JONAS
Joint Framework for Ocean Noise in the Atlantic Seas

Acoustic data gathering stations

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Nomenclature

ADC	Analogue Digital Converter
A$x.y$	Action y of work package x
CEFAS	Centre for Environmental Fisheries and Aquatic Science
D$x.y$	Deliverable y of work package x
EC	European Commission
EU	European Union
GPS	Global Positioning System
IH	Instituto Hidrográfico
JOMOPANS	Joint Monitoring Programme for Ambient Noise North Sea
JONAS	Joint Framework for Ocean Noise in the Atlantic Seas
MSFD	Marine Strategy Framework Directive
MSS	Marine Scotland Science
PC	Project Coordinator
PI	Principal Investigator
PLOCAN	Plataforma Oceanica de Canarias
PMO	Project Management Office
QO	Quiet Oceans
TL	Transmission Loss
SHOM	Service Hydrographique et Oceanographique de la Marine
UALG	Universidade do Algarve
UCC	University College of Cork
UPC	Universitat Politécnica de Catalunya
WPx	Work Package x
WPL	Work Package Leaders

Executive Summary

JONAS addresses the impact of underwater noise on sensitive species and the potential threat to biodiversity, in the EU North Atlantic area. With this in mind, the main objective of this report is to assess the installed capacity for the available acoustic data recording stations, their technical specifications and the potential to meet the requirements of action A4.2. This report will focus on two aspects: on the data availability for noise map calibration purpose, and on the recommendations for the production of raw acoustic data files. The complete inventory of the data gathering stations with their characteristics and specifics, from the hydrophone input up to data formatting and availability is made. The evaluation of the potential to meet the requirements of action A4.2, taking into account the North Atlantic Area specificities is also performed. Based on the stations inventory it was possible to define an operational year and to propose data technical level recommendations for instrument calibration and measurement methodology.

Contents

Introduction

JONAS addresses the impact of underwater noise on sensitive species and the potential threat to biodiversity, in the EU North Atlantic area. The vastness of the ocean and the intrinsic noise variability in time and space, makes it impossible to experimentally assess the level of underwater noise at basin scale. Additionally, basin scale noise monitoring would be cost prohibitive. For these reasons, numerical models are being widely used for propagating the sound pressure produced by anthropogenic sources to map noise level over time and space. In order for JONAS to produce realistic noise maps, recorded acoustic data is required to perform proper model calibration. This fact makes it imperative to assess the experimental acoustic data available in the Atlantic region, in order to obtain a meaningful area coverage.
According to this, action A4.1, aims at the assessment of the installed capacity for acoustic data recording to be useful for MSFD Descriptor D11 monitoring through the regions and countries of the Atlantic Area. Gathering data from different regions, at different times and by different institutions with a variety of installations, makes it difficult to obtain absolute certainty of calibrated compatible data. Instead of suggesting the adoption of a hard standardization via the same sensing recording equipment and measurement procedures, the approach taken in JONAS is a soft standardization by using hardware transparent calibration procedures for data conversion and cross-platform usability. This is included in this report as a set of recommendations.

This report is organized as follows: section 1 addresses the list of acoustic data observatories, including the type of equipment used by the various institutions and the deployments undertaken. Section 2 analyzes data recordings along time with the purpose of defining the period of interest. Section 3 reports information about acoustic data specification. Section 4 includes a set of recommendations, and guidelines for proper data calibration and finally, section 5 draws some conclusions.

1 Acoustic data

The acoustic data available depends on the number and duration of deployments conducted both by JONAS project partners and by other institutions of the Atlantic Arc countries with granted data access. The objective is to collect acoustic data with a wide coverage of the target NE Atlantic area and a time span as large as possible. The importance of the assessment of the acoustic data available is related to the validation of the numerical noise mapping. We may divide the acoustic data observations in two main aspects: the platform type and the time-space coverage. The platform type section deals with an assessment of the different equipment available/used. In the time-space coverage section, the data will be analyzed in terms of number of deployments per country, geographical location and duration (number of days). According to these goals, an evaluation of the number of deployments since 2008 is made in Table 1. Note that this table presents only an overview of the number of deployments per country in order to have an indicative spatial coverage. This means that the duration of the deployment was not taken into account at this point. The detailed vision regarding the duration of deployments is presented in section 2.2.2 for years 2018 and 2019 and in full detail in appendix B - Data Coverage Chart.

Table 1: Number of deployment from 2008 and 2019[1].

Countries	Untill 2016	2017	2018	2019	Total
UK	0	9	18	5	32
Ireland	22	0	5	3	30
France	12	1	0	5	18
Spain[2]	5	2	-	4	16
Portugal	16	6	3	3	28

1 Only the starting year was taken into account
2 Year information is not available

Between 2008 and 2019 there were a total of 124 deployments. Between 2008 and 2016 the deployments were sparse. These mainly occurred in Ireland and in the Azores, specifically in the area of Pico, Faial and São Jorge Islands. It is important to notice that the high number of deployments in the Azores Islands is probably related to the fact that this region is an important area for cetaceans' distribution and study in the Atlantic Ocean. For this reason, even if the deployments were mainly related with cetacean observation, the acoustic data collected can be used to monitor underwater noise and consequently for noise mapping calibration. The number of deployments increased from 2017 and on: 18 in 2017, 26 in 2018 and 20 deployments in 2019, reaching a total of 64 deployments in the past three years, compared to 55 deployments between 2008 and 2016. This fact led us to reduce the number of years analyzed and consider only, at this stage, the most recent years, of 2017, 2018 and 2019.

1.1 Platform type evaluation

As mentioned above a variety of recording equipment were available. There are five different platforms (see Table 2):

- Observatory
- Autonomous recorder
- Moored hydrophone
- PAM mooring
- PLOCAN stand alone mooring (buoy)

Table 2: Platform type per country.

Countries	Observatory	Autonomous recorder	Moored hydrophone	PAM mooring	PLOCAN stand alone	Total
UK	0	0	0	32	0	32
IRELAND	1	0	29	0	0	30
FRANCE	2	16	0	0	0	18
SPAIN	5	1	0	0	10	16
PORTUGAL	28	0	0	0	0	28

Most deployments were performed considering an observatory platform (36 deployments). The United Kingdom only used PAM moorings and, Spain predominantly PLOCAN, stand alone and observatory platforms. On the contrary, Portugal only used acoustic data provided by observatories. Ireland and France collected information provided by observatories, autonomous recorders and moored hydrophones. The geographic location of the deployments is shown in Figure 1.

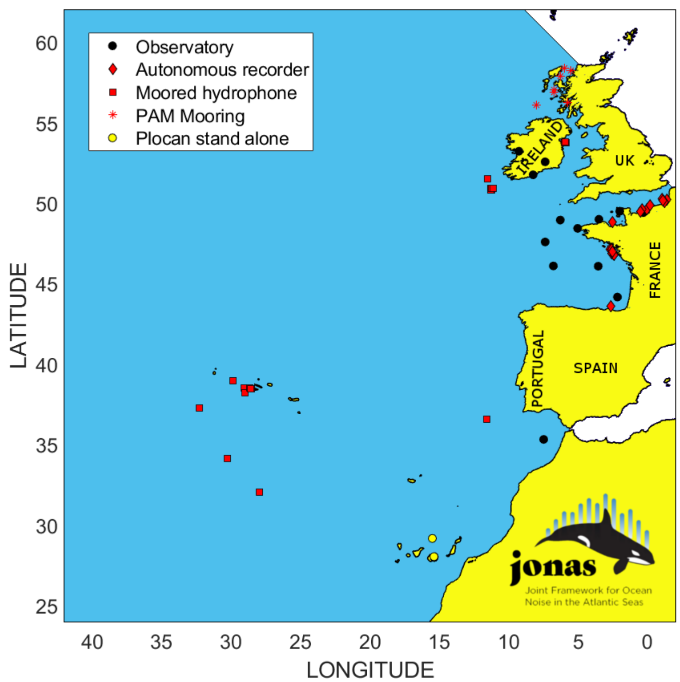

Figure 1: Platform geographic distribution over the JONAS area.

The detailed view of the platform types used in the different areas is presented in Appendix C - Detailed platform type distribution.

1.2 Data coverage

This section shows the temporal coverage of the acoustic data. This information is important to take decisions ahead, for instance, the temporal period to be considered in the numerical models and for the acquisition of the Automatic Identification System (AIS) data. It is important to refer that several deployments crossed two or more years. In those cases, only the recording start year was taken into account.

1.2.1 Number of deployments per country

As observed in the previous section, the number of deployments between 2017 and 2019 was superior than that between 2008 and 2016. Additionally, the timeliness of the data is an important criterion. For that reason, it was agreed between JONAS partners that acoustic data prior to 2017 should be avoided unless it was very significant, which, based on the results of previous section was not the case. According to this, it was decided to evaluate the number of deployments in three periods: until 2017, in 2018 and in 2019 (Table 3).

Table 3: Deployments until 2017, in 2018 and 2019 per country[1].

Countries	Until 2017	2018	2019	Total
UK	9	18	5	27
Ireland	3	5	3	11
France	13	0	5	18
Spain[2]	7	0	4	16
Portugal	22	3	3	28

1 Only the starting year was taken into account
2 Year information is not available

The deployments in 2018 were mainly conducted by the United Kingdom, in the Northern coast of Scotland, which in terms of spatial coverage is limited. In 2019 there were less deployments but with a wider spatial coverage: the coast of Scotland, the northwestern part of France and the Azores Islands of Pico, Faial and São Jorge (Figure 2).

