Table S1 Variance inflation factor (VIF) of co-variables used in the sardinella and anchovy model.

| Sardinella model | Variable | VIF | Anchovy model | Variable | VIF |
|---|---|---|---|---|---|
| | Temperature | 2.51 | | Temperature | 2.51 |
| | Chlorophyll | 2.04 | | Chlorophyll | 2.01 |
| | Latitude | 1.49 | | Latitude | 1.50 |
| | Bottom depth | 2.68 | | Longitude | 1.78 |
| | Oxygen | 2.07 | | Oxygen | 2.07 |
| | Multinet filtered water volume | 1.58 | | Multinet filtered water volume | 1.58 |

Table S2 Spawning areas and associated temperature ranges of anchovy (*Engraulis encrasicolus*); in light grey spawning period and in dark grey peak spawning period.

| Reference | Area | Surface Temp [°C] | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Motos et al. 1996 | Bay of Biscay | 14 – 18 | | | | | | | | | | | | |
| Somarakis et al. 2004 | Bay of Biscay | 13 – 22 | | | | | | | | | | | | |
| Palomera 1992 | NW Mediterranean | 15 – 20 | | | | | | | | | | | | |
| Somarakis et al. 2004 | Northern Aegean Sea | 16.7 – 25.5 | | | | | | | | | | | | |
| Present study | Southern Senegal, Gambia, Guinea-Bissau | <20 °C (mean temperature of uppermost 25 m) | ? | ? | ? | ? | | ? | ? | ? | ? | ? | ? | ? |

