The German Instrument Pool for Amphibian Seismology (DEPAS)

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2017 European OBS technical workshop

HELMHOLTZ GEMEINSCHAFT

DEPAS: **De**utscher Geräte**p**ool für **a**mphibische **S**eismologie

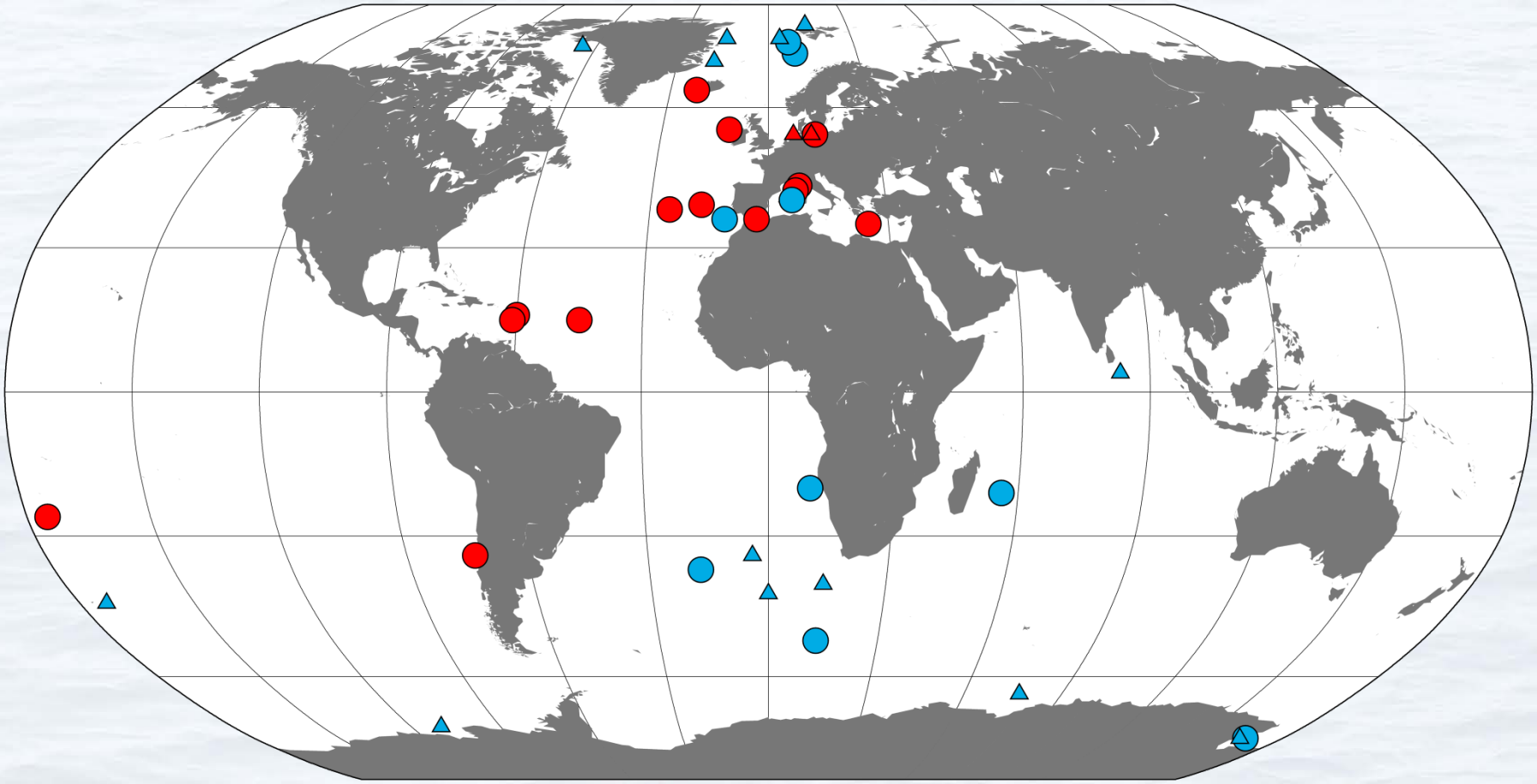
- Founded 2005
- GFZ Potsdam: approx. 100 onshore stations
- AWI: approx. 80 ocean-bottom seismometers
- Manufacturer: K.U.M. Umwelt- und Meerestechnik, Kiel
- Staff: 1 scientist, 1 engineer, student assistants
- Large-scale facility for German researchers
- Scientists from German universities or research institutes can apply for the use of instruments
- Evaluation by external steering committee

