BILBAO MARINE ENERGY WEEK

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Title: Environmental impacts over fish communities of submarine cable installation in the Biscay Marine Energy Platform (bimep).

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Abstract for Poster presentation

The Biscay Marine Energy Platform (*bimep*) is an offshore infrastructure for the demonstration and testing of wave energy harnessing devices promoted by the Basque Entity of Energy (Ente Vasco de la Energía - EVE). *Bimep* is located close to Arminza town (Basque Country, Northern Spain) and it consists on an 5.3 km^2 sea area between 50 and 90 m depths where four static submarine cables will be placed, operating at 13kV and 5MW. On the first of June 2009, the General Council on Environmental Quality Assessment of the Ministry of Rural, Marine and Natural Environment of the Spanish Government, on the light of the Environmental Impact Study (EIS) of the *bimep* project undertaken by AZTI in 2008, decided not to submit the project to the whole Environmental Impact Assessment (EIA) process. Nevertheless, the Environmental Impact Statement (EISt) of the Ministry, taking into account the great uncertainties about some predicted environmental impacts, underlined the need to implement the proposed Environmental Monitoring Program (EMP) of the EIS. Among other environmental factors and impact over fish communities was foreseen due to sound and vibrations expected to be generated during submarine cable installation. Hence, on August 29 of 2013, the EVE entrusted to AZTI to carry out the EMP of the fish communities during installation of the submarine cables in *bimep*, which consist on and active acoustic motorization of fish communities by means of five M3i buoys developed by Marine Instruments (www.marineinstruments.es) and placed in each of the four mooring areas and one far enough from BIMEP area to act as control site. The results obtained were compared with those obtained during the preoperational phase of the EMP (carried on 2012), showing that the observed impacts were in the range of those predicted in the EIS of *bimep*.

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Environmental impacts over fish communities of submarine cable installation in the Biscay Marine Energy Platform (bimep)

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Bilbao, 20-24 April 2015

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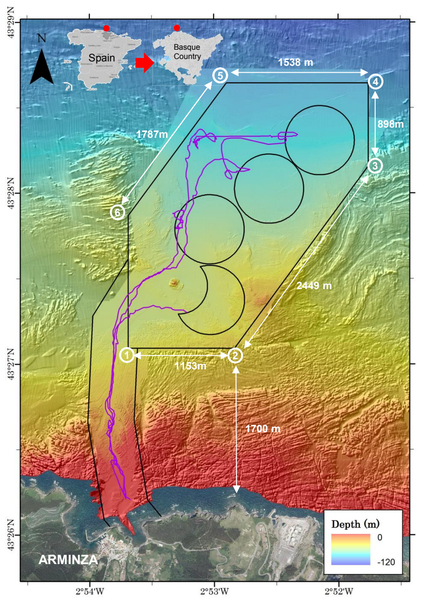
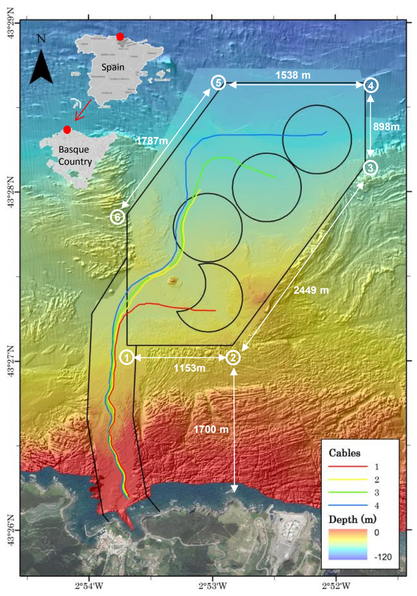
1. INTRODUCTION

- On the first of June 2009, the General Council on Environmental Quality Assessment of **the Ministry of Rural, Marine and Natural Environment of the Spanish Government**, on the light of the **Environmental Impact Study (EIS)** (Bald *et al*. 2008) of the **BIMEP project** (www.bimep.com) undertaken by **AZTI**, decided to **not submit** the project to the whole Environmental Impact Assessment (EIA) process.
- Anyway, the **Environmental Impact Statement (EISt)** of the Ministry, taking into account the great uncertainties about some predicted environmental impacts, underlined the **need to implement** the proposed **Environmental Monitoring Program (EMP)** of the EIS. Among other environmental factors and impact over **fish communities** was foreseen due to **sound** and **vibrations** expected to be generated during submarine cable installation.
- Consequently, on August 29th 2013, the **Basque Entity of Energy** (promotor of the BIMEP project) entrusted to **AZTI** to carry out the EMP of fish communities during installation of the submarine cables in bimep.