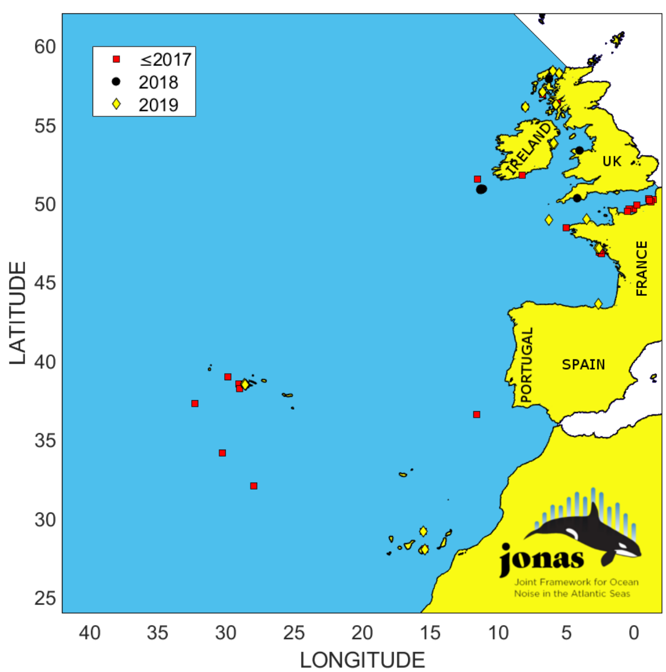

Figure 2: Deployments over the years: until 2017, 2018 and 2019

Figures 3, 4 and 5 show in higher detail the deployments during the year of 2019.

The deployments in the United Kingdom were made in Scotland, near Garvellachs, Hyskeir, Stanton, Stoer and Tolsta (Figure 3) with PAM moorings for shallow water recording (depth ≤100m).

The deployments undertaken by France were made in the region of Brittany and in the Pays de la Loire, near the wind parc of Saint Nazaire (Figure 4) with two types of equipment: autonomous recorders and observatories. The deployments were made only in shallow water (four at a depth ≤ than 72m and one at 120m). In the French case it is important to refer that the deployments in the region of Brittany are still on going at present time.

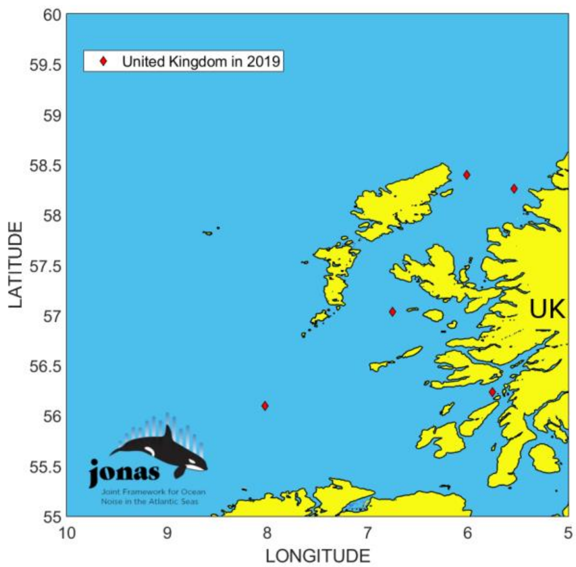

Figure 3: Deployments undertaken by the United Kingdom during the year of 2019.

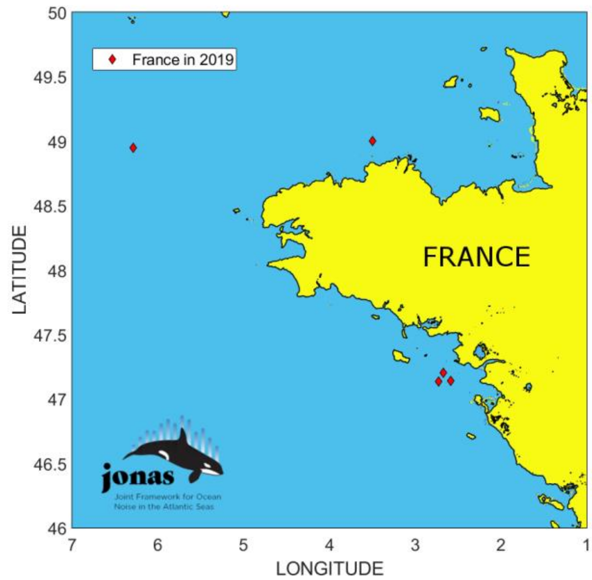

Figure 4: Deployments undertaken by France during the year of 2019.

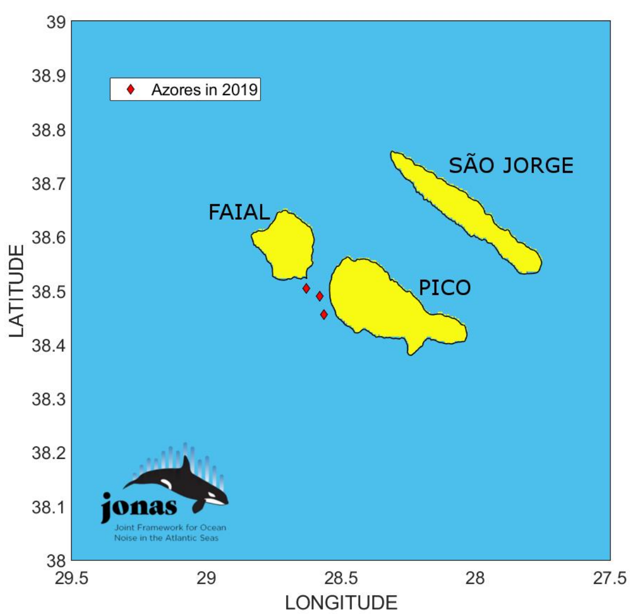

Figure 5: Deployments undertaken by Portugal the year of 2019.

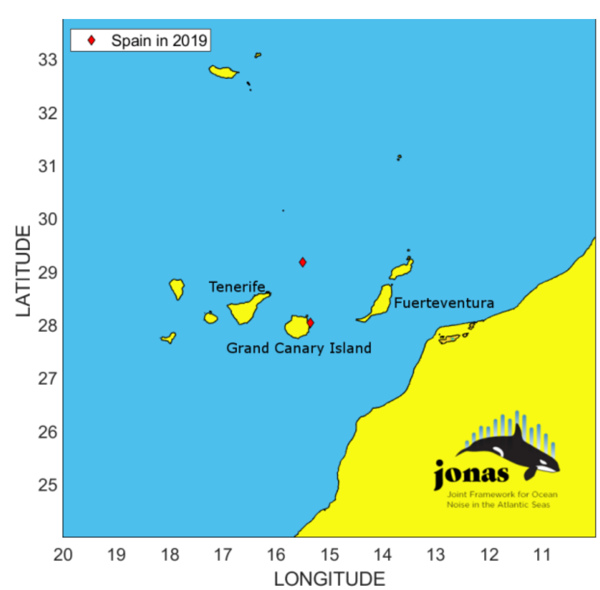

Figure 6: Deployments undertaken by Portugal the year of 2019.

The deployments conducted in Portugal were all located between the Azores Islands of Faial and Pico, more precisely near the seamount of Guia MG (at 200m depth), at seamount of Guia CA (at 484m depth) and at seamount Guia IN (at 200m depth) (Figure 5). A moored hydrophone was used to collect acoustic data in all three cases. Spain undertook deployments in the Canary Islands, mainly near Grand Canaria at 45m and 150m depth (Figure 6).

1.2.2 Deployment duration

Regarding the duration, a total of 234 days of observation in 2018 and 361 in 2019 was registered. There are ongoing recordings in 2019 and for this reason they cannot be taken into account in the duration criteria of this report but will likely extend the total number of deployment days for this year.

Table 4: Deployment duration in days [1]

Countries	2018	2019
UK[2]	118	97
Ireland	10	6
France[2]	0	30
Spain	0	120
Portugal	106	108
TOTAL	**234**	**361**

1 Only the starting year was taken into account
2 The deployments ongoing are not taken into account

Taking into account the information about the duration of each deployment a Gantt chart is shown in Figure 7: for 2018 and in Figure 8 for 2019. Note that the GPS coordinates are shown in the left most column to allow an easier reference between the location and the deployment, even if there are some locations that are extremely close or even repeated.

Figure 7: Deployment chart - year 2018.

Although the recordings cover the whole year, it was observed that the highest temporal deployments density is between March and June.

Figure 8: Deployment chart - year 2019.

Also in 2019, the highest recording density is between March and June. This is probably due to the coincidence with the cetacean migration period in the Azores. Some of the deployments in the United Kingdom started in 2018. The geographical distribution of these deployments is shown in the Figure 9.

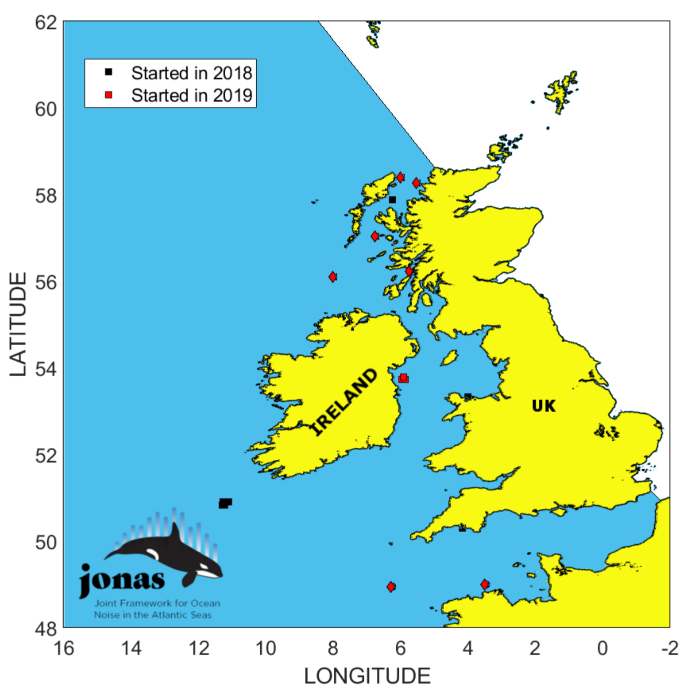

Figure 9: Deployment in the United Kingdom area that crossed the years of 2018 and 2019.