(GFZ/AWI/Wikipedia)

DEPAS OBS pool 2006 - 2017:

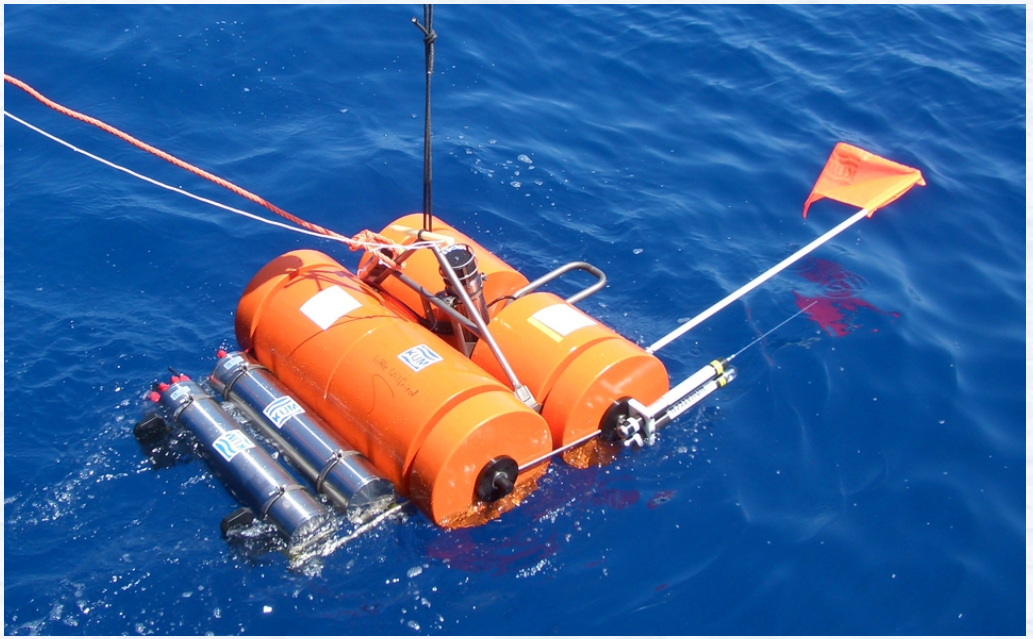
- 39 projects: 19 AWI PI , 3 AWI partner, 17 external projects