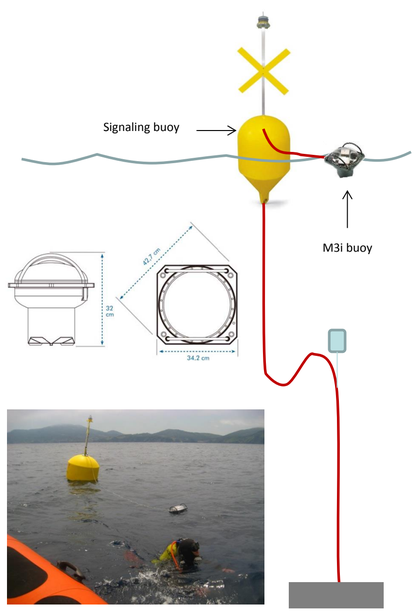
2. THE BIMEP PROJECT

- Promoted by the **Basque Entity of Energy (EVE),** BIMEP represents an **offshore test site** for the demonstration and proving of **wave energy converters (WEC)** promoted by the Basque Entity of Energy (EVE
- It consists of 5.3 km^2 sea area between 50 and 90 m depth where **four static submarine cables will be placed, operating at 13kV and 5MW**. Wave energy generation devices will be connected to these cables through dynamic submarine cables.
- The **installation** of the submarine **cables began** on the **11th of September 2013** with the **PLRG** of the cable route
- And **ended** between the **20th and 27th of September 2013** with the **laying** of the **four** submarine **cables.**
- In land, BIMEP will provide a research centre in Arminza (Bizkaia, Basque Country, Northern Spain) where developers will be able to control the behavior and performance of the devices.

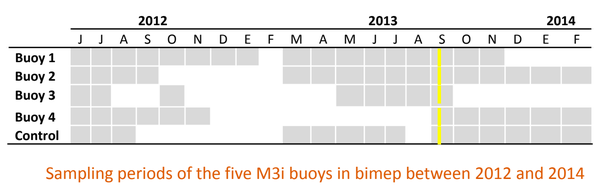




3. METHODOLOGY

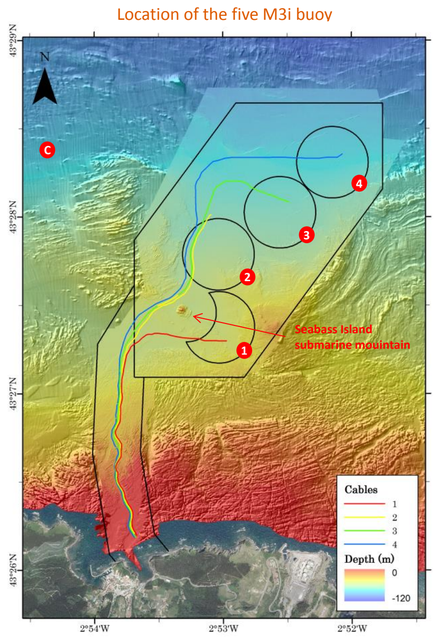


Five **M3i buoys**, developed by Marine Instruments (www.marineinstruments.es), were placed on the **6 of June 2012** in the area, one in each of the four mooring areas and one far enough from BIMEP area to act as control site. The M3i buoys are equipped with a GPS and **echo-sounder (50 kHz and 500 W)** and solar electric panels as their energy source. While the GPS of the buoy allows tracking the position of the buoy itself, the echo-sounder allows measuring the relative **biomass** below the buoy

