SUPPLEMENTARY INFORMATION

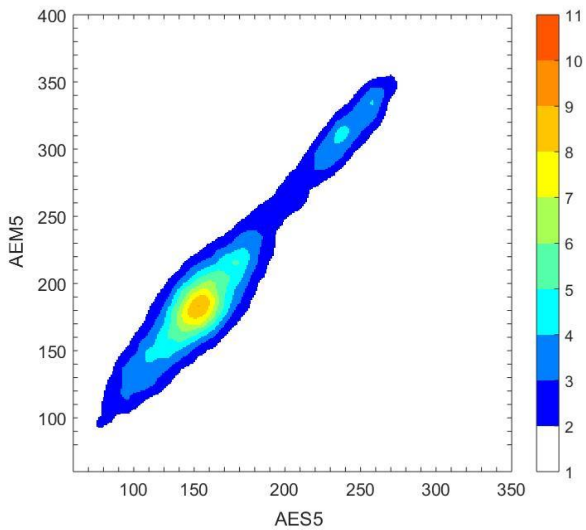

Fig S1. The down-looking (AEM5) signal versus the up-looking signal (AES5) at the same depth. The color scale indicates the number of data pairs within a quadrant of units AES5=0.4 and AEM5= 0.5.

We compared the down-looking (Master, AEM5) and up-looking (Slave, AES5) LADCP using only downcast data to derive a correlation (**Fig. S1**). When we compared the depth profiles of both beams from one cast, then the down-looking master channel sometimes recorded peaks representing thin layers that were not found in the up-looking slave channel. This was probably the result of the rosette with the LADCP passing through these thin-layers before the slave channel measured at that depth of the thin-layer; this eliminated the thin-layers either by dispersion and mixing or by flight response. These thin-layer peaks are responsible for part of the variance of the regression slope in **Fig. S1**. A type 2 linear regression of the data in **Fig. S1** yielded: slope: 1.082+/-0.002; y-intercept: -2.44+/-0.24; n: 35647; Pearson correlation coefficient. 0.944. We applied a conversion equation based on this linear regression to adjust the AES5 data to the AEM5 response and fill in the top 50 m of the AEM5 profile. Because the up-looking beam only provided data below 5 m depth, we extrapolated the data from 6m depth to the surface to complete the profile. The LADCPs measures data in 10m depth bins, thus the data attributed to 6 m depth are really an average between 1-11m depth. Therefore, any significant change in acoustic target above 6m depth would be underestimated.

To estimate the volume backscatter signal related to particles that we define as organisms, i.e. Acoustic Backscatter population (*ABP*) we have to subtract a backscatter baseline (*BB*), from the acoustic volume backscatter (*AVB*) signal received by the LADCP as echo strength

$$ABP = AVB - BB \qquad \text{Eq. 1}$$

We used a single baseline value (*BB*) to subtract from all *AVB* data obtained during this cruise, assuming that the sensitivity of the ADCP had not changed during the cruise. To arrive at the baseline value, the lowest values in each profile has been registered. In **Fig. 2**, we graphed the lowest values against the depths where the lowest value in each profile was found. In most profiles, the lowest values were within the ODL at less than 500 m, only in a few profiles the lowest value was at the low end of the profile near 2000 m. We considered that in the latter cases, migrating organisms increased the lowest *AVB* values within the ODL during the day.

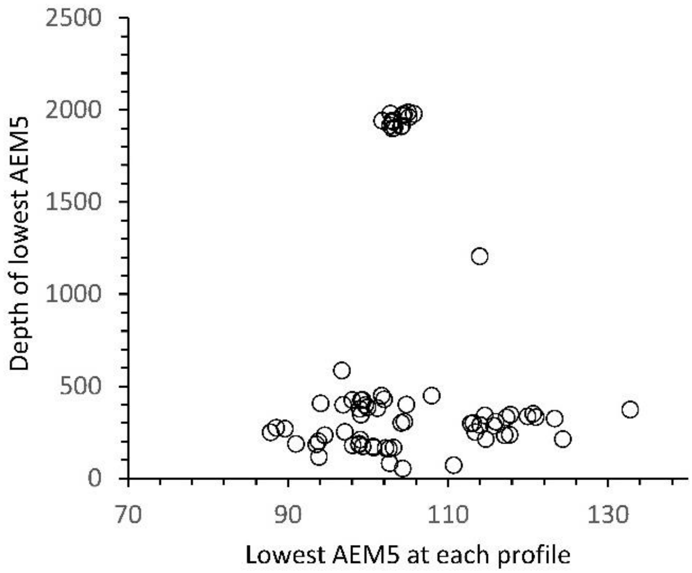

Fig S2. The lowest AEM5 values found in each profile at the indicated depth.

Sorting the data in **Fig. S2** we get **Fig. S3**, where we found no trend related to station/cast numbers and no difference between day and night. Here we used the value of 90 as a baseline (*BB*) to subtract from all LADCP data, and we interpret the values above 90 as the signal corresponding to organisms that represent the backscatter (*ABP*).

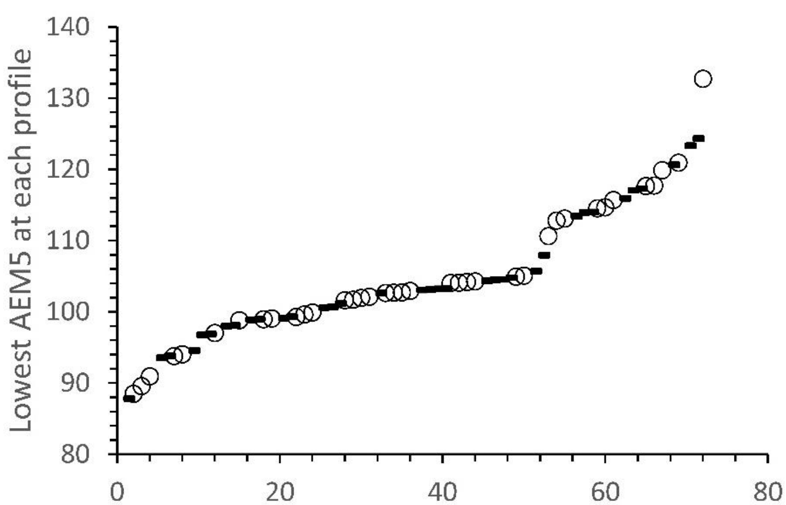

Fig S3. The lowest acoustic volume backscatter values recorded in each profile sorted by values. The dashes indicate data from night profiles (18:00 to 06:00 solar day time) and the circles day time samples.