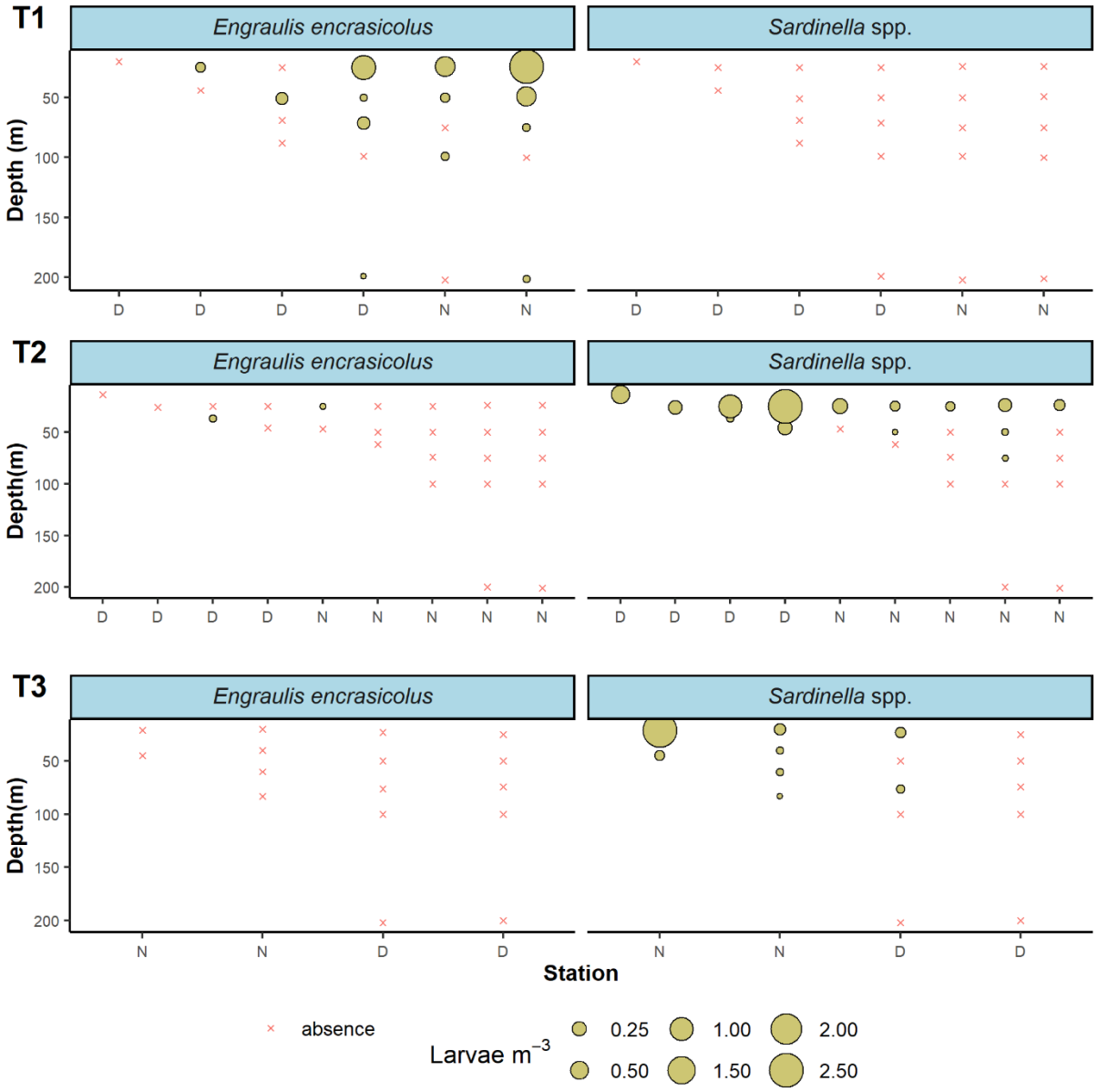


Fig. S1 Vertical distribution of larval density (larvae $m^{-3}$) for *E. encrasicolus* and *Sardinella* spp. in the three selected transects (T1, T2, T3 indicated in Fig. 1). Depth positions of the values indicate the lower depth of the tow. Ticks at the x-axis indicate the position of the stations from inshore to offshore. Day or night sampling at each sampling site is indicated with D or N, respectively.

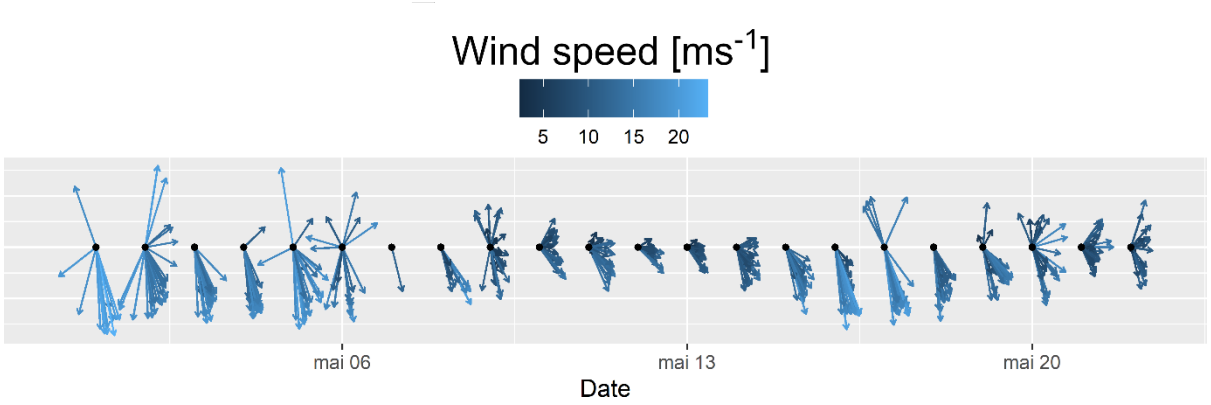


Fig. S2 Arrows (vectors) of hourly mean wind direction and speed for the period 1 – 22 May 2022 measured on board Dr. Fridtjof Nansen; arrow length is relative to the mean wind speed represented also in a blue colour scale.