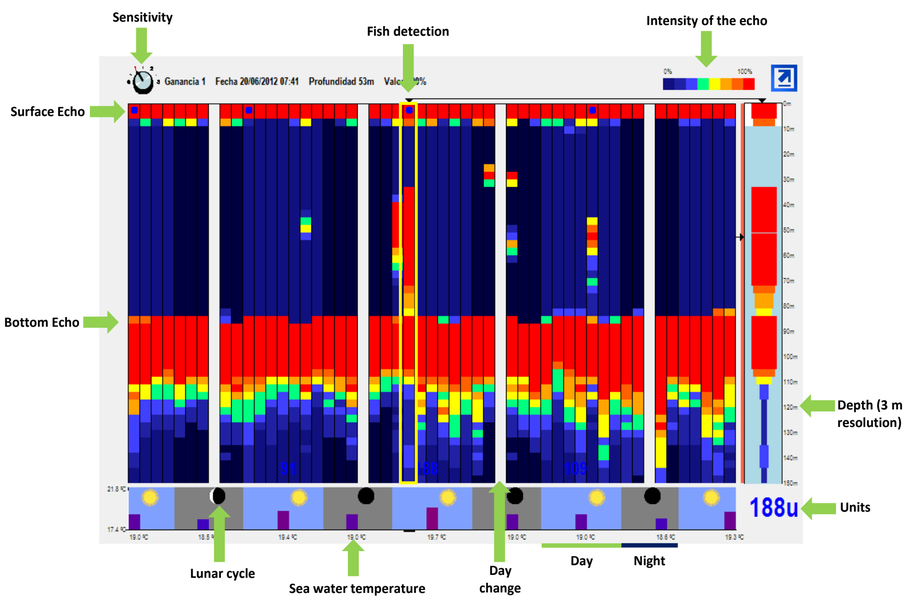


Sampling periods of the five M3i buoys in bimep between 2012 and 2014

Location of the five M3i buoy

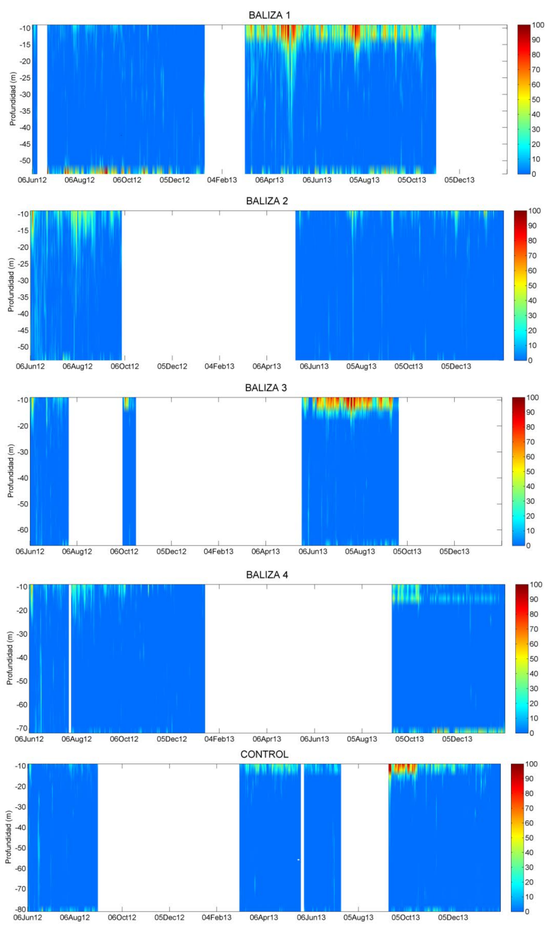


Example of data collected by the M3i Control buoy between the 18 to 22/06/2012

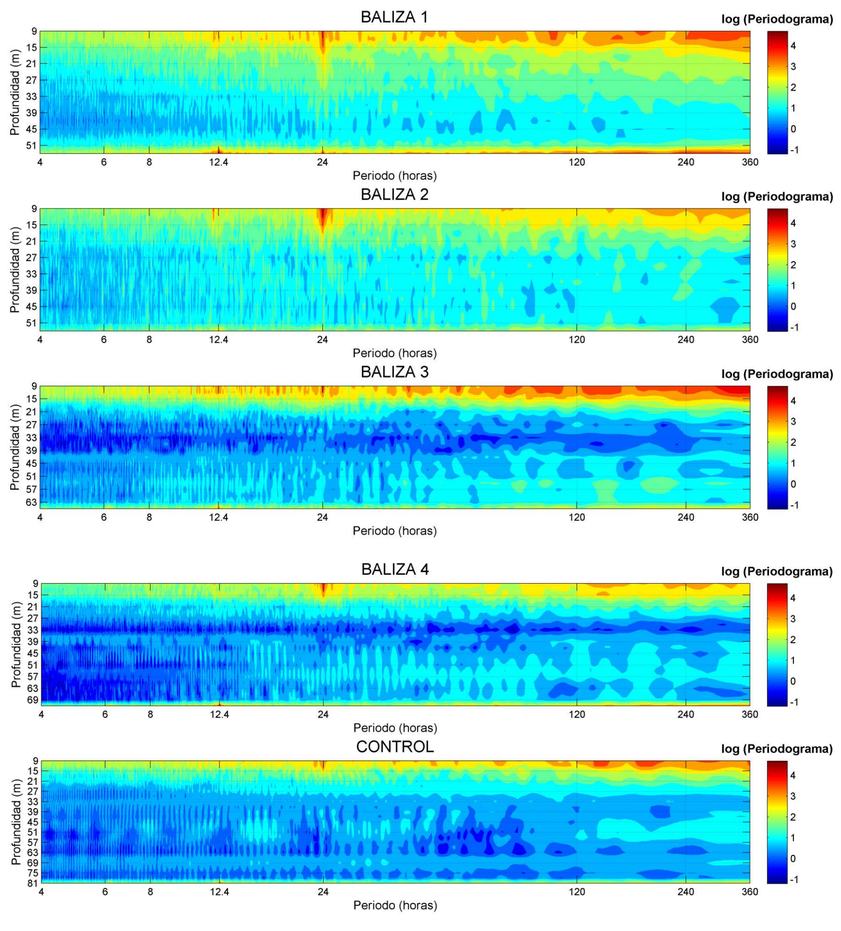


4. RESULTS

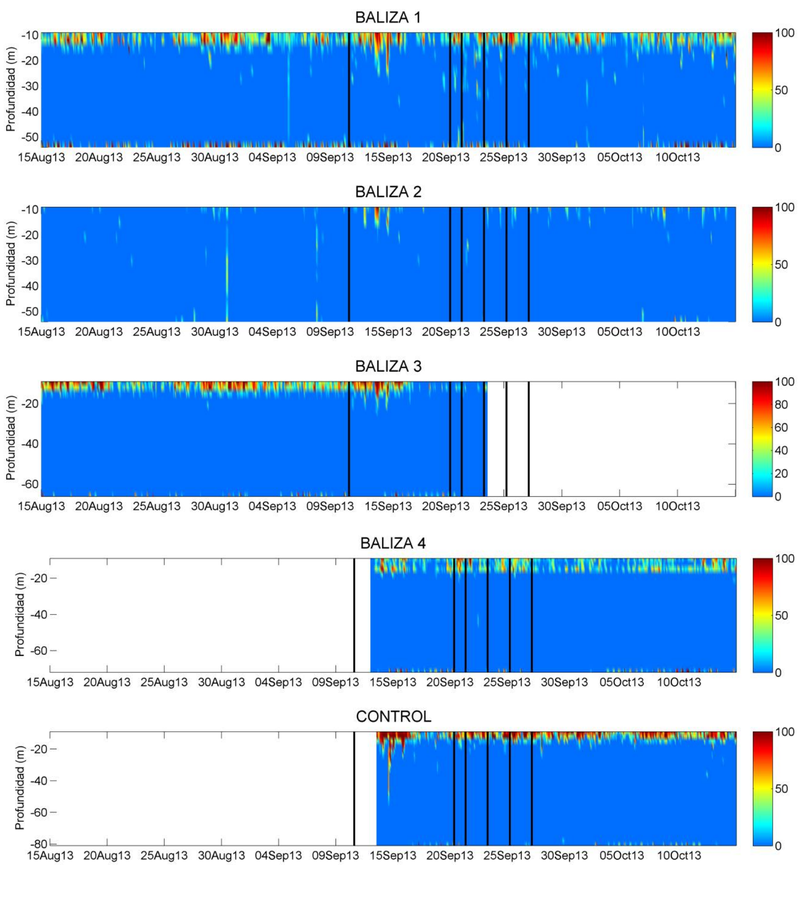
Fish shoals more abundant during summer months and in the first 30 m depth and in the proximity of Buoy 1, which is the nearest buoy to the submarine mountain named “Seabass Island”. It is known for concentrating great fish biomasses.



The spectral analysis of the data following the Lomb-Scargle methodology (Lomb, 1976; Scargle, 1982), showed a **daily variability in the surface layer**, especially in relation to buoy 1 and 2, which are those that are closer to the submarine mountain named “Seabass island”.



No differences where observed in the number of fish shoal detections before, during and the cable installation works (black lines in the figure below).



5. CONCLUSION

- Fish shoals are more common during summer months and in the first 30 m depth of the water column and near te Seabass Island. No significant differences where observed in the number of detections of fish shoals before, during and after the installation of submarine cables. **Consequently, observed impacts are in the range or below those expected by the EIS of bimep**.

6. REFERENCES

- Lomb, N. R., 1976. Least-squares frequency analysis of unequally spaced data. Astrophysics and Space Science, 39:447-462.
- Scargle, J., 1982. Studies in astronomical time-series analysis. II - Statistical aspects of spectral analysis of unevenly spaced data. The Astrophysical Journal, 263:835-853.

Acknowledgements

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