It is important to refer that most of the deployments that crossed these two years were located at exactly the same locations as it can be seen in Figures 7 and 8. The detailed information about the location of each deployment is available in table A – Data Gathering Stations in the appendix.

2 Period of interest

The definition of the period of interest for JONAS was considered as an important step in the project. Since no experimental measurements were undertaken, it is important to evaluate the existing data to determine, first, the period in time where acoustic data is available, and second, its geographical coverage. According to JONAS requirements, five criteria were defined to help in selecting the period of interest:

- Full cycle variability of temporal coverage (one year);
- Environmental variability (shallow and deep water, low / high vessel density)
- Spatial data coverage (at different latitudes and longitudes)
- Recent data is desired (no more than three years old data)
- Good Automatic Identification System (AIS) coverage

Through the analysis of the available data, presented in the previous section, it was possible to conclude that the years of 2018 and 2019 were very similar. However, 2019 has a better spatial coverage (around United Kingdom, France and Portugal) and the data is, of course, more recent. It was not possible to evaluate the AIS data coverage of the concerned area so no information regarding AIS nor vessel density was made available for this report. Based on the available information the year of 2019 was selected as the most suitable for the JONAS project purpose.

3 Data Specification

Since different institutions have different strategies to collect acoustic data, using different platforms and equipment, it is important to evaluate which data was collected with which equipment and how. Two parameters were evaluated: duty cycle and frequency bandwidth. The duty cycle specifies the time on/off periods for each recorder. This choice depends on the rate of change of the phenomena being observed – in this case, shipping noise. The frequency bandwidth depends on the phenomena under observation. For example shipping noise deals mostly with the frequency band below 500 Hz, while marine mammal vocalizations may occur, depending on the specie, from 16 Hz up to 70kHz or more. A higher duty cycle requires more energy and a larger bandwidth requires more storage space. Energy and storage are two limiting parameters for non-cabled recorders.

There are various duty cycle assigned to the deployments, depending on the institution involved and on the type of platform used. Table 5 presents the duty-cycles defined by each county.

Table 5: Duty-cycle used by country.

Countries	Duty cycle
UK	20/40min; 10/20min; 15/15min
Ireland	-
France	30%; 33%; 40%, 100%
Spain	1/3h; 5/15min; 15min/3h; 100%
Portugal	0.5/10min; 1.5/15min; 60/138min; 60/210min; 3/15min; 360/1440min

As for the duty cycle, also the bandwidth is strongly dependent on the institution and may vary between 0 and 192kHz (Table 6).

Table 6: Bandwidth by country.

Countries	Bandwidth
UK	0 – 48kHz
Ireland	2Hz – 192kHz; 16kHz – 125kHz and 48kHz
France	10Hz – 192kHz and 10Hz – 48kHz and 0-37kHz
Spain	5Hz – 125kHz and 10Hz – 3.5kHz and 5Hz – 62,5kHz
Portugal	0 – 25kHz 0 – 1kHz

The specifications for the complete data set is available on the appendix A – Data Gathering Stations.

4 Recommendations for raw data formatting and instrument calibration

This section intends to point out some aspects that should be taken into account to harmonize data sharing and suggest some methodologies of reference to be adopted. This section is divided in three sub-sections: raw data format, general recommendations for equipment performance and calibration data methodologies.

4.1 Raw data format

The raw data format depends on the equipment being used to record the acoustic data and vary among institutions/countries, as shown in Table 7.

Table 7: Raw-data format by country.

Countries	Raw data format
UK	.WAV
Ireland	.WAV
France	.Flac and .WAV
Spain	.WAV
Portugal	.BIN

In fact, the format of the raw data is not important as long as the files are not compressed and an open source freely accessible driver is used, which is the case for ".WAV" and ".Flac" formats.

4.2 Typical data acquisition parameters

The general recommendations for equipment performance must cover some key parameters such as dynamic range, acoustic sensitivity, frequency response, sensitivity diagram, sampling rate, filtering and system self-noise. Some typical values are presented in Table 8.

Table 8: General recommendations for equipment performance.

Metric	Specification
Frequency range	Nominally 10Hz to 20kHz
Dynamic range	Minimum 16 bit Preferably 24 bit
Sensitivity	Ideally in the range: -165 to -185 dB re. 1V/μPa
Frequency response	Ideally flat in 10 Hz to 20kHz
Directionality	Omnidirectional to within +/- 1dB up to 20kHz azimuthal, and to within +/- 2dB in vertical elevation
Sampling rate	Minimum 44kHz Ideally at least 48kHz
Filtering	Any filter characteristics should be known and corrections applied.
System self-noise	Ideally, better than 64dB re 1μPa²/Hz at 63Hz Ideally, better than 59dB re 1μPa²/Hz at 125Hz Ideally, 6dB below the lowest sound level

4.3 Calibration data methodologies

Calibrated data is essential to produce meaningful measurements and to allow comparison with other studies and among project partners. Figure 9 presents the complete signal/calibration chain. Data calibration permits to quantify which sound pressure level (SPL) corresponds to a given level in the digital audio file. The calibration procedure converts the original signal into a calibrated sound pressure level. In this procedure, it is necessary to take into account a correction factor, $S(f)$, which depends on the calibration method being used. Note that the recommendations presented in this report will take into account the calibration sequence until the raw data file. The remaining sequence, dealing with data exchange, formatting and archiving will be taken into account in deliverable D4.3. There are three methods of producing a calibrated sound level: 1) using a sound calibrator, 2) using a signal generator and 3) taking into account the system specifications and consequently calculate the correction factor.

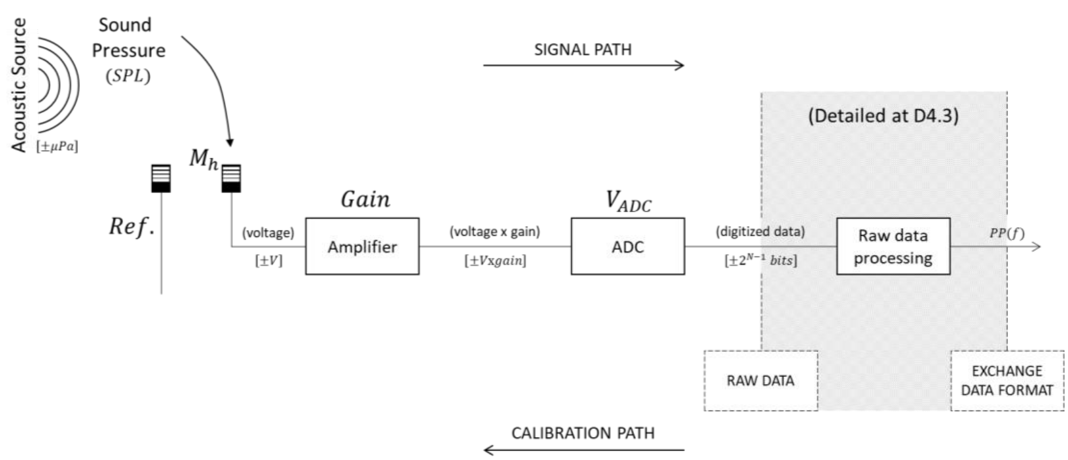

Figure 10: Signal path (from left to right) and calibration path (from right to left).

4.3.1 Correction factor using a sound calibrator/ reference hydrophone

The acoustic source generates a sinusoidal sound pressure signal of known frequency, f, and zero-to-peak pressure amplitude, p_{peak}, at the system transducer (microphone or hydrophone), and this known level is then compared to the analyzed signal from the system to calculate the correlation factor $S(f)$ in dB

$$S(f) = PP(f) + 3 - 20log_{10}(p_{peak})$$

where $PP(f)$ is the power spectrum of the digital signal at the test frequency f. The factor 3 accounts for the 3dB difference between the peak pressure amplitude, p_{peak}, and the RMS amplitude given by the power spectrum.

4.3.2 Correction factor using a signal generator

In this method, the manufacturer transducer sensitivity $M_h(f)$ is considered and should be known. To calibrate the recording system using a signal generator, a sinusoidal voltage of known frequency, f, and zero-to-peak voltage amplitude, V_{peak}, is applied at the amplifier input (transducer output). The correction factor, $S(f)$, is given by:

$$S(f) = PP(f) + 3 - 20log_{10}(V_{peak}) + M_h(f)$$

where $M_h(f)$is the transducer sensitivity at a test frequency, f, and has units of dB re 1 V/µPa (a correction of -120dB is needed to convert µPa into Pa).

4.3.3 Correction factor taking into account the system specifications

The calibration computed directly from the system specifications is necessary to know the transducer sensitivity, $M_h(f)$, the system gain at the frequency of interest, $G(f)$ and the zero-to-peak voltage, V_{ADC}, of the analogue-to-digital converter (ADC) and is described by the following expression:

$$S(f) = M_h(f) + G(f) + 20log_{10}\left(\frac{1}{V_{ADC}}\right) + 20log_{10}(2^{N_{bit}-1})$$

where the N_{bit} is the bit-depth of the digital signal (which means 16 bit or 24 bit).

5 Conclusions

The JONAS project does not cover the possibility to undertake experimental acoustic measurements, but rather to use the experimental acoustic data already available among the different partners and associated institutions. Based on this, a complete inventory of the installed recording stations, their capacity and technical specifications was made. Experimental acoustic data is necessary to produce reliable noise maps in the different regions that concern to JONAS or, in a wider view, it may indicate geographical regions where it could be interesting to setup experimental test cases. Based on the data available, and taking into account the criteria defined to choose a reference period in the acoustic data collected, it was possible to select the year of 2019 as the year of reference, having a wide spatial data coverage and timeliness data.

