# Autonomous measurements of coastal turbidity using glider mounted ADCP

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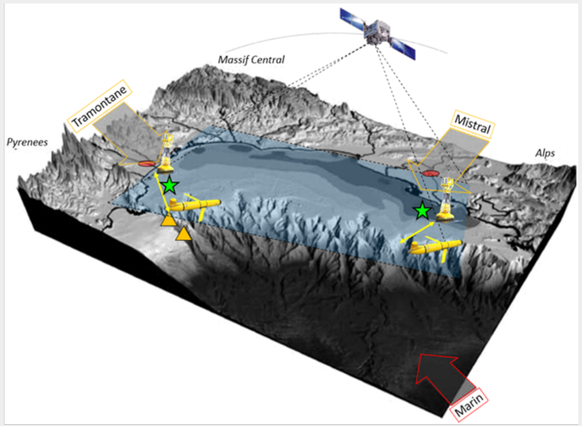
## MATUGLI project (ANR ASTRID)

Coastal particles characteristics and dynamics in the Gulf of Lions during severe meteorological events

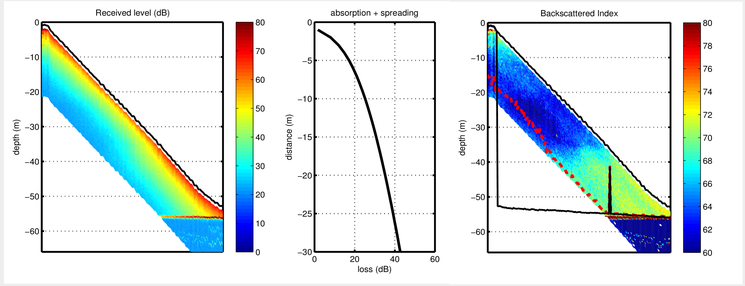



Multiplatform approach using acoustics and optical instruments:
- Instrumented sites POEM and MESURHO
- Recurrent ship cruises surveys
- Benefits of a glider mounted measurement
  → low cost / long term monitoring, high spatial resolution

http://cefrem.univ-perp.fr/index.php/programme/programme-en-cours/matugli

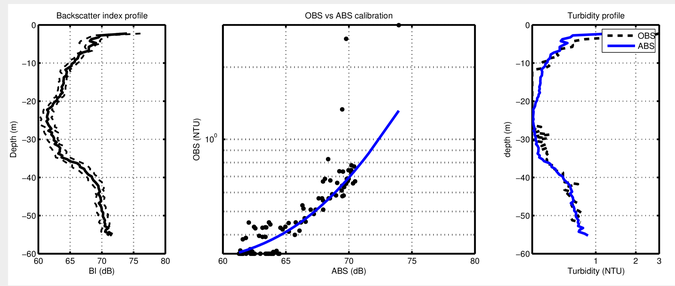
## Turbidity profile from moving ADCP measurement

PLUMRHO 2015 experiment. Ship based measurements from Lowered ADCP + OBS




**Backscatter Index estimation:**
From transducer's received level (RL)
Empirical correlation threshold applied (---)
Spherical spreading and seawater absorption loss correction
Gostiaux & Van Haren 2010

$$BI = 10\log\left(10^{\frac{Kc \times RL}{10}} - 10^{\frac{Kc \times Er}{10}}\right) + TL_w + TL_g + cst$$




**Acoustic vs optical calibration:**
OBS-3+ Turbidity sensor (850nm) used to calibrate BI

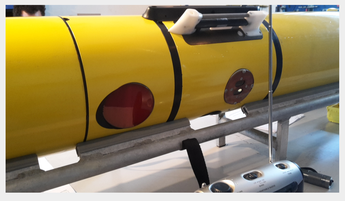
$$NTU = 10^{\alpha . BI + \beta} + \gamma$$

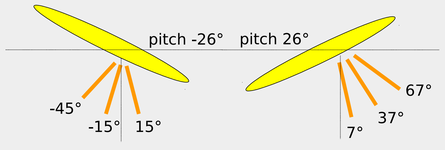
Construction of a complete hybrid turbidity profile; from the surface to the bottom.