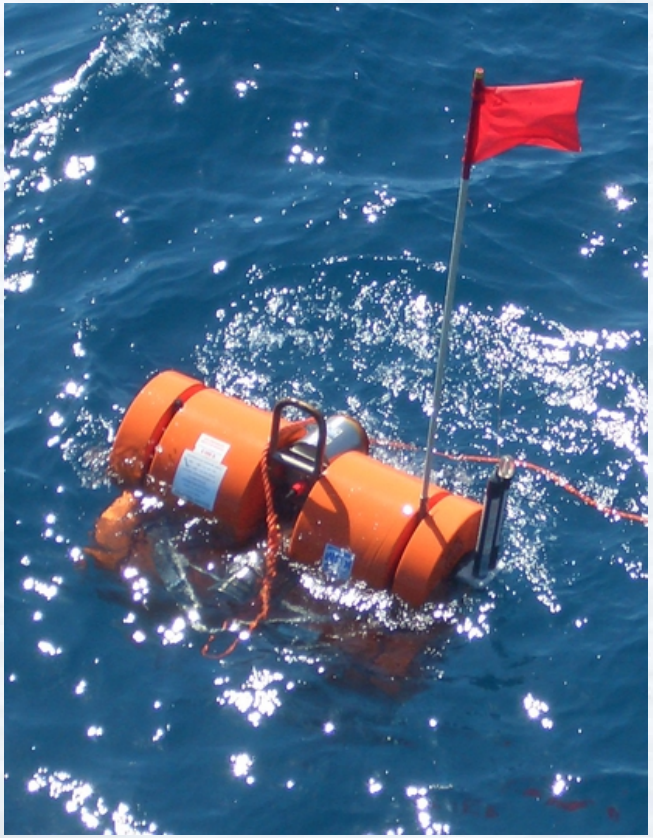
- 721 OBS deployments: 324 long-term and 396 short-term (< 1 month)



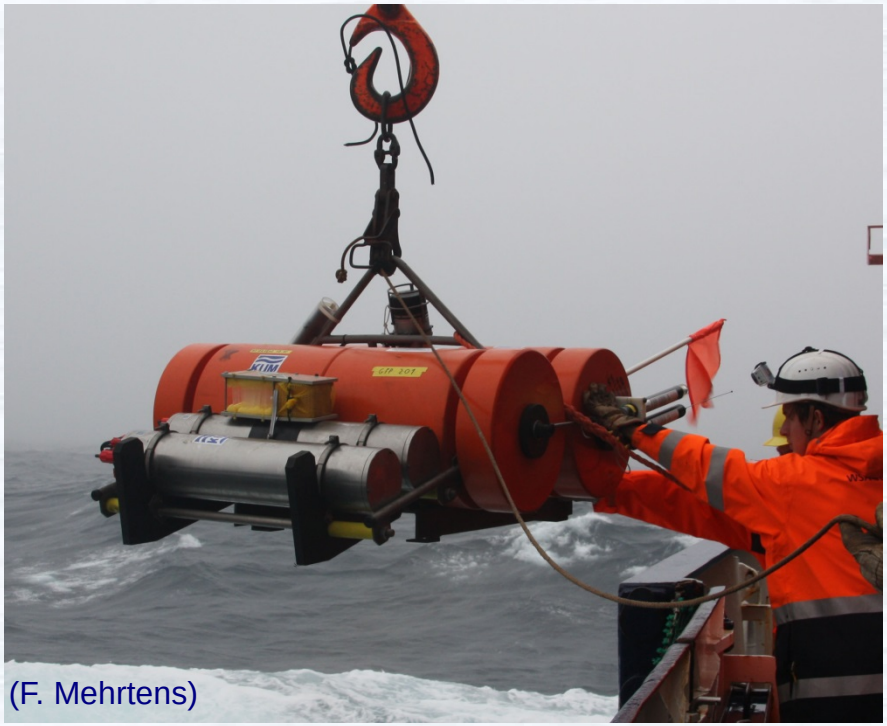
"Lobster" (6000 / 7300 m depth):

- Frame and tubes: titanium alloy
- Floatation: syntactic foam
- Size: 165 x 130 x 72 cm
- Weight: approx. 400 kg (incl. anchor)