This report allowed also to share recommendations regarding data calibration. As it was not possible to undertake experimental measurements, it was necessary to ensure a common calibration procedure in order to allow exchange of meaningful data. According to this, it was possible to describe some general recommendations regarding the equipment performance, the raw data format, calibration methods and technical data processing.

Appendix

A Data Gathering Stations

In the Data Gathering Stations table it is possible to identify:

- the partner that undertakes the deployment and its deployment characteristics (as the type of platform used, the geographical area, the period of coverage, the spatial coverage);
- the technical specifications (as the duty cycle, the bandwidth, the resolution);
- the data specifications (as the raw data format, the pre-processing steps required, the final format, the data gaps, the data owner)
- the usage restrictions.

A - Data Gathering Stations

Index	Unique ID	Country	Category	Platform type	Geographical area				Period Coverage			Spatial Coverage	Duty cycle	Bandwidth	Scale/Resolution	Use Restrictions	Meta data	Raw format (if available)	Pre-Processing Steps Required / done	Final Format	Data gaps	Held By	Reader available if proprietary format
	(Unique ID)	(Country)	(Category)	(Platform type)	(Latitude)	(Longitude)	(Depth)	(Shallow/Deep)	(Period Coverage)	(Operation Years)	(Duration in days)	(Spatial Coverage)	(Duty Cycle)	(Bandwidth)	(Scale/Resolution)	(Use Restrictions)	(Meta data)	(Raw format)	(Pre-Processing steps required/done)	(Final Format)	(Data gaps)	(Held by)	(Reader available if propiertary format)
1	MOW	Spain	Acoustic	observatory	35,32196	-7,48302	1403	Deep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Shannon Estuary	Spain	Acoustic	observatory	52,57240	-7,37510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Marine Institute of Ireland SmartBay Observatory	Spain	Acoustic	observatory	53,22730	-9,26630	22	Shallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	PLOCAN	Spain	Acoustic	observatory	27,98330	-15,36670	51	Shallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	European Station for Time series in the Ocean Canary Islands	Spain	Acoustic	observatory	29,16700	-15,50000	3630	Deep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	PLOCAN_BdE20151107-201511021	Spain	Acoustic	PLOCAN stand alone moorin	28.038000	-15.366667	37,3	Shallow	2015/11/07-2015/11/21	2015	14	Single Point - Vertical Array	1h/3h	5Hz-125kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA_SDA14_1	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH - 48			PLOCAN	-
7	PLOCAN_BdE20150730-20150813	Spain	Acoustic	PLOCAN stand alone moorin	28.038000	-15.366667	37,3	Shallow	2015/07/30-2015/08/13	2015	14	Single Point - Vertical Array	1h/3h	5Hz-62.5kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA_SDA14_1	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH			PLOCAN	-
8	PLOCAN_BdE20140315-20150415	Spain	Acoustic	PLOCAN stand alone moorin	28.033889	-15.371944	37,3	Shallow	2014/03/15-2015/04/15	2014 and 2015	396	Single Hydrophone	1h/3h	5Hz-125kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA_SDA14_1	Not available	Acoustic processing third octave and 10Hz-10kHz processing done - SPL Infomation available through graphs per frequency bins and time periods	SPL Graphs in PDF		PLOCAN	-
9	PLOCAN_BdE20190616-20190812	Spain	Acoustic/ Environmental	EMSO EGIM - stand alone m	28.027833	-15.361000	45	Shallow	2019/06/16-2019/08/12	2019	-	Single Hydrophone	100%	10Hz-3.5kHz	24bits	eric.delory@plocan.eu	OceanSonics ICListen HF Hydrophone	WAV				PLOCAN	-
10	PLOCAN_BdE20161129-20161207	Spain	Acoustic	PLOCAN stand alone moorin	28.036317	-15.381800	23	Shallow	2016/11/29-2016/12/07	2016	8	Single Hydrophone	100%	5Hz-125kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA_SDA14_1	WAV	SPL Report available - Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH - 48			PLOCAN	-
11	PLOCAN_BdE20171130-20171226	Spain	Acoustic	PLOCAN stand alone moorin	-	-	-		2017/11/30-2017/12/26	2017	26	Single Hydrophone	5min/15min	5Hz-62.5kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA_SDA14_1	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH			PLOCAN	-
12	PLOCAN_ESTOC20191208-2020MMDD	Spain	Acoustic/ Environmental	PLOCAN stand alone moorin	29.166667	-15.500000	150	Shallow	2019/12/08-...	...	-	Single Hydrophone	15min/3h	5Hz-62.5kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA-SDA14_1	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH			PLOCAN	-
13	PLOCAN_ESTOC20190301-20190604	Spain	Acoustic/ Environmental	PLOCAN stand alone moorin	29.166667	-15.500000	150	Shallow	2019/03/01-2019/06/04	2019	95	Single Hydrophone	15min/3h	5Hz-62.5kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA-EA-SDA14	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH			PLOCAN	-
14	PLOCAN_ESTOC20170415-20170521	Spain	Acoustic/ Environmental	PLOCAN stand alone moorin	29.166667	-15.500000	150	Shallow	2017/04/15-2017/05/21	2017	36	Single Hydrophone	15min/3h	5Hz-62.5kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA-EA-SDA14	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH			PLOCAN	-
15	PLOCAN_ESTOC20161015-20161031	Spain	Acoustic/ Environmental	PLOCAN stand alone moorin	29.166667	-15.500000	150	Shallow	2016/10/15-2016/10/31	2016	16	Single Hydrophone	1h/3h	5Hz-62.5kHz	24bits	eric.delory@plocan.eu	Recorder Serial Number EA-EA-SDA14	WAV	Analog Value (V) = Value in .wav file * 2.5 / 2^(nbit-1) * 1/Gain * 1/Gain_correction_factor. SPL (dBuPa) = 20 * log10(Analog Value) – Hydrophone SH		30 and 31 oct 2016 are only partially recorded due to progressivepower loss	PLOCAN	-
16	Bay of Biscay	Spain	Acoustic	SAMARUC	43,61137	-2,656983	414	Deep	20/06/2019 - 15/07/2019	2019	25	Single Hydrophone	5h/10h	192kHz	-	-	-	WAV	Sensivity: -155 dB; Gain: 12 dB	-	-	-	-
17	SHOM 03C	France	Acoustic	observatory	49,00000	-3,50000	72.3	Shallow	01/09/2019 - ?	2019	-	-	100%	0-37kHz	-	-	-	WAV	-	-	-		-
18	SHOM 04C	France	Acoustic	observatory	48,95000	-6,28500	120	Shallow	01/09/2019 - ?	2019	-	-	100%	0-37kHz	-	-	-	WAV	-	-	-	-	-
19	SHOM 05G	France	Acoustic	observatory	47,59160	-7,37160	576	Deep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	SHOM 06G	France	Acoustic	observatory	46,10000	-6,78330	4788	Deep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	SHOM 07G	France	Acoustic	observatory	46,08500	-3,55000	136	Shallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	SHOM 08G	France	Acoustic	observatory	44,16670	-2,16670	775	Deep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	SHOM 02Mn	France	Acoustic	observatory	49,50000	-2,00000	24	Shallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	SHOM 01Mn	France	Acoustic	observatory	49,41670	-0,30000	19	Shallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	Parc eolien Treport	France	Acoustic	autonomous recorder	50,20880	1,40110	14	Shallow	2015/06/25-2016/06/04	2015 and 2016	345	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
26	Parc eolien Treport	France	Acoustic	autonomous recorder	50,25858	1,05202	29	Shallow	2015/06/25-2016/06/04	2015 and 2016	345	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
27	Parc eolien Treport	France	Acoustic	autonomous recorder	50,06458	1,20617	14	Shallow	2015/06/25-2016/06/04	2015 and 2016	345	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
28	Parc eolien Treport	France	Acoustic	autonomous recorder	50,15493	1,12195	22	Shallow	2015/06/25-2016/06/04	2015 and 2016	345	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
29	Parc eolien Fecamp	France	Acoustic	autonomous recorder	49,63260	-0,02431	26	Shallow	2013/06/25-2013/07/14	2013	19	-	33%	10Hz-48kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
30	Parc eolien Fecamp	France	Acoustic	autonomous recorder	49,86840	0,19822	28	Shallow	2013/06/25-2013/07/14	2013	20	-	33%	10Hz-48kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
31	Parc eolien Courseulles	France	Acoustic	autonomous recorder	49,61570	-0,38244	26	Shallow	2013/06/25-2013/07/14	2013	20	-	33%	10Hz-48kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
32	Parc eolien Courseulles	France	Acoustic	autonomous recorder	49,46340	-0,49500	26	Shallow	2013/06/25-2013/07/14	2013	20	-	33%	10Hz-48kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
33	Parc eolien Saint Brieuc	France	Acoustic	autonomous recorder	48,84776	-2,52951	35	Shallow	-	-	-	-	-	-	-	-	-	-	-	-	-	Iberdrola / In Vivo	-
34	Parc eolien Saint Nazaire	France	Acoustic	autonomous recorder	47,20449	-2,66774	14	Shallow	2019/06/20-2019/07/20	2019	30	-	30%	10Hz-192kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
35	Parc eolien Saint Nazaire	France	Acoustic	autonomous recorder	47,13463	-2,72790	26	Shallow	2019/06/20-2019/07/20	2019	30	-	30%	10Hz-192kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
36	Parc eolien Saint Nazaire	France	Acoustic	autonomous recorder	47,13824	-2,58307	21	Shallow	2019/06/20-2019/07/20	2019	30	-	30%	10Hz-192kHz	-	-	-	FLAC	-	-	-	EDF/ Quiet-Oceans	-
37	Parc eolien Yeu Noirmoutier	France	Acoustic	autonomous recorder	46,83875	-2,47029	29	Shallow	2015/07/30-2016/09/28	2015 and 2016	426	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
38	Parc eolien Yeu Noirmoutier	France	Acoustic	autonomous recorder	46,88081	-2,56217	35	Shallow	2015/07/30-2016/09/29	2015 and 2016	427	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
39	Parc eolien Yeu Noirmoutier	France	Acoustic	autonomous recorder	46,76616	-2,43598	31	Shallow	2015/07/30-2016/09/30	2015 and 2016	428	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
40	Parc eolien Yeu Noirmoutier	France	Acoustic	autonomous recorder	47,00049	-2,51716	29	Shallow	2015/07/30-2016/09/31	2015 and 2016	429	-	33%	10Hz-192kHz	-	-	-	FLAC	-	-	-	ENGIE/ Quiet-Oceans	-
41	AFB Fromveur	France	Acoustic	observatory	48,43492	-5,03388	41	Shallow	2017/09/01-2018/10/01	2017 and 2018	395	-	30%	10Hz-192kHz	-	-	-	FLAC	-	-	-	AFB / Quiet-Oceans	-
42	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,53983	-29,04588	189	Shallow	2008/03/10 - 2008/05/23	2008	74	single sensor	0.5min / 10min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
43	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,53992	-29,04362	190	Shallow	2008/08/06 - 2008/12/20	2008	136	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 Db	-	-	IMAR - University of the Azores	-
44	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,53990	-29,04355	190	Shallow	2009/06/30 - 2009/11/02	2009	125	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
45	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,54012	-29,04378	190	Shallow	2010/04/10 - 2010/09/15	2010	158	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
46	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,53968	-29,04340	195	Shallow	2010/09/29 - 2011/03/06	2010 and 2011	158	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
