2017 European OBS Technical Workshop

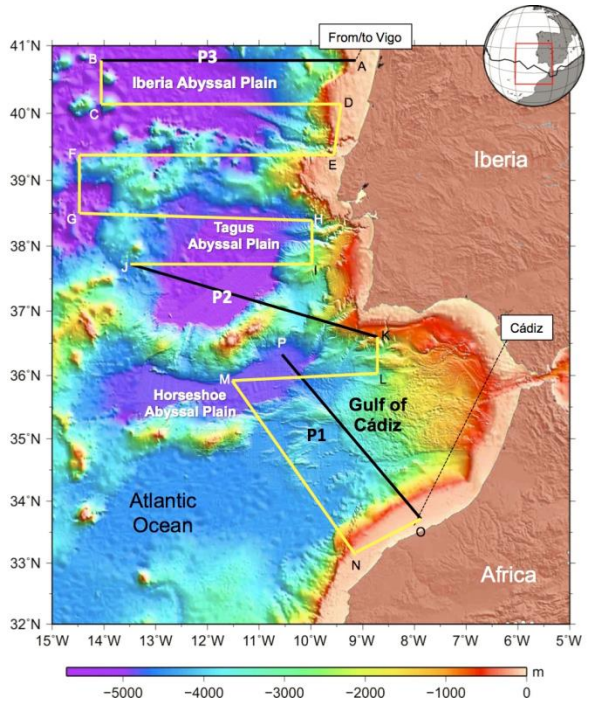
06 - 07 November, 2017, IPGP, Paris

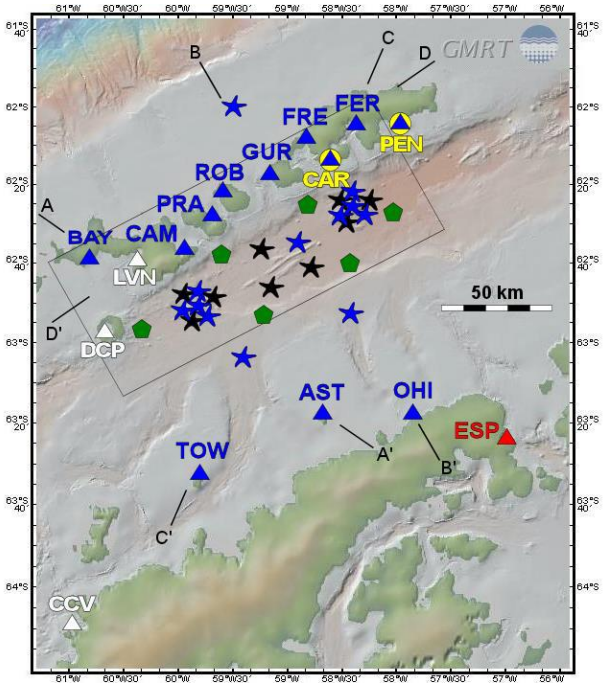
UTM-CSIC OBSs park projects

Antoni Bermúdez, David Pina
OBSs Department
UTM-CSIC

Planned cruises

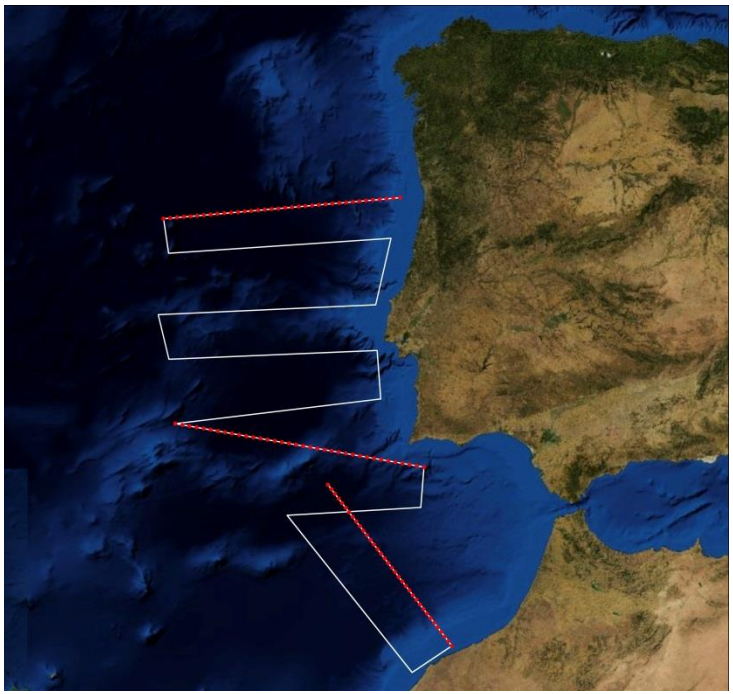
- FRAME-1 (Gulf of Cádiz and offshore Portugal, North Atlantic Ocean)
- BRAVOSEIS (Bransfield Strait, Antarctic Ocean)
- Other proposals: Honduras area (Gulf of Mexico and Pacific Ocean), Jamaica area (Caribbean Sea), etc.