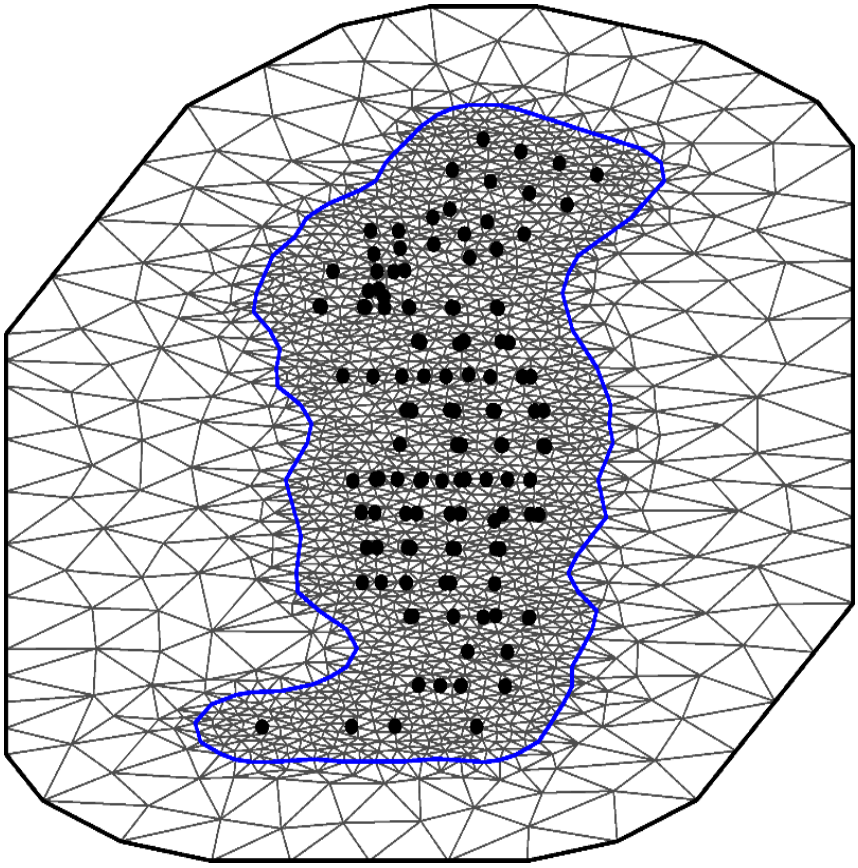

Fig. S3 Sampling stations (black dots) superimposed on the spatial random field (mesh) used in the model. The mesh is based on constrained refined Delaunay triangulation; the random spatial field represents the $v_{i,j}$ in both models; the estimated spatial correlation is based on the Matérn correlation that estimates w which is visualized in Fig. 5 in the main article. A more detailed description on how to create and use a mesh in R-INLA is described in Zuur et al. (2017).