47	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,53947	-29,04438	195	Shallow	2011/10/15 - 2012/03/06	2011 and 2012	143	single sensor	60min / 138min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
48	Azores_Condor Seamount	Portugal	Acoustic	moored hydrophone	38,53998	-29,04358	190	Shallow	2012/05/26 - 2012/10/18	2012	145	single sensor	60min / 210min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
49	Azores_Gigante Seamount	Portugal	Acoustic	moored hydrophone	38,98760	-29,88050	175	Shallow	2008/03/19 - 2008/05/30	2008	72	single sensor	0.5min / 10min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.64 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
50	Azores_Gigante Seamount	Portugal	Acoustic	moored hydrophone	38,98638	-29,88232	190	Shallow	2008/08/06 - 2008/12/10	2008	126	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.64 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
51	Azores_Gigante Seamount	Portugal	Acoustic	moored hydrophone	38,98753	-29,88050	190	Shallow	2010/07/06 - 2010/09/14	2010	70	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
52	Azores_Gigante Seamount	Portugal	Acoustic	moored hydrophone	38,98748	-29,88072	190	Shallow	2010/09/15 - 2011/02/20	2010 and 2011	158	single sensor	1.5min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
53	Azores_Açores Seamount	Portugal	Acoustic	moored hydrophone	38,20145	-28,98768	190	Shallow	2011/10/15 - 2012/03/15	2011 and 2012	152	single sensor	60min / 210min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
54	Azores_Açores Seamount	Portugal	Acoustic	moored hydrophone	38,20168	-28,98788	190	Shallow	2012/04/13 - 2012/11/14	2012	215	single sensor	60min / 210min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
55	Azores_Atlantis Seamount	Portugal	Acoustic	moored hydrophone	34,14373	-30,25672	294	Deep	2015/07/25 - 2015/10/15	2015	82	single sensor	3min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
56	Azores_Irving Seamount	Portugal	Acoustic	moored hydrophone	32,04665	-27,96897	264	Deep	2015/07/30 - 2015/10/15	2015	77	single sensor	3min / 15min	0 - 25 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
57	Azores_Gorringe Seamount	Portugal	Acoustic	moored hydrophone	36,57532	-11,59695	255	Deep	2015/09/01 - 2016/07/22	2015 and 2016	325	single sensor	3min / 15min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -195.16 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
58	Azores_Guia OF Seamount	Portugal	Acoustic	moored hydrophone	38,45972	-28,60335	639	Deep	2017/02/24 - 2017/07/05	2017	131	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -195.16 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
59	Azores_Guia MG Seamount	Portugal	Acoustic	moored hydrophone	38,50535	-28,63202	272	Deep	2017/02/24 - 2017/07/05	2017	131	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
60	Azores_Guia MG Seamount	Portugal	Acoustic	moored hydrophone	38,50418	-28,62825	200	Shallow	2018/03/19 - 2018/07/03	2018	106	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
61	Azores_Guia MG Seamount	Portugal	Acoustic	moored hydrophone	38,50427	-28,62832	200	Shallow	2019/03/14 - 2019/07/01	2019	109	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -194.17 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
62	Azores_Guia CA Seamount	Portugal	Acoustic	moored hydrophone	38,45553	-28,54340	420	Deep	2017/02/24 - 2017/07/05	2017	131	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.44 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
63	Azores_Guia CA Seamount	Portugal	Acoustic	moored hydrophone	38,45553	-28,54340	420	Deep	2017/07/21 - 2018/01/18	2017 and 2018	181	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.44 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
64	Azores_Guia CA Seamount	Portugal	Acoustic	moored hydrophone	38,45553	-28,56302	484	Deep	2018/03/19 - 2018/07/03	2018	106	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.44 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
65	Azores_Guia CA Seamount	Portugal	Acoustic	moored hydrophone	38,45560	-28,56327	484	Deep	2019/03/16 - 2019/07/01	2019	107	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.44 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
66	Azores_Guia IN Seamount	Portugal	Acoustic	moored hydrophone	38,48600	-28,57650	212	Deep	2017/05/12 - 2017/10/18	2017	159	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
67	Azores_Guia IN Seamount	Portugal	Acoustic	moored hydrophone	38,48983	-28,57855	200	Shallow	2018/03/19 - 2018/07/03	2018	106	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
68	Azores_Guia IN Seamount	Portugal	Acoustic	moored hydrophone	38,48985	-28,57852	200	Shallow	2019/03/14 - 2019/07/01	2019	109	single sensor	360min / 1440min	0 - 1 kHz	16-bit Intel PCM (LSB, MSB)	data shared under collaboration with data owners	-	BIN	Sensitivity: -193.14 dB; Gain: 47.5 dB	-	-	IMAR - University of the Azores	-
69	EGIM - Acores	Portugal		moored hydrophone	37,28870517	-32,27674783		Shallow	-	2017	-	-	-	-	-	-	-	-	-	-	-	-	-
70	Strive Cork	Ireland	Acoustic	observatory	51,76119	-8,24367	20	Shallow	2012/07/20-2012/08/02	2012	13	-	40%	-	-	-	-	FLAC	-	-	-	UCC/ Quiet-Oceans	-
71	STRIVE - Cork harbour	Ireland	Acoustic - environmental noise	hydrophone mounted on seabed	-	-	-	-	2013 - ?	2013	1 year	point	-	-	-	-	-	-	-	-	-	Thomas Folegot/UCC	-
72	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	55,63017	−9,73023	1600	Deep	08/05/2015 - 28/08/2015	2015	112	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	DCCAE/GMIT	-
73	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	55,3018	−10,30840	1995	Deep	08/05/2015 - 28/08/2015	2015	112	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
74	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	54,24563	−11,99587	1900	Deep	07/05/2015 - 30/08/2015	2015	115	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
75	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	54,00138	−14,04242	1920	Deep	07/05/2015 - 30/08/2015	2015	115	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
76	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	55,6323	−9,72522	1620	Deep	28/08/2015 - 13/12/2015	2015	107	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
77	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	55,30105	−10,30372	1971	Deep	28/08/2015 - 13/12/2015	2015	107	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
78	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	54,25128	−11,99402	1850	Deep	30/08/2015 - 14/12/2015	2015	106	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
79	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	54,00153	−14,04288	1944	Deep	30/08/2015 - 14/12/2015	2015	106	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−164 dB re 1 V/μPa	-	-	-	-
80	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	54,25022	−11,99263	1770	Deep	29/03/2016 - 29/06/2016	2016	92	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
81	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	52,62254	−15,30446	1752	Deep	21/03/2016 - 10/07/2016	2016	111	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
82	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	51,72257	−15,20771	1765	Deep	20/03/2016 - 11/07/2016	2016	113	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
83	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	50,50957	−14,31242	1750	Deep	19/03/2016 - 11/07/2016	2016	114	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
84	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	49,54771	−13,37298	1760	Deep	19/03/2016 - 09/03/2016	2016	112	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
85	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	52,62214	−15,30469	1750	Deep	10/07/2016 - 02/11/2016	2016	115	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
86	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	51,72447	−15,23419	1745	Deep	11/07/2016 - 02/11/2016	2016	114	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
87	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	50,50848	−14,31495	1750	Deep	11/07/2016 - 03/11/2016	2016	115	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
88	ObSERVE acoustic - Irish EEZ	Ireland	Acoustic/Environmental	towed hydrophone/static acoustic moorings	49,54783	−13,37230	1760	Deep	09/08/2016 - 03/11/2016	2016	86	single sensor	-	16kHz and 125kHz	16bit and 24bit	-	-	-	−165 dB re 1 V/μPa	-	-	-	-
89	GIST - PAM 1	Ireland	Acoustic	Moored hydrophone	53,738	-5,994	55	Shallow	25/10/2019 - 26/10/2019	2019	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	GIST	-
90	GIST - PAM 2	Ireland	Acoustic	Moored hydrophone	53,737	-5,897	55	Shallow	25/10/2019 - 26/10/2019	2019	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	GIST	-
91	GIST - PAM 3	Ireland	Acoustic	Moored hydrophone	53,787	-5,94	55	Shallow	25/10/2019 - 26/10/2019	2019	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	GIST	-
92	PANiC - M1	Ireland	Acoustic	Moored hydrophone	50,840657	-11,236539	344	Deep	10/06/2018 - 12/06/2019	2018	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	PANiC	-
93	PANiC - M2	Ireland	Acoustic	Moored hydrophone	50,834462	-11,319225	511	Deep	10/06/2018 - 12/06/2019	2018	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	PANiC	-
94	PANiC - M3	Ireland	Acoustic	Moored hydrophone	50,904246	-11,290947	898	Deep	10/06/2018 - 12/06/2019	2018	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	PANiC	-
95	PANiC - M4	Ireland	Acoustic	Moored hydrophone	50,91045	-11,20815	651	Deep	10/06/2018 - 12/06/2019	2018	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	PANiC	-
96	PANiC - M5	Ireland	Acoustic	Moored hydrophone	50,899953	-11,125091	250	Deep	10/06/2018 - 12/06/2019	2018	2	Vertical Array	-	48kHz	16 bit	-	-	WAV	Sensitivity: -165 dB; Gain: 35 dB	-	-	PANiC	-
97	DSPMMSSN in Irish waters	Ireland	Acoustic	Moored hydrophone	51,5	-11,5	150	Shallow	15/07/2014 - 20/07/2014	2014	5	single sensor	-	2Hz - 192kHz	16 bit	-	-	WAV	Sensitivity: -165 dB	-	-	-	-
98	DSPMMSSN in Irish waters	Ireland	Acoustic	Moored hydrophone	51,5	-11,5	50	Shallow	15/07/2014 - 20/07/2014	2014	5	single sensor	-	2Hz - 48kHz	16 bit	-	-	WAV	Sensitivity: -240 dB and -165	-	-	-	-
99	DSPMMSSN in Irish waters	Ireland	Acoustic	Moored hydrophone	51,5	-11,5	15	Shallow	15/07/2014 - 20/07/2014	2014	5	single sensor	-	2Hz - 48kHz	16 bit	-	-	WAV	Sensitivity: -240 dB	-	-	-	-
100	COMPASS Garvellachs	UK	Acoustic	PAM Mooring	56,23398	-5,75675	87	Shallow	18/06/2018 - 23/11/2018	2018	158	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	335859734 ST10	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
101	COMPASS Garvellachs	UK	Acoustic	PAM Mooring	56,23398	-5,75675	90	Shallow	23/11/2018 - 05/03/2019	2018 and 2019	102	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 5 BP5, cable 5	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
102	COMPASS Garvellachs	UK	Acoustic	PAM Mooring	56,23398	-5,75675	92	Shallow	05/03/2019 - 11/06/2019	2019	98	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 11 BP11, cable 11	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-