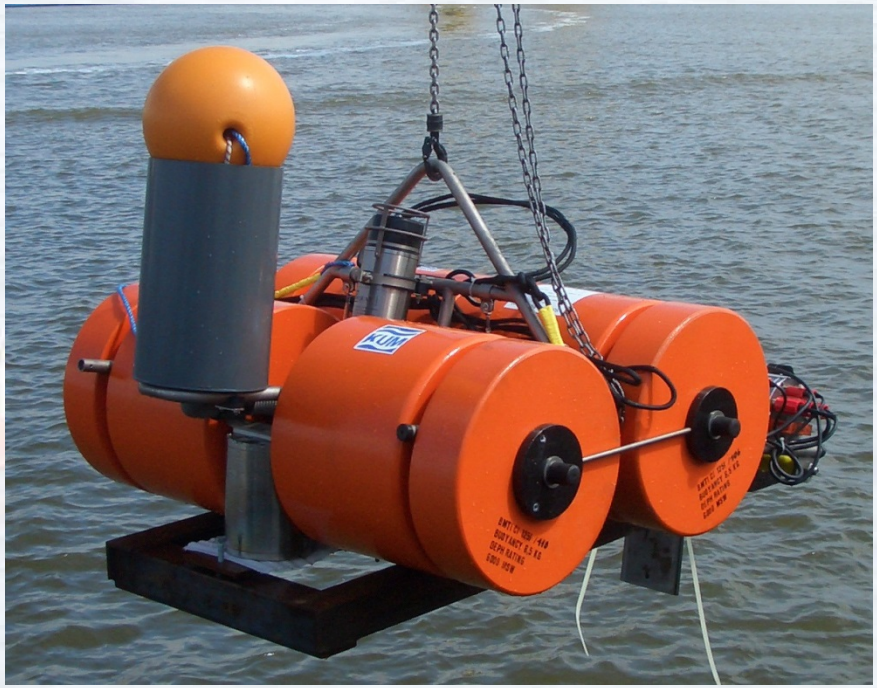
- Seismometer: Güralp CMG-40T (60 s, ~ 100 mW)
  Trillium Compact (120 s, ~ 180 mW)
- Hydrophone: HTI-04-PCA/ULF (8 kHz - 100 s)
- Data logger: Send MCS (24 bit, ~ 520 mW)
  KUM 6D6 (32 bit, ~ 125 mW)



(F. Mehrtens)

Piggy-back experiments:

- Autonomous systems
- E.g. biological colonisation experiments
- Up to 5 kg additional weight without modification possible



Special deployment areas:

- E.g. North Sea or inland lakes
- Disposal of anchor weights not allowed
- Solution: pop-up buoys with recovery rope
- Maximum deployment depth: 80 m