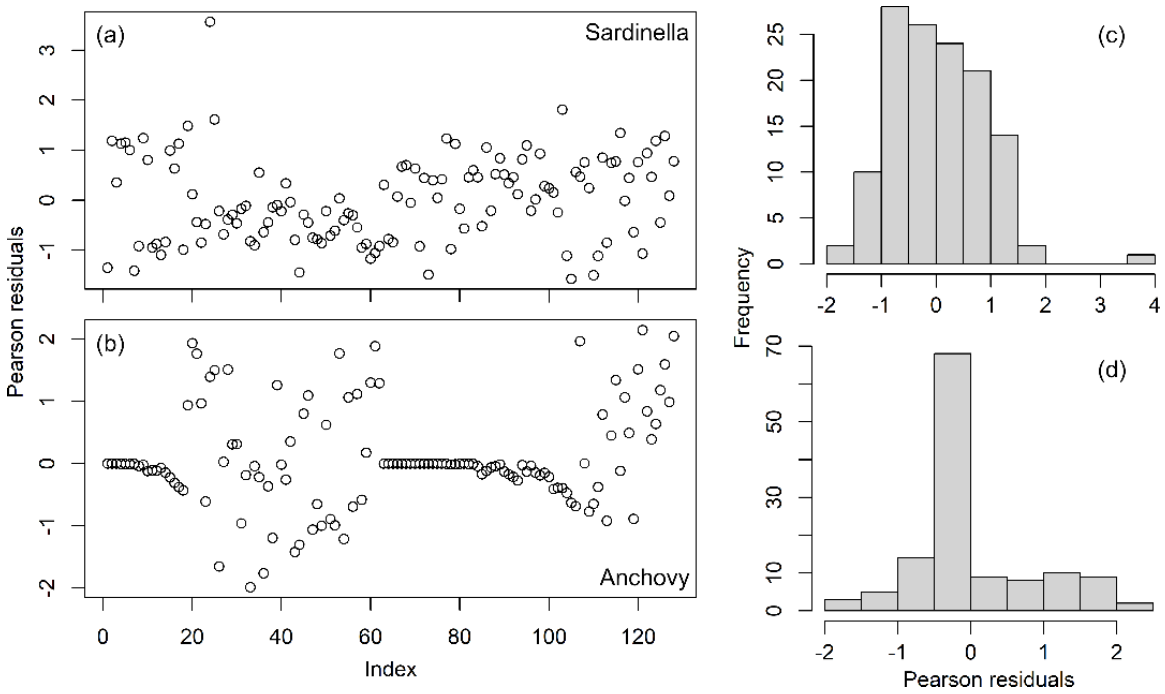


Fig. S4 Model validation plots for sardinella (a and c) and anchovy (b and d). Person residual plots (left panel) and histograms (right panel).

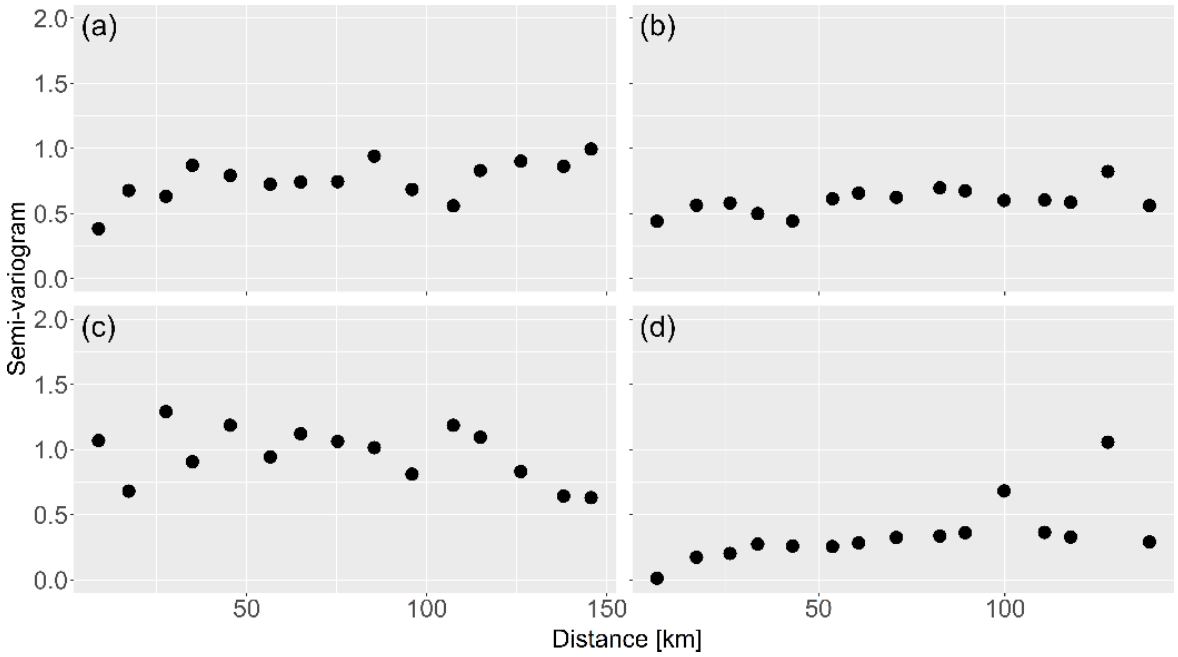


Fig. S5 Variograms testing the spatial correlation between sites after using the spatial random field (S1 Fig. 2) in the models; in a perfect model the points should be on a horizonal line; (a) leg 1 and (b) leg 2 representing the sardinella model and (c) leg 1 and (d) leg 2 representing the anchovy model.