103	COMPASS Garvellachs	UK	Acoustic	PAM Mooring	56,23398	-5,75675	94,4	Shallow	07/11/2017 - 12/04/2018	2017 and 2018	156	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	SAMS Soundtrap 335822901	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
104	COMPASS Garvellachs	UK	Acoustic	PAM Mooring	56,23398	-5,75675	95	Shallow	03/03/2018 - 18/06/2018	2018	107	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	336068655 ST6	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
105	COMPASS Hyskeir	UK	Acoustic	PAM Mooring	57,03640	-6,75433	0	Shallow	04/03/2018 - 10/06/2018	2018	98	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	335843350 ST5	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
106	COMPASS Hyskeir	UK	Acoustic	PAM Mooring	57,03640	-6,75433	48	Shallow	10/06/2018 - 01/12/2018	2018	174	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	336330799 ST7	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
107	COMPASS Hyskeir	UK	Acoustic	PAM Mooring	57,03640	-6,75433	50	Shallow	08/03/2019 - 17/06/2019	2019	101	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 2 BP2, cable 2	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
108	COMPASS Hyskeir	UK	Acoustic	PAM Mooring	57,03640	-6,75433	51	Shallow	01/12/2018 - 08/03/2019	2018 and 2019	97	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 6 BP6, cable 6	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
109	COMPASS Hyskeir	UK	Acoustic	PAM Mooring	57,03640	-6,75433	53,53	Shallow	08/11/2017 - 04/03/2018	2017 and 2018	146	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	SAMS Soundtrap 336121903	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
110	Hyskeir	UK	Acoustic	PAM Mooring	56,90691	-6,73214	34	Shallow	22/08/2017 - 04/03/2018	2017 and 2018	194	-	10min on 20min off	0-48kHz	-	Acknowledge EMFF	DSG-ST	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
111	COMPASS Shiants	UK	Acoustic	PAM Mooring	57,87615	-6,27288	83	Shallow	14/11/2018 - 09/03/2019	2018 and 2019	115	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 4 BP4, cable 4	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
112	COMPASS Shiants	UK	Acoustic	PAM Mooring	57,87615	-6,27288	84	Shallow	05/03/2018 - 08/06/2018	2018	95	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	335835204 ST2	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
113	Shiant Isles	UK	Acoustic	PAM Mooring	57,87614	-6,27214	86,35	Shallow	09/11/2017 - 05/03/2018	2017 and 2018	116	-	10min on 20min off	0-48kHz	-	Acknowledge EMFF	SAMS Soundtrap 335843397	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
114	COMPASS Stanton	UK	Acoustic	PAM Mooring	56,09693	-8,02212	100	Shallow	05/11/2018 - 08/03/2019	2018 and 2019	123	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 2 BP2, cable 2	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
115	COMPASS Stanton	UK	Acoustic	PAM Mooring	56,09693	-8,02212	109	Shallow	25/02/2018 - 12/06/2018	2018	107	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	335564854 ST1	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
116	COMPASS Stanton	UK	Acoustic	PAM Mooring	56,09693	-8,02212	110	Shallow	01/11/2017 - 12/06/2018	2017 and 2018	223	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	SAMS Soundtrap 335847477	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
117	COMPASS Stanton	UK	Acoustic	PAM Mooring	56,09693	-8,02212	66	Shallow	08/03/2019 - 10/06/2019	2019	94	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 5 BP5, cable 5	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
118	COMPASS Stoer	UK	Acoustic	PAM Mooring	58,25768	-5,53893	100	Shallow	09/03/2019 - 19/06/2019	2019	102	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	ST BP7, cable 7	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
119	COMPASS Stoer	UK	Acoustic	PAM Mooring	58,25768	-5,53893	101	Shallow	05/03/2018 - 20/06/2018	2018	107	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	335564853 ST3	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
120	COMPASS Stoer	UK	Acoustic	PAM Mooring	58,25768	-5,53893	101	Shallow	20/06/2018 - 14/11/2018	2018	147	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	1208778785 ST11	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
121	COMPASS Stoer	UK	Acoustic	PAM Mooring	58,25768	-5,53893	106,37	Shallow	10/11/2017 - 05/03/2018	2017 and 2018	115	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	SAMS Soundtrap 335859734	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
122	COMPASS Stoer	UK	Acoustic	PAM Mooring	58,25768	-5,53893	99,6	Shallow	14/11/2018 - 09/03/2019	2018 and 2019	115	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 3 BP3, cable 3	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
123	COMPASS Tolsta	UK	Acoustic	PAM Mooring	58,39523	-6,01237	0	Shallow	14/11/2018 - 09/03/2019	2018 and 2019	115	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	Soundtrap 1 BP1, cable 1	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
124	COMPASS Tolsta	UK	Acoustic	PAM Mooring	58,39523	-6,01237	100	Shallow	09/03/2019 - 08/06/2019	2019	91	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	ST BP 9, cable 9	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
125	COMPASS Tolsta	UK	Acoustic	PAM Mooring	58,39523	-6,01237	102,81	Shallow	10/11/2017 - 06/03/2018	2017 and 2018	116	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	SAMS Soundtrap 336330799	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
126	COMPASS Tolsta	UK	Acoustic	PAM Mooring	58,39523	-6,01237	98	Shallow	06/03/2018 - 10/06/2018	2018	96	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	738725892 ST4	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
127	COMPASS Tolsta	UK	Acoustic	PAM Mooring	58,39523	-6,01237	99	Shallow	10/06/2018 - 14/11/2018	2018	137	-	20min on 40min off	0-48kHz	-	Acknowledge COMPASS	335843397 ST9	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
128	Tolsta	UK	Acoustic	PAM Mooring	58,39414	-6,01175	96,4	Shallow	18/08/2017 - 10/11/2017	2017	84	-	10min on 20min off	0-48kHz	-	Acknowledge EMFF	DSG-ST 1678045223	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
129	Kerrera	UK	Acoustic	PAM Mooring	56,35782	-5,63924	25	Shallow	23/08/2017 - 12/04/2018	2017 and 2018	232	-	10min on 20min off	0-48kHz	-	Acknowledge EMFF	DSG-ST 134787111	WAV	requires analysed for TOL for given time period	-	-	Marine Scotland Science	-
130	Plymouth	UK	Acoustic	autonomous recorder	50,30833	-4,20013	19	Shallow	2018/04/01 - ?	2018 and 2019	-	one location	15 min on / 15 min off	24-48kHz	-	-	Soundtrap ST300 STD	WAV	-	-	-	-	-
131	Bangor	UK	Acoustic	autonomous recorder	53,33643	-4,0279	22	Shallow	2018/03/01 - ?	2018 and 2019	-	one location	15 min on / 15 min off	24-48kHz	-	-	Soundtrap ST300 STD	WAV	-	-	-	CEFAS	-