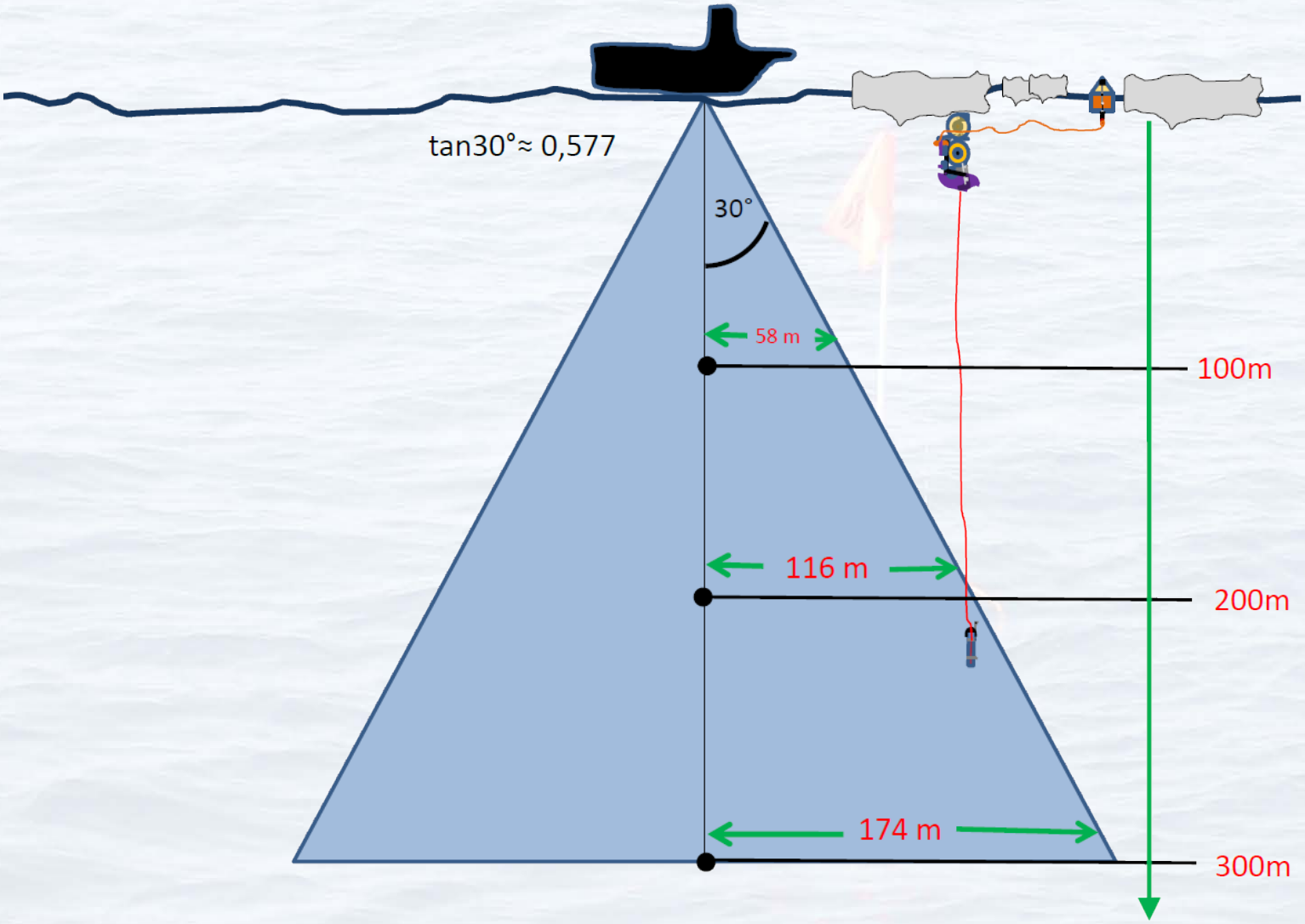
Ongoing development

OBS deployments in ice-covered areas:

- OBS rising velocity approx. 1.2 m/s → rising time up to 1.5 h
- OBS drift during descent and ascent → exact recovery position unknown
- Drifting ice floes → OBS may stuck beneath ice floes
- Dense ice coverage → difficulties to spot / grab OBS

