Appendix I

Prior to deployment, we performed an in-situ inter-calibration of all the temperature probes. We opted for in-situ instead of laboratory-controlled experiments to estimate the accuracy and precision of the probes in the same environment where we wanted to perform our measurements. The setting up of the inter-calibration experiment was as follows. Once in the Antarctic Base, and prior to start our experiment, we placed the 12 probes inside a net. We deployed them at a depth of 20 m to avoid solar radiation effects. We set them to measure at 1-second (1 Hz) intervals during 3.5 hours. The probes acquired thermal balance in ~0.5h, leading to ~10000 measurements for each probe after thermal balance. We calculate the mean temperature curve resulting from the arithmetical mean of the twelve time series. For each time step we calculate the remainder for each probe with respect to the mean temperature curve at that given time step. Then, we calculate the mean and standard deviation of the remainders, their 99.7% probability interval, and their confidence region (or interval) at 99.7% (Table A1).
The probability interval indicates that, for each instrument, at least, 997 times, the remainders of 1000 observations are upper-bounded by the maximum (in absolute value) of the two end points of the corresponding interval. Therefore, the probability interval gives us the upper bound of the error, i.e., a calibration of each instrument. We observe that the remainder of each instrument has an upper bound of order 10^{-2} ºC; in case of probe F10, this upper bound is 1.05 10^{-1}°C. This means that the accuracy of the probes is of order 10^{-2}°C (except for probe 10, which has an accuracy of order 10^{-1}°C). The confidence region (or interval) gives an estimation of the population mean of the remainders. These regions, or intervals, show a radius of order 10^{-4}. Note that, in all cases, the first fluctuation appears at 10^{-4}. That means that we have a strong confidence (99.7%) that the estimation of the population mean of the remainders is of order 10^{-4}.

Table A1. In-situ inter-calibration of bottom temperature probes.

Probe #	Mean of the remainders	Standard deviation of the remainders	Probability interval (99.7%)	Confidence region (99.7%)
1	0.0010639	0.0042666	[-1.1736e-02, 1.3864e-02]	[9.3594e-04, 1.1919e-03]
2	-0.048406	0.0073653	[-7.0502e-02, -2.6310e-02]	[-4.8627e-02, -4.8185e-02]
3	-0.00051771	0.0092626	[-2.8305e-02, 2.7270e-02]	[-7.9557e-04, -2.3984e-04]
4	0.0017815	0.0062525	[-1.6976e-02, 2.0539e-02]	[1.5939e-03, 1.9690e-03]
5	0.0091126	0.0063258	[-9.8648e-03, 2.8090e-02]	[8.9229e-03, 9.3024e-03]
6	-0.045469	0.0071427	[-6.6897e-02, -2.4041e-02]	[-4.5683e-02, -4.5255e-02]
7	0.0097628	0.0060233	[-8.3070e-03, 2.7833e-02]	[9.5821e-03, 9.9435e-03]
8	0.016162	0.0051253	[7.8574e-04, 3.1537e-02]	[1.6008e-02, 1.6315e-02]
9	-0.059306	0.0055953	[-7.6092e-02, -4.2520e-02]	[-5.9474e-02, -5.9138e-02]
10	0.066753	0.0128565	[2.8183e-02, 1.0532e-01]	[6.6367e-02, 6.7139e-02]
11	0.017020	0.0056781	[-1.3743e-05, 3.4055e-02]	[1.6850e-02, 1.7191e-02]
12	0.032043	0.0072190	[1.0386e-02, 5.3700e-02]	[3.1827e-02, 3.2260e-02]

Appendix II

The hypothesis of a propagating wavelike structure can be examined in terms of frequency. The frequency range for topographic waves is given by:

$$\omega = \beta N \sin\theta \coth(kNH/f) \quad \text{(A1)}$$

where β is the topographic slope, N is the Brünt-Väisälä frequency, θ is the wave propagation direction with respect to the slope, k is the wavenumber, H is the mean depth and f the Coriolis parameter (Pedlosky, 1979, p. 378). The high frequency limit corresponds to a wave propagating along-slope and is given by $\omega = \beta N$. The average slope in Port Foster is 0.11 to 0.32 (Figure A1), and the Brünt-Väisälä frequency in the lower layer of the water column (i.e., from 60 to 160 m) is N = 0.0026 s^{-1} (Figure A1). Given these values, the threshold period ranges 2.1 to 6.1 h. Given that topographic waves exist strictly at sub-inertial frequencies (Brink 1991) the cut-off frequency obtained under stratified conditions is meaningless. However, in homogeneous conditions, N ~0.001 s^{-1} (Lenn *et al.* 2003; their Figure 8b), which leads to a threshold period of 5.5 to 15.9 h. Therefore we expect coastal-trapped waves in Port Foster of period longer than the inertial period (i.e., ~13.5 h) in summer and larger than ~15.9 h in winter. Wave-like patterns at periods of ~1 to 2 days (Figure 6 and Figure 7) are therefore not surprising.

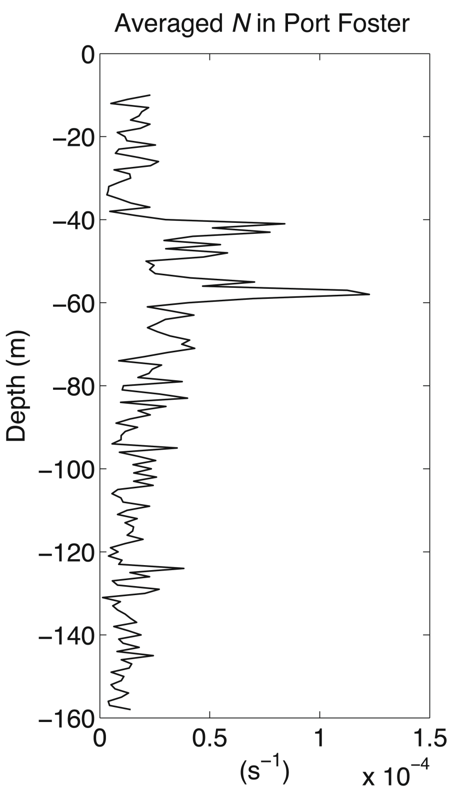

Fig. A1. Averaged Brünt-Väisälä frequency, N (in s^{-1}) in Port Foster obtained from CTD stations 3 to 7 (see location Figure 1).