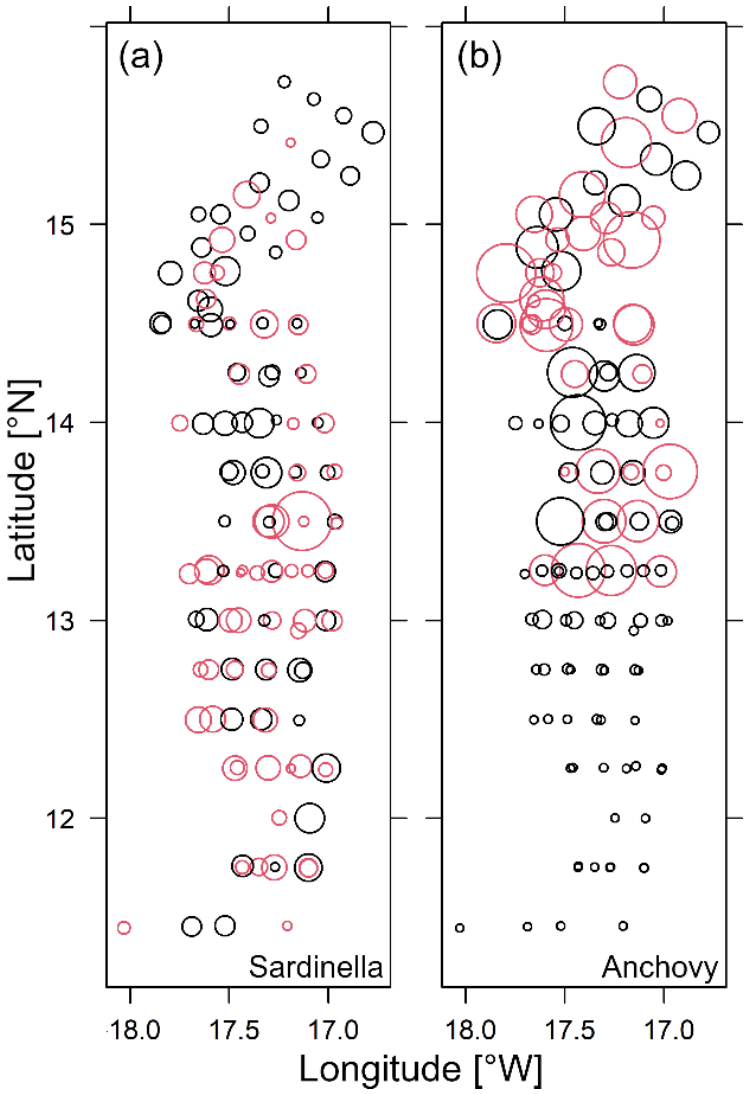


Fig. S6 Pearson residuals mapped from sardinella model (a) and anchovy model (b); red bubbles mark positive residuals and black bubbles negative residuals. The bubble size is based on the dimension of the residuals (S1 Fig.3 a-b); statistically optimal would be a homogenous spread of different sized and coloured residuals.

