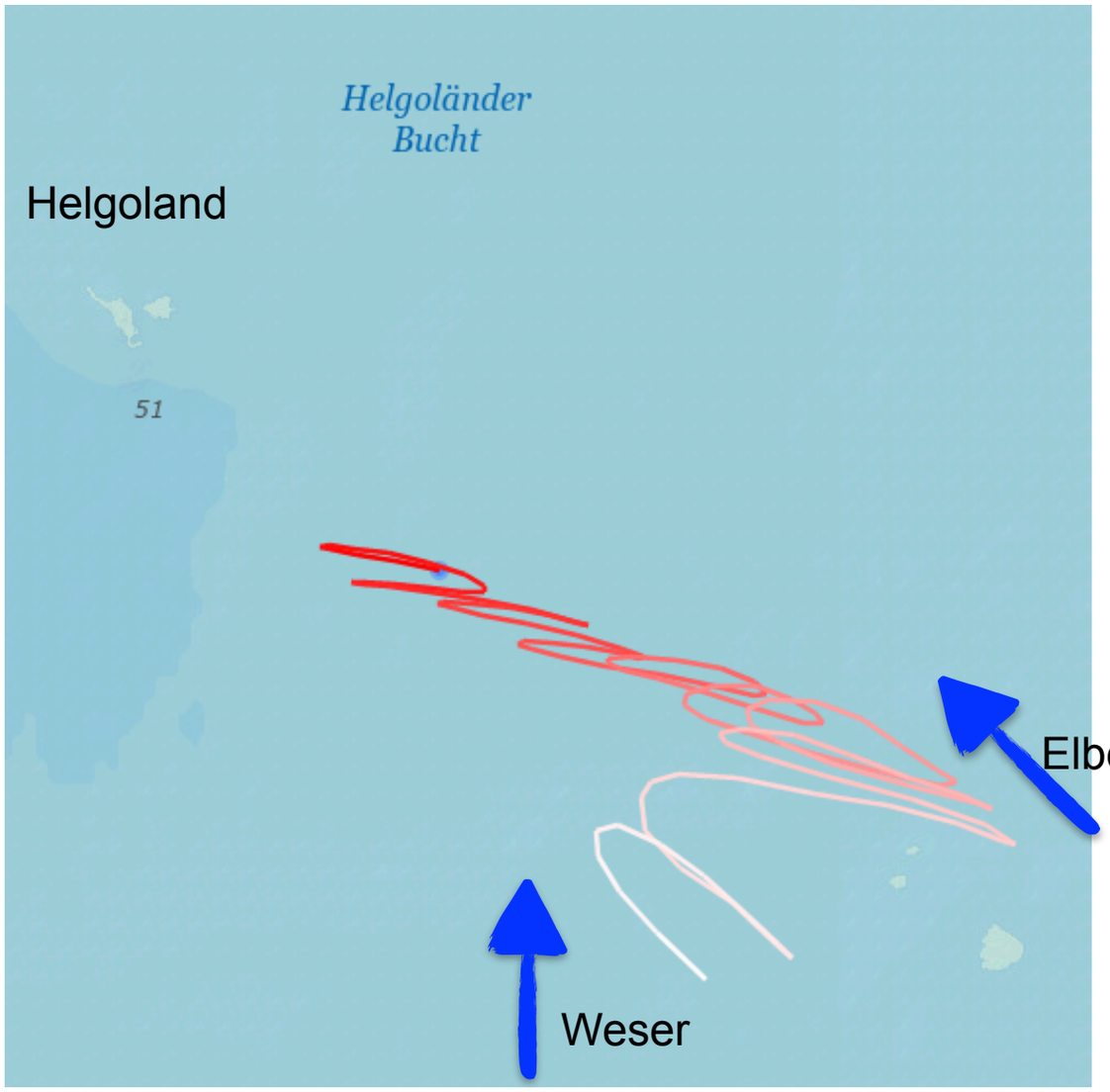
Dilution of Elbe river water with 105 nM



Dilution of Weser river water with 152 nM

Back-tracking of water masses

- https://www.hzg.de/drift-now
- Part of the water off Helgoland originated from the river „Weser“ not only from the river „Elbe“



Conclusions

Modular Observation Solutions for Earth Systems

- New techniques to measure CH_4 continuously and at longer time scales => new patterns
- Combination of data matrixes allows to model and explain the observed patters
- Challenges: data management and comparability between sensors

Thank you for your attention !

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