B - Data Coverage Chart

Coordinates		January	February	March	April	May	June	July	August	September	October	November	December
2008													
Portugal		**PORTUGAL**											
38,53983	-29,04588												
38,53992	-29,04362												
38,98760	-29,88050												
38,98638	-29,88232												
2009													
Portugal		**PORTUGAL**											
38,53990	-29,04355												
2010													
Portugal		**PORTUGAL**											
38,54012	-29,04378												
38,98753	-29,88050												
2012													
Ireland		**IRELAND**											
51,76119	-8,24367												
Portugal		**PORTUGAL**											
38,53998	-29,04358												
38,20168	-28,98788												
2013													
France		**FRANCE**											
49,63260	-0,02431												cont. in 2014
49,86840	0,19822												cont. in 2014
49,61570	-0,38244												cont. in 2014
49,46340	-0,49500												cont. in 2014
2014													
Ireland		**IRELAND**											
51,5	-11,5												
51,5	-11,5												
51,5	-11,5												
France		**FRANCE**											
49,63260	-0,02431	started in 2013											
49,86840	0,19822	started in 2013											
49,61570	-0,38244	started in 2013											
49,46340	-0,49500	started in 2013											
Spain		**SPAIN**											
28.033889	-15.371944												
2015													
Ireland		**IRELAND**											
55,63017	−9,73023												
55,3018	−10,30840												
54,24563	−11,99587												
54,00138	−14,04242												
55,6323	−9,72522												
55,30105	−10,30372												
54,25128	−11,99402												
54,00153	−14,04288												
France		**FRANCE**											
50,20880	1,40110												cont. in 2016
50,25858	1,05202												cont. in 2016
50,06458	1,20617												cont. in 2016
50,15493	1,12195												cont. in 2016
46,83875	-2,47029												cont. in 2016
46,88081	-2,56217												cont. in 2016
46,76616	-2,43598												cont. in 2016
47,00049	-2,51716												cont. in 2016
Spain		**SPAIN**											
28.033889	-15.371944												
28.038000	-15.366667												
28.038000	-15.366667												
Portugal		**PORTUGAL**											
34,14373	-30,25672												
32,04665	-27,96897												
36,57532	-11,59695											cont. in 2016	
2016													
Ireland		**IRELAND**											
54,25022	−11,99263												
52,62254	−15,30446												
51,72257	−15,20771												
50,50957	−14,31242												
49,54771	−13,37298												
52,62214	−15,30469												
51,72447	−15,23419												
50,50848	−14,31495												
49,54783	−13,37230												
France		**FRANCE**											
50,20880	1,40110	started in 2015											
50,25858	1,05202	started in 2015											
50,06458	1,20617	started in 2015											
50,15493	1,12195	started in 2015											
46,83875	-2,47029	started in 2015											
46,88081	-2,56217	started in 2015											
46,76616	-2,43598	started in 2015											
47,00049	-2,51716	started in 2015											
Spain		**SPAIN**											
28.036317	-15.381800												
29.166667	-15.500000												
Portugal		**PORTUGAL**											
36,57532	-11,59695	started in 2015											
2017													
United Kingdom		**UNITED KINGDOM**											
56,23398	-5,75675												cont. in 2018
57,03640	-6,75433												cont. in 2018
56,90691	-6,73214												cont. in 2018
57,87614	-6,27214												cont. in 2018
56,09693	-8,02212												cont. in 2018
58,25768	-5,53893												cont. in 2018
58,39523	-6,01237												cont. in 2018
58,39414	-6,01175												
56,35782	-5,63924												cont. in 2018
France		**FRANCE**											
47,20449	-2,66774												
Spain		**SPAIN**											
29.166667	-15.500000												
Portugal		**PORTUGAL**											
38,45972	-28,60335												
38,50535	-28,63202												
38,45553	-28,54340												
38,45553	-28,54340												cont. in 2018

38,48600	-28,57650												

2018

United Kingdom		UNITED KINGDOM											
56,23398	-5,75675	started in 2017											
57,03640	-6,75433	started in 2017											
56,90691	-6,73214	started in 2017											
57,87614	-6,27214	started in 2017											
56,09693	-8,02212	started in 2017											
58,25768	-5,53893	started in 2017											
58,39523	-6,01237	started in 2017											
56,35782	-5,63924	started in 2017											
56,23398	-5,75675												
56,23398	-5,75675												
57,03640	-6,75433												
57,03640	-6,75433												
57,87615	-6,27288												
56,09693	-8,02212												
58,25768	-5,53893												
58,25768	-5,53893												
58,39523	-6,01237												
58,39523	-6,01237												
56,23398	-5,75675												cont. in 2019
57,03640	-6,75433												cont. in 2019
57,87615	-6,27288												cont. in 2019
56,09693	-8,02212												cont. in 2019
58,25768	-5,53893												cont. in 2019
58,39523	-6,01237												cont. in 2019
50,30833	-4,20013												cont. in 2019
53,33643	-4,0279												cont. in 2019
Ireland		**IRELAND**											
50,840657	-11,236539												
50,834462	-11,319225												
50,904246	-11,290947												
50,91045	-11,20815												
50,899953	-11,125091												
Portugal		**PORTUGAL**											
38,45553	-28,54340	started in 2017											
38,50418	-28,62825												
38,45553	-28,56302												
38,48983	-28,57855												

Coordinates		2019											
United Kingdom		**UNITED KINGDOM**											
56,23398	-5,75675	started in 2018											
57,03640	-6,75433	started in 2018											
57,87615	-6,27288	started in 2018											
56,09693	-8,02212	started in 2018											
58,25768	-5,53893	started in 2018											
58,39523	-6,01237	started in 2018											
50,30833	-4,20013	started in 2018											ongoing
53,33643	-4,0279	started in 2018											ongoing
56,23398	-5,75675												
57,03640	-6,75433												
56,09693	-8,02212												
58,25768	-5,53893												
58,39523	-6,01237												
Ireland		**IRELAND**											
53,738	-5,994												
53,737	-5,897												
53,787	-5,94												
France		**FRANCE**											
47,20449	-2,66774												
47,13463	-2,72790												
47,13824	-2,58307												
49,00000	-3,50000												ongoing
48,95000	-6,28500												ongoing
Spain		**SPAIN**											
43,61137	-2,656983												
28,02783	-15,36100												
29,16667	-15,50000												ongoing
29,16667	-15,50000												
Portugal		**PORTUGAL**											
38,50427	-28,62832												
38,45560	-28,56327												
38,48985	-28,57852												

C Detailed platform type distribution

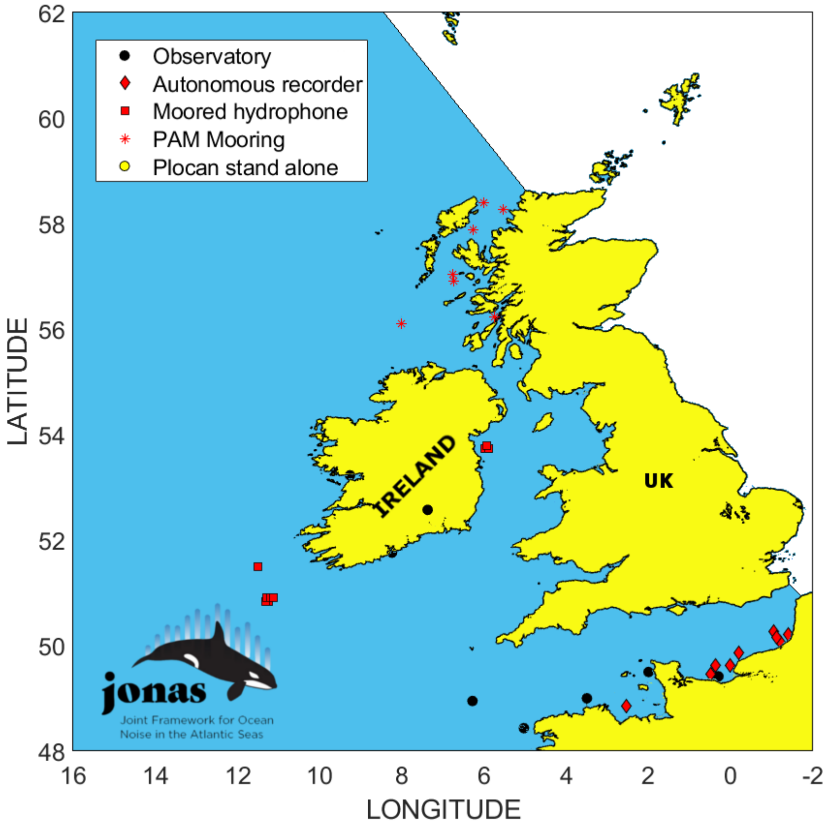

Figure 1: Platform type used in United Kingdom and Ireland.

