Measuring dissolved gases (CO$_2$ and CH$_4$) with the HydroC™ in flow-through applications and on other platforms – Past measurements and future advancements

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Geesthacht, 1.9.2011
Outline

- Motivation & Fields of Application
- Connection between platforms and sensors: Platforms & Sensor integration
- Sensor design & Measuring principle
- Calibration
- Example data
- Summary & Outlook

Courtesy of Björn Fiedler, IFM-GEOMAR

Peer Fietzek, p.fietzek@contros.eu, Geesthacht, 1.9.2011
Versatility

Underwater
• Protection Cap
• Flow-Head
• Underwater - Flow-through

Surface
• Flow-through

financed by the European Union, European Regional Development Fund (ERDF)
Flow-through options

- Flow-through stand alone

Courtsey of Björn Fiedler, IFM-GEOMAR
Flow-through options

- Integration into a flow-through system

Courtesy of 4h-Jena-Engineering
Measuring Principle - HydroC™

1. Dissolved gasses and water vapor pass hydrophobic membrane
   ➔ Equilibration

2. Gas concentration measured by non-dispersive infrared spectrometry (NDIR) within a gas circuit; Zeroing included (for CO₂)

3. Internal datalogger saves xCO₂ along with T, p and rH (microcontroller and AD-converter); RS 232 – serial connection
Example data – ACT-Test Seattle

Source: Alliance for Coastal Technology, Performance Demonstration Statement – CONTROS HydroC™/CO₂, www.act-us.info
HZG-FB – Tor Dania – Cuxhaven-Immingham

- HydroC™-FT intergated into the FB’s on the roll-on/roll-off ship *TorDania* and on the cargo ship *LysBris*

Source: http://www.coastalwiki.org/coastalwiki/FerryBox_-_Continuous_and_automatic_water_quality_observations_along_transects

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Summary and outlook

• $p\text{CO}_2$ and $c\text{CH}_4$ are parameters of increasing interest that are monitored within multiple applications and on various platforms.

HydroC’s:

• Reliability proven during many missions and on various platforms
  – More than one year of continuous data of HydroC™-FTs in FB’s
  – Usage of acid as an anti fouling mean proved a positive effect $\rightarrow$ pH change influence

• Individually in-situ calibrated, fast and including drift correction means

• Continue with data analysis and processing optimization

• New version of the underwater sensor released in October; FT will follow:
  – Smaller, faster, programmable sleep-mode, ...
Thank you!

Any questions?

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