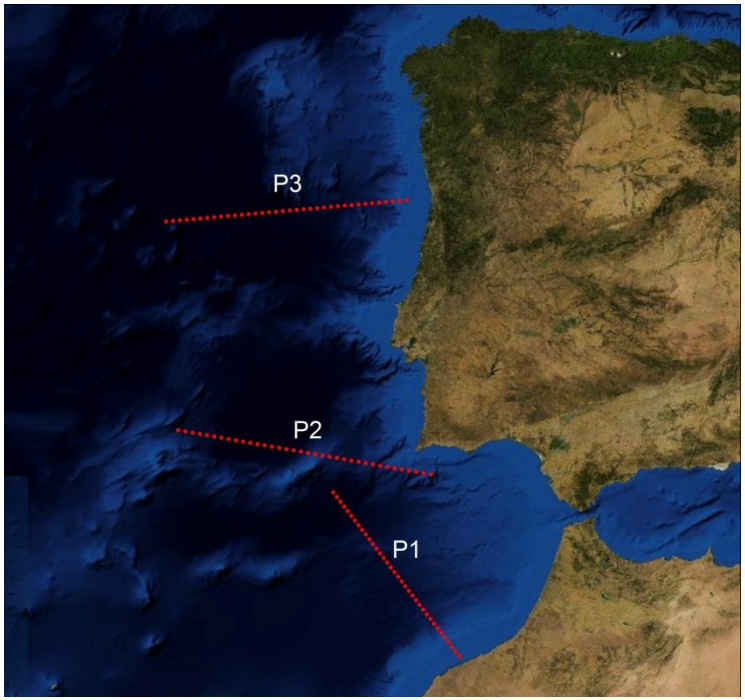




FRAME-1 project

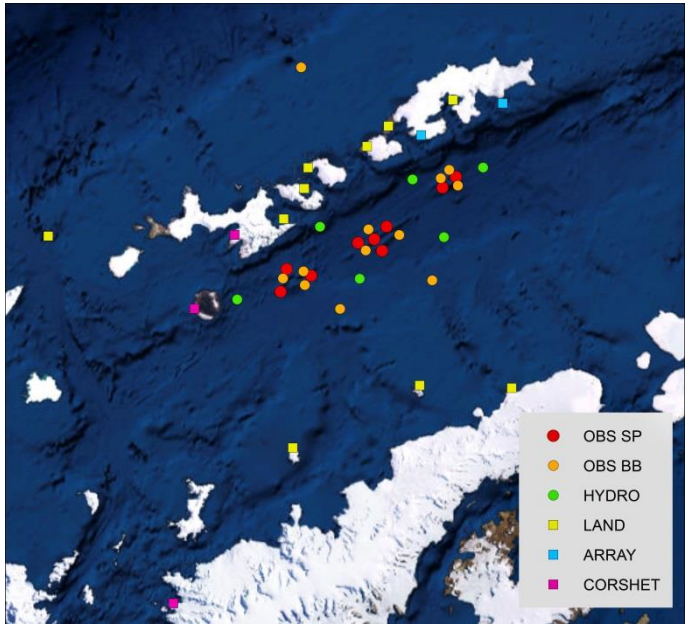
- Area: Gulf of Cádiz and offshore Portugal (North Atlantic Ocean)
- Vessel: B/O Sarmiento de Gamboa (September 2018)
- Type: Active experiment
- Source: air guns (about 5.000 c.i.)
- Up to 3 lines of UTM-CSIC SP OBSs (16) and Geomar OBHs (approximately 20)
- Other instrumentation: 6 km multichannel streamer, echo sounders, gravity meter and possibly Geomar OBMTs