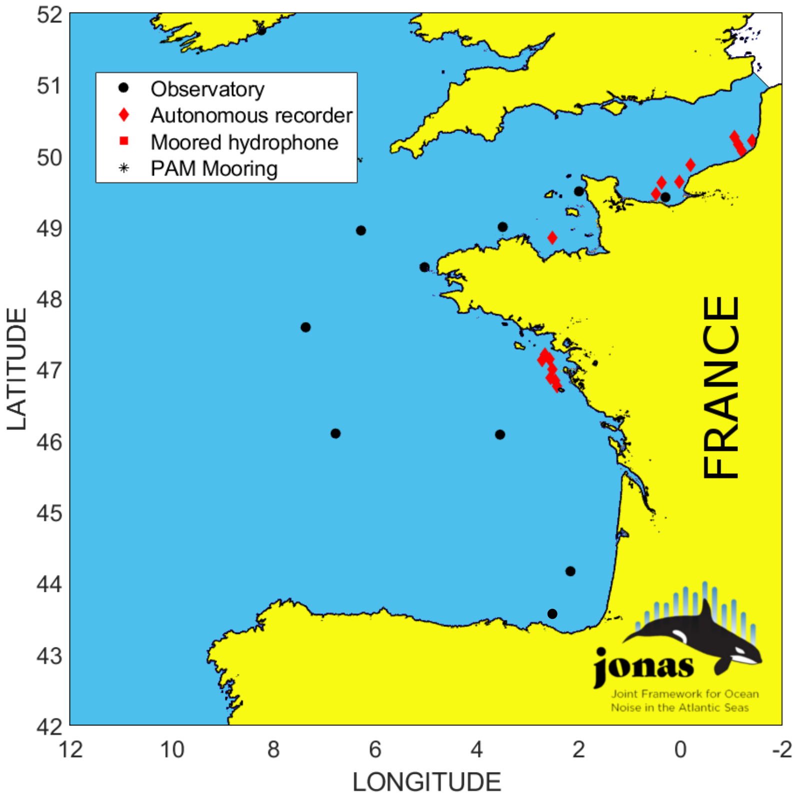

Figure 2: Platform type used in France.

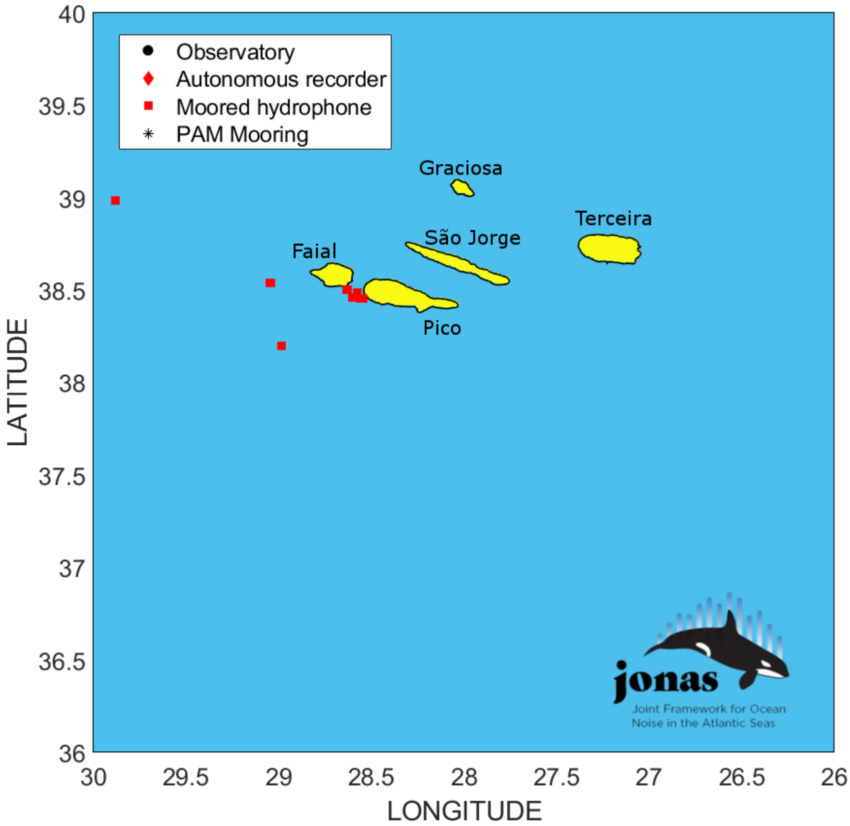

Figure 3: Platform type used in Azores.

D Detailed deployment over the years

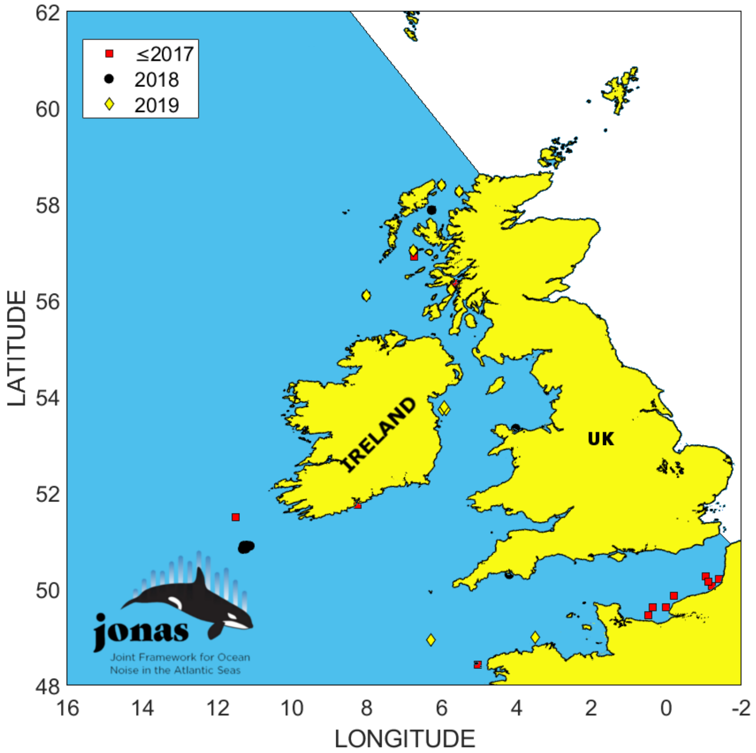

Figure 1: Detailed view of deployments over the years in United Kingdom and Ireland.

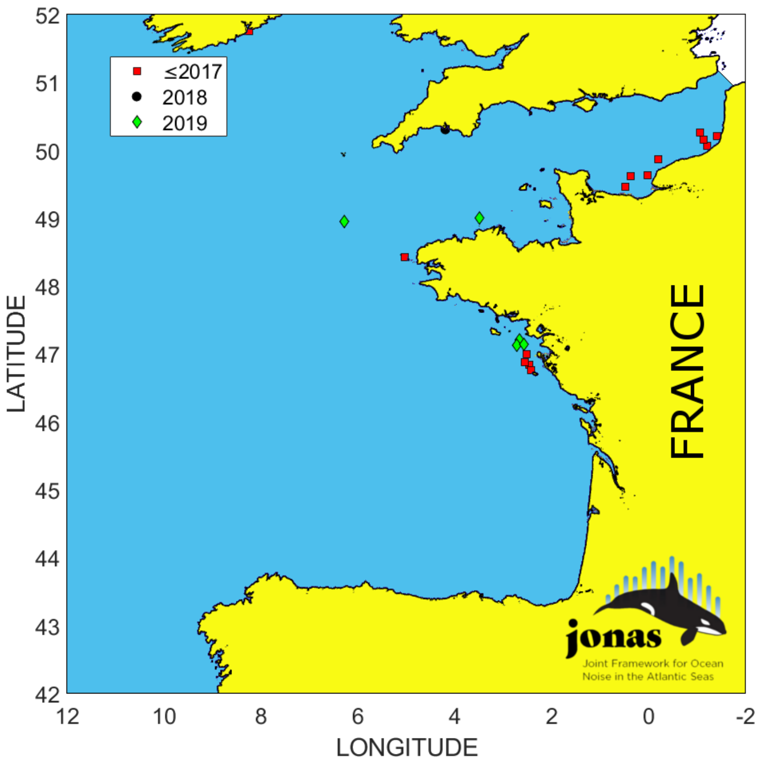

Figure 2: Detailed view of deployments over the years in France.

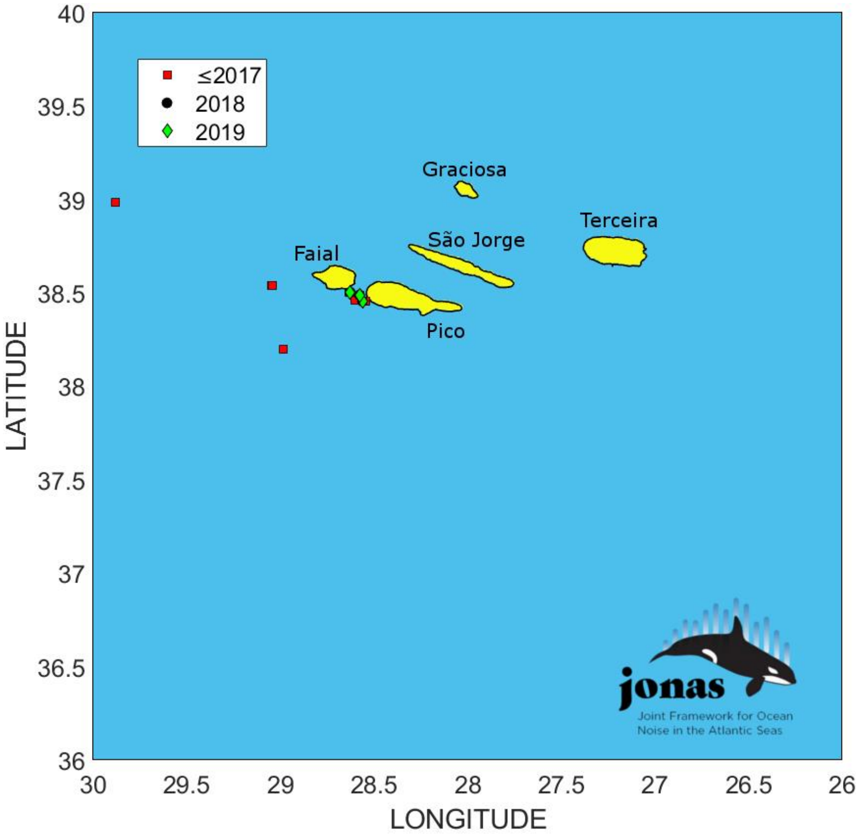

Figure 3: Detailed view of deployments over the years in Azores.