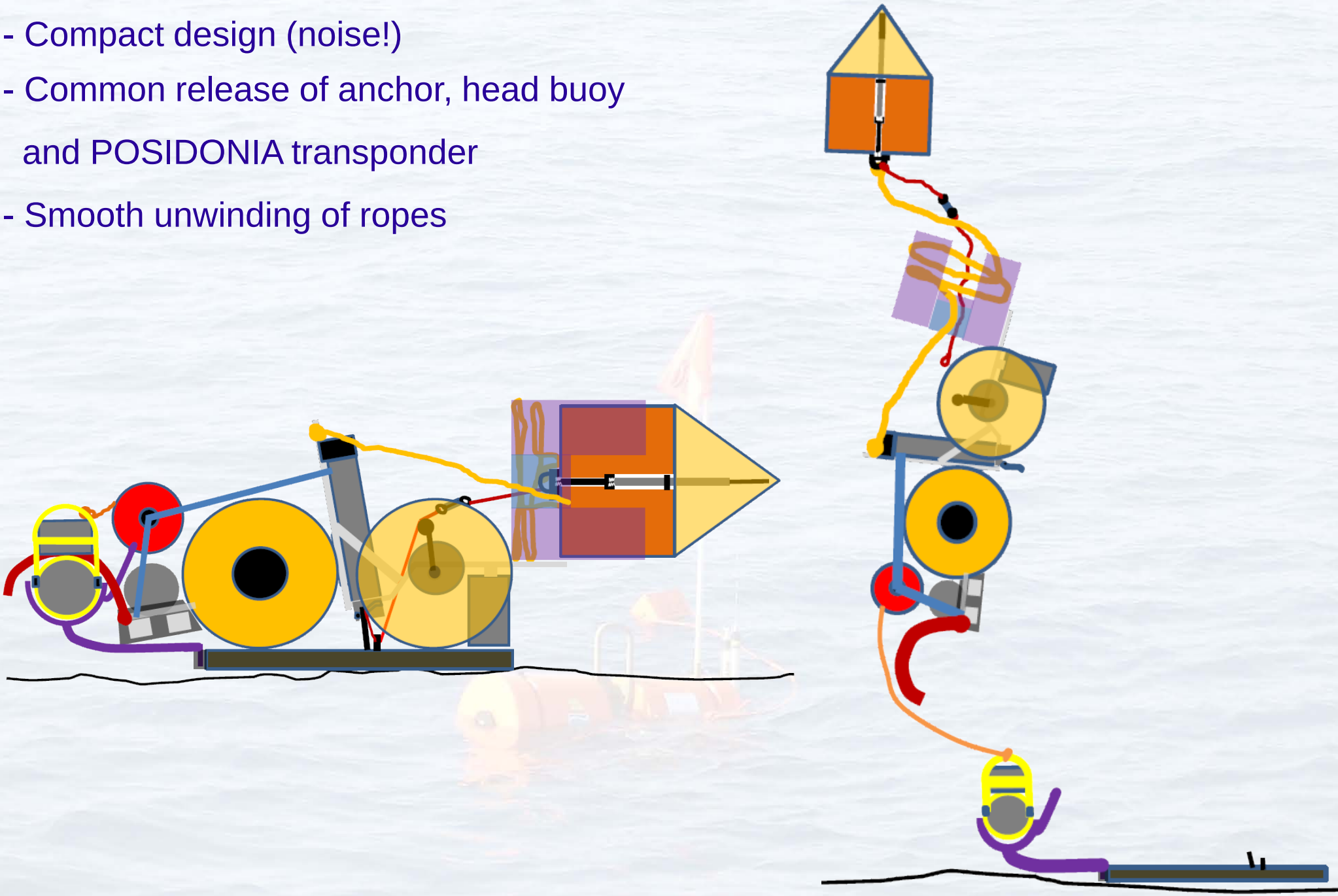
Ongoing development

- Exact position on sea floor / at surface unknown → POSIDONIA transponder
- OBS may stuck beneath ice floes → large solid head buoy
- Difficulties to spot / grab OBS → large head buoy with VHF radio beacon inside