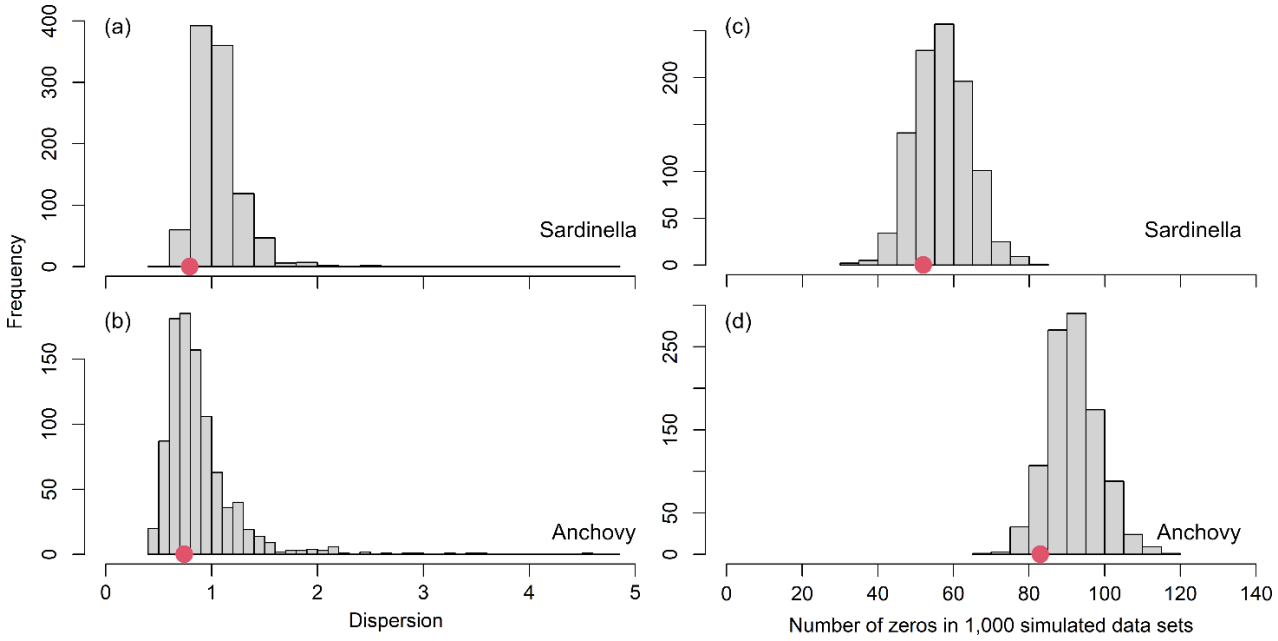


Fig. S7 Histograms of the simulation study to investigate whether the dispersion parameters of the models (a-b) fit in the range of the simulated data sets for sardinella (top) and anchovy (bottom). The red dots (a-b) indicate the dispersion parameter from the models. Histograms (c-d) show the zero counts in 1,000 simulated data sets with the red dots indicating the original zero counts from the field observations.

## Text S1. Acoustic sampling

Acoustic recordings were conducted during both legs. Acoustic transects were parallel and spaced 15 NM apart between 20 m and 1,000 m bottom depth (Figure 7). Raw data of acoustic echoes were recorded continuously throughout the survey using a Simrad ER60 scientific echo sounder equipped with keel-mounted transducers at nominal operating frequencies of 18, 38, 120 and 200 kHz. Only NASC recordings from the 38 kHz transducer were used to identify sardinellas and anchovies in this study. Standard sphere calibrations were carried out prior to the survey on the 24.02.2013 (Baía dos Elefantes, Angola). Calibration results are available from the authors upon request together with more detailed technical specifications and operational settings of the echo sounders.

The acoustic raw data were scrutinized using the Large Scale Survey System (LSSS) software version 1.6.1 (release version from August 22, 2012) (Korneliussen et al. 2006). The mean 1 NM area backscattering coefficient NASC ($m^2/NM^2$) was allocated to a predefined set of species groups based on established echogram features (FAO 2009). These species groups included "*Sardinella* spp." (both *S. aurita* and *S. maderensis*), "Anchovy", "Pelagic group 2" (other pelagic fish species than clupeoids), "Mesopelagic species", "Demersal species" and "plankton". *S. aurita* and *S. maderensis* are difficult to separate acoustically and are therefore considered as one acoustic group. *Sardinella* spp. typically resemble "finger" or "blob" like patterns mostly in upper parts (~20 m) of the water column. Anchovy can be distinctly separated on the echogram. This species has considerably smaller school sizes than *Sardinella* spp. with a "needle" like appearance in the echograms, also occur mostly in the upper 20 m of the water column. However, the echo reflection of anchovy is typically stronger than for *Sardinella* spp. and a strong Sv threshold can be applied without losing any of the echo energy to separate the two groups.

Anchovy schools can also be mixed with sardinella schools. In these incidences, the groups are difficult to be separated acoustically. However, in such situations acoustic registrations are verified by means of targeted trawling. The relative proportion of the two groups in a trawl catch are normally used to indicate the proportion of the two species in the echograms (MacLennan & Simmonds 1992).

## References

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