Supplementary Information

A standard processing framework for the location data of satellite-linked buoys on Drifting Fish Aggregating Devices

Yannick Baidai (contact Author)[12], Jon Uranga[3], Maitane Grande[3], Hilario Murua[4], Josu Santiago[3], Iñaki Quincoces[3], Guillermo Boyra[3], Blanca Orue[5], Laurent Floch[1] and Manuela Capello[1]

[1] MARBEC, Univ Montpellier, CNRS, Ifremer, IRD, Sète, France

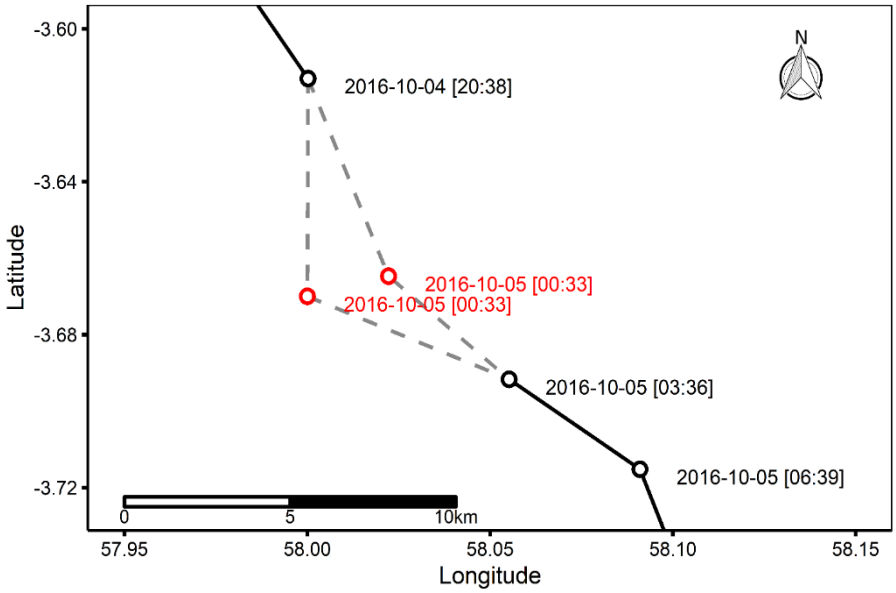
[2] Centre de Recherches Océanologiques (CRO), 29, rue des Pêcheurs BPV. 18 Abidjan Côte d'Ivoire.

[3] AZTI-Tecnalia, Herrera kaia portualdea z/g 20110 Pasaia (Gipuzkoa), Spain