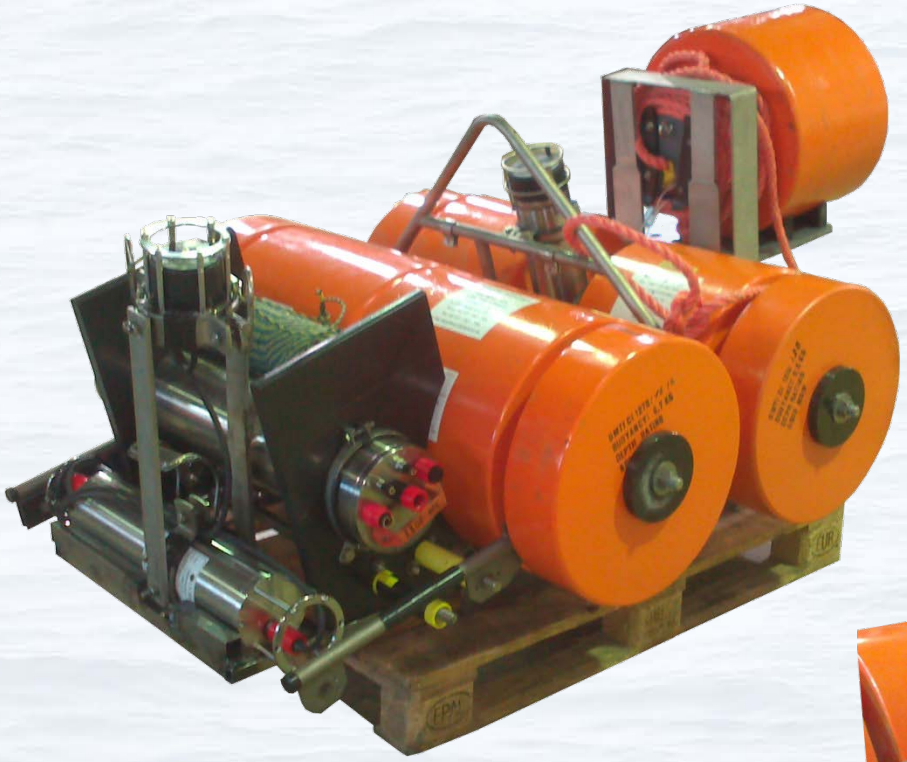


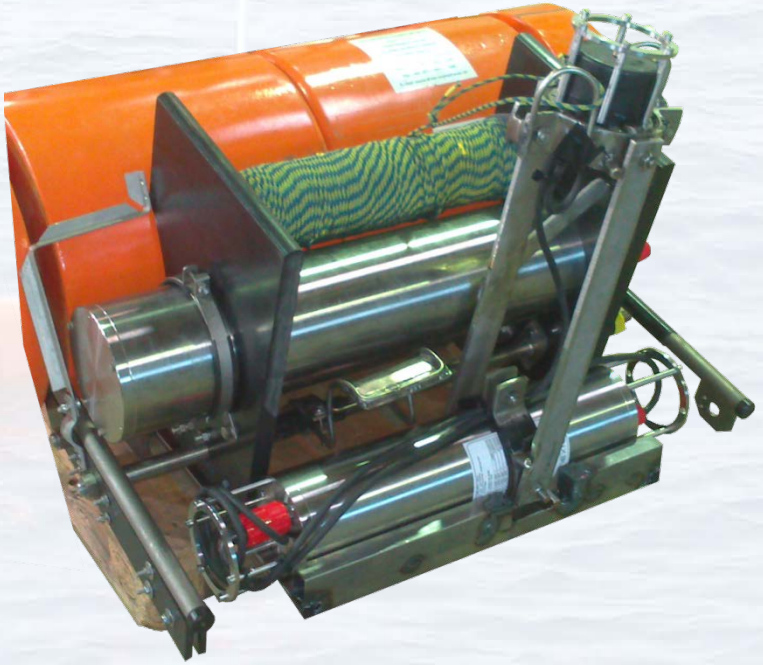
Ongoing development

- Compact design (noise!)
- Common release of anchor, head buoy and POSIDONIA transponder
- Smooth unwinding of ropes



Ongoing development





Outlook

Recent recoveries:

- Ross Sea, 12 DEPAS, active source
- Lesser Antilles, 24 DEPAS + 10 OBSIP, long-term and active source
- Sri Lanka, 14 DEPAS + 20 GEOMAR, active source
- Knipovich Ridge, 23+4 DEPAS + 6 Poland, long-term and active source

Ongoing project:

- AlpArray, 12 DEPAS + 12 GEOMAR + 9 INSU

Upcoming deployments:

- Switzerland, 8 DEPAS, passive
- North-East Greenland, 15 DEPAS + 15 BGR, active source
- Eastern Gakkel Ridge, 6 ice-going DEPAS, long-term
- Bransfield Straight, 12 DEPAS + 9 CSIC-UTM, long-term and active source

Outlook