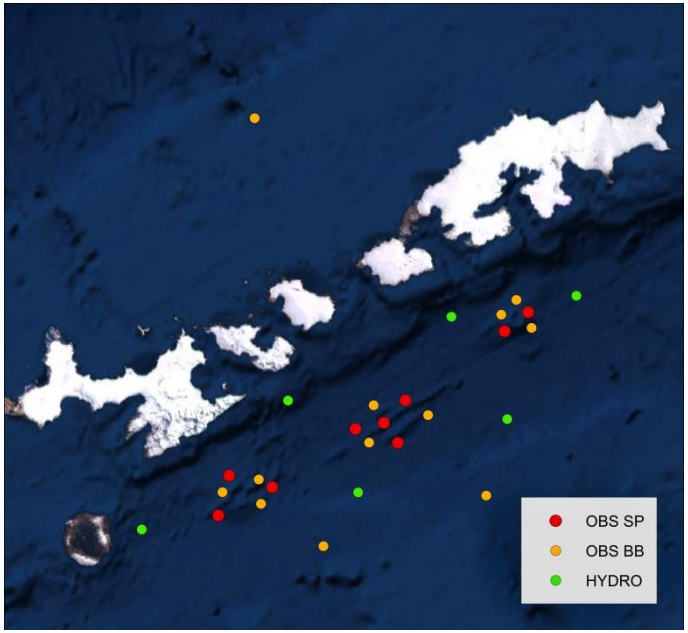




BRAVOSEIS project

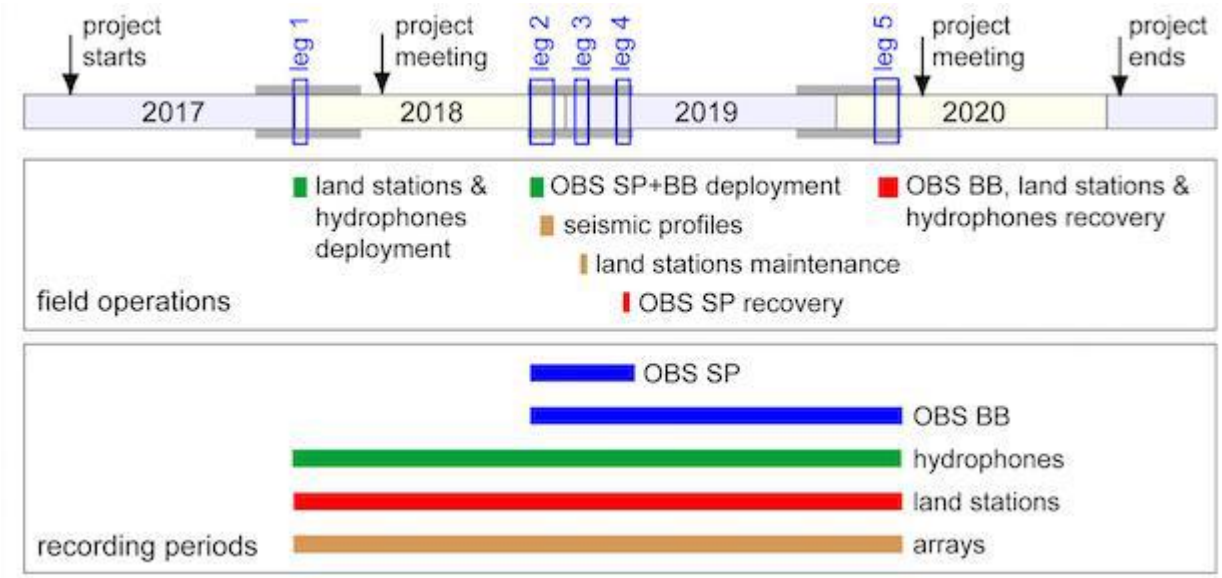
- Area: Bransfield Strait (Antarctic Ocean)
- Vessel: BIO Hespérides (January 2019)
- Type: Active experiment/passive experiment
- Tomography and seismicity: UTM-CSIC SP OBSs (at least 9) probably during 2 months, some OBSIP BB OBSs (at least 12) during 1 year, and perhaps Geomar OBHs (6) during 2 years
- Other instrumentation: broadband land stations (13) and land seismic arrays (2) during 2 years