**Future:**
- Comparison between Optical and Acoustic sensors
  → Real time cross calibration
  → Construction of a full profile (surface to bottom)
  → Particles characterization (concentration, size and nature)
- Bottom track for flight model / dead reckoning improvements
- Current profiling

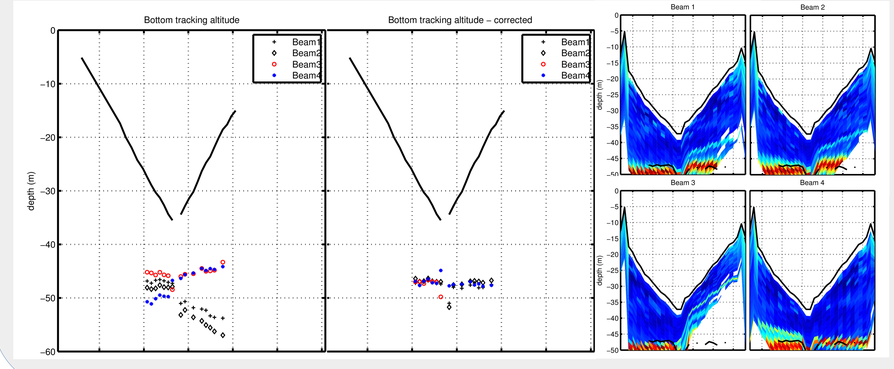
## EXPOEM experiment: 1st deployment of Teledyne Acoustic glider

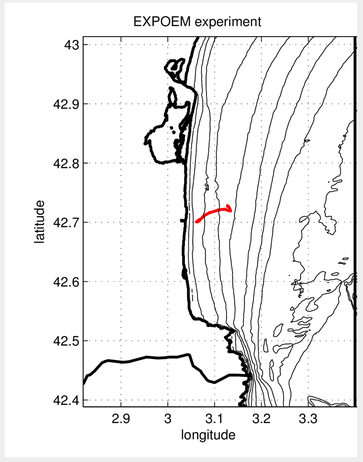
Slocum G2 glider
Teledyne-RDI EXPDVL 600 kHz
4 beams. Beams 3 at 0°
Mounted to point 11° forward






Typical flight angle ±26°
Pitch & roll correction
Beam evaluation

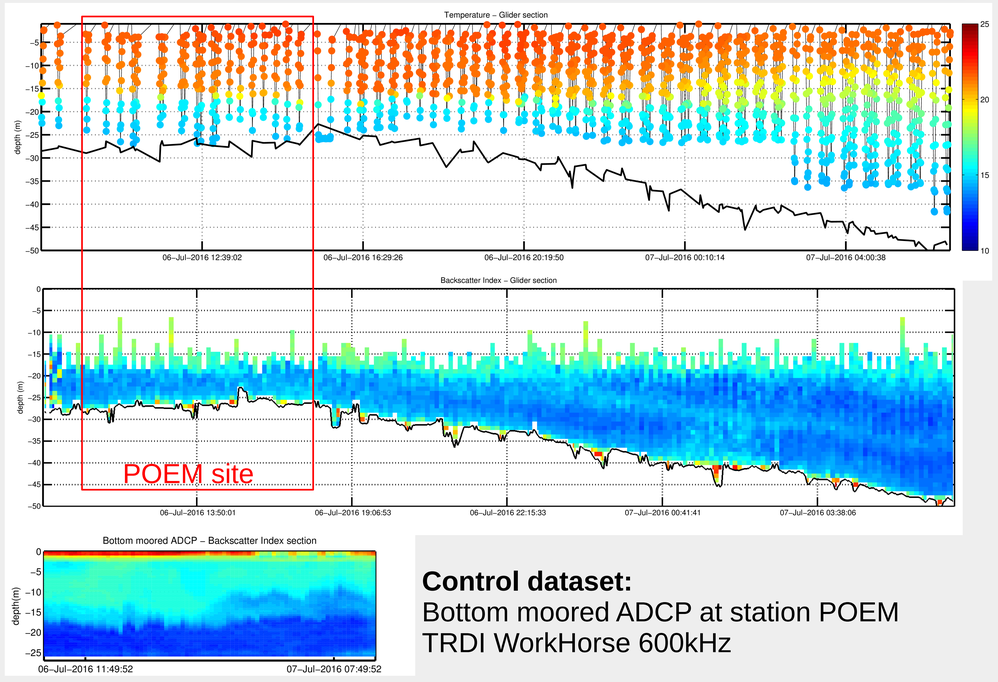



From POEM instrumented site towards the edge of the shelf.

24h / 15km long mission.

Validation and debug of EXP DVL configuration, glider operation, power consumption.




**Control dataset:**
Bottom moored ADCP at station POEM
TRDI WorkHorse 600kHz