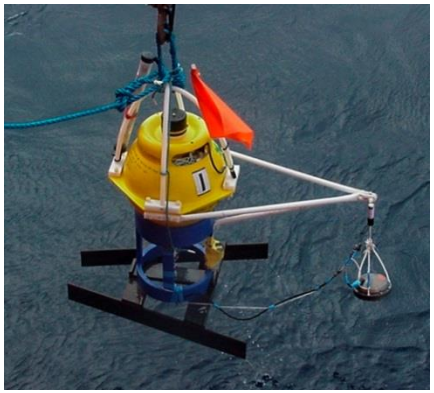
BRAVOSEIS project timeline

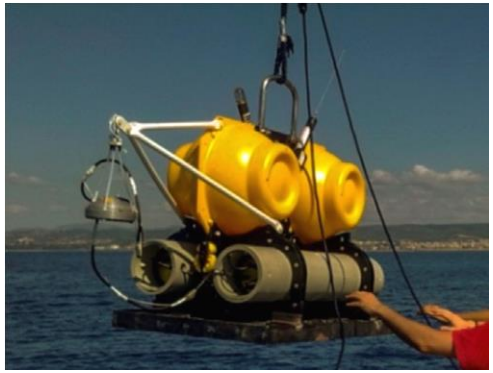
- Amphibious project (land stations and marine instrumentation)
- 2 years project
- It starts in February 2018
- It finishes in March 2020



Development projects

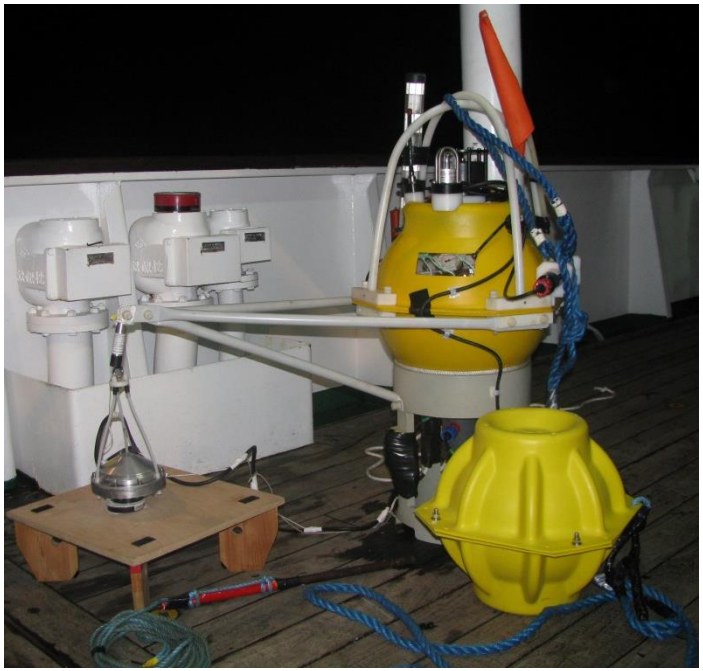
- During some time (2000-2007) UTM-CSIC was involved in Spanish National Plan projects (together with the UPC and the UPNA) for building a new generation of OBSs on the basis of the previous pool of 9 miniDOBS
- Some prototypes were built (new acquisition system, new release system, some changes on the external frame) and they passed the sea trials
- When the prototypes were operative the scientists asked for a more robust and reliable instrument, and more autonomy (more than 1 month)
- Concurring with the B/O Sarmiento de Gamboa completion the researchers asked for a fleet of widely used OBSs and it was the reason of purchasing the IGPP-SIO-UCSD LC SP 4x4 seismometers
- The development project for building new OBSs was set aside because of lack of funding and the new pool of LC SP 4x4 instruments





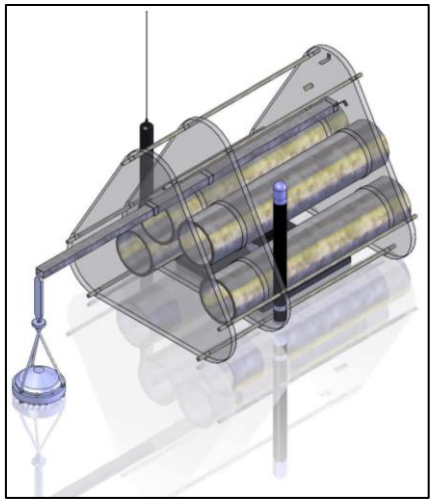
Development projects (lessons learnt)

- Some lessons learnt:
  - For this kind of ambitious projects it is necessary to have a critical mass of experienced staff and funding
  - Timing is crucial: the project must progress quickly for having a still state-of-the-art instrument at the end
  - The objectives for the project partners can be different



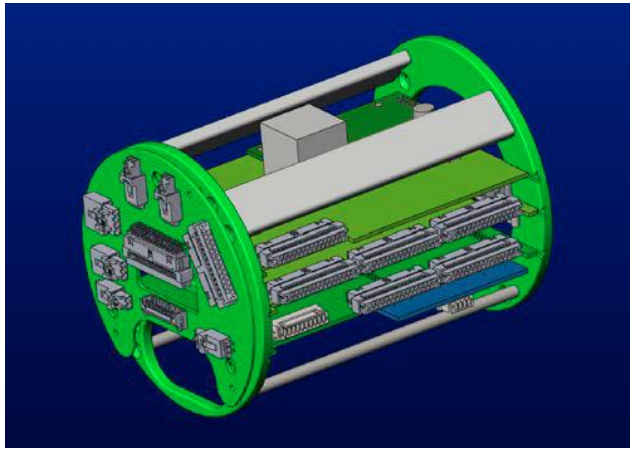
Development projects (conclusions)

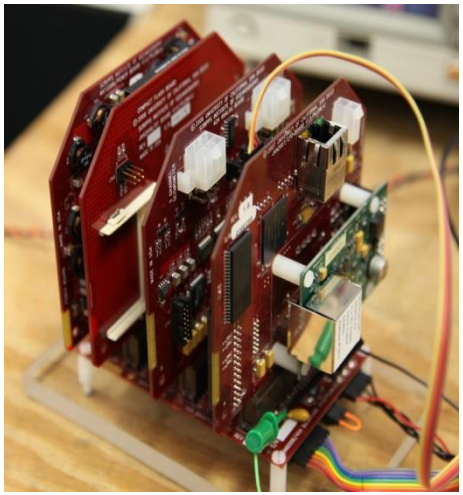
- Some facts:
  - Our experience is not fully satisfactory for that kind of ambitious projects
  - Currently our staff cannot be involved full-time in this sort of large projects because our institution also asks us for transversality
  - We are more focused on smaller projects for improving some parts of the instruments
  - Nowadays for us it is very difficult to get extra funding for developing new hardware, it is easier to obtain money for investing in standard instruments than getting funds for developing new equipments

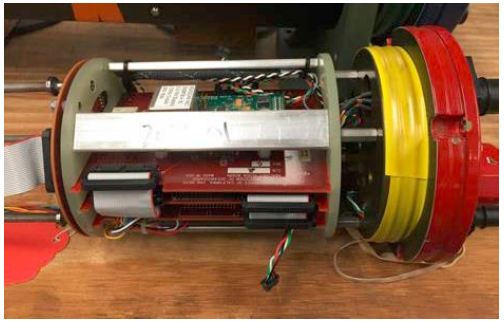


Upgrade of OBSs dataloggers

- In cooperation with the IGPP-SIO-UCSD we are aiming to upgrade part of our LC-4x4 dataloggers to LC-AB-rev1
- Some advantages:
  - Download data without opening the pressure case
  - Improve storing autonomy
  - Improve the sampling rate configuration

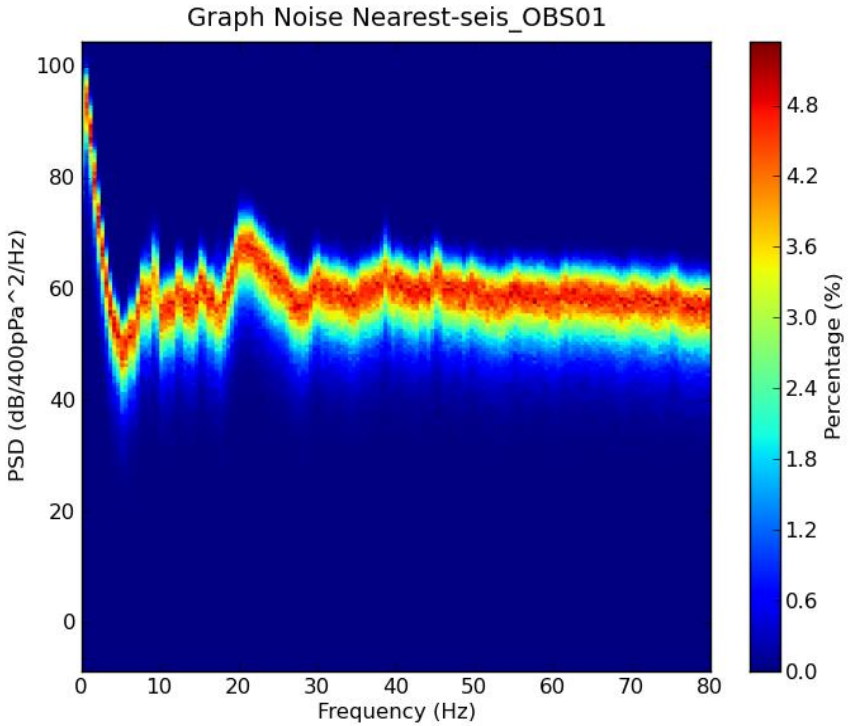






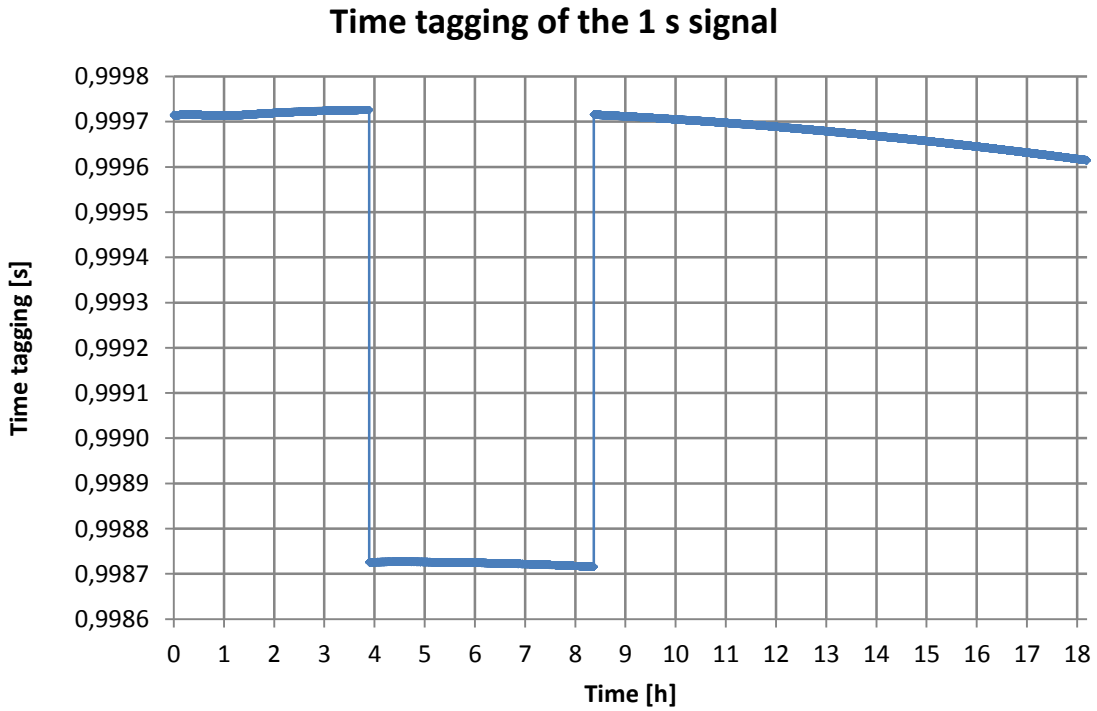
Technical interests and projects (I)

- Data quality control and noise measurements (using the Brüel & Kjær PULSE multi-analyzer system)



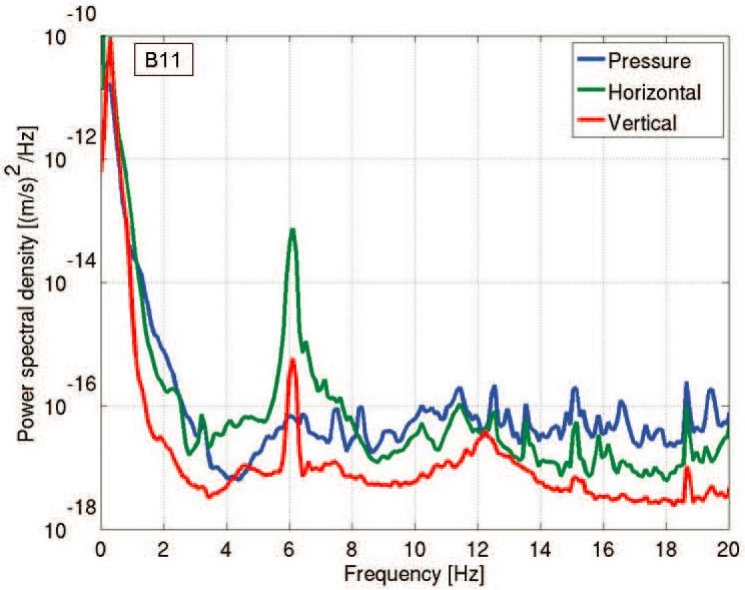
Technical interests and projects (II)

- Effects of a sudden change in temperature on the Seascan SISMTB clock stability
- Integration of environmental data (like temperature, tilt orientation, or water currents using Arduino, Raspberry Pi or similar devices)



Technical interests and projects (III)

- Integration of other seismic sensors to the instruments (like DPGs, APGs or strong-motion accelerometers)
- Integration of more precise clocks for long-term experiments
- Time recovery using mathematical algorithms (forward modelling)
- Relocation of the instrument deployed at the sea bottom
- Noise of 6-7 Hz collected in some cruises (it has improved changing the underwater sensors cables)




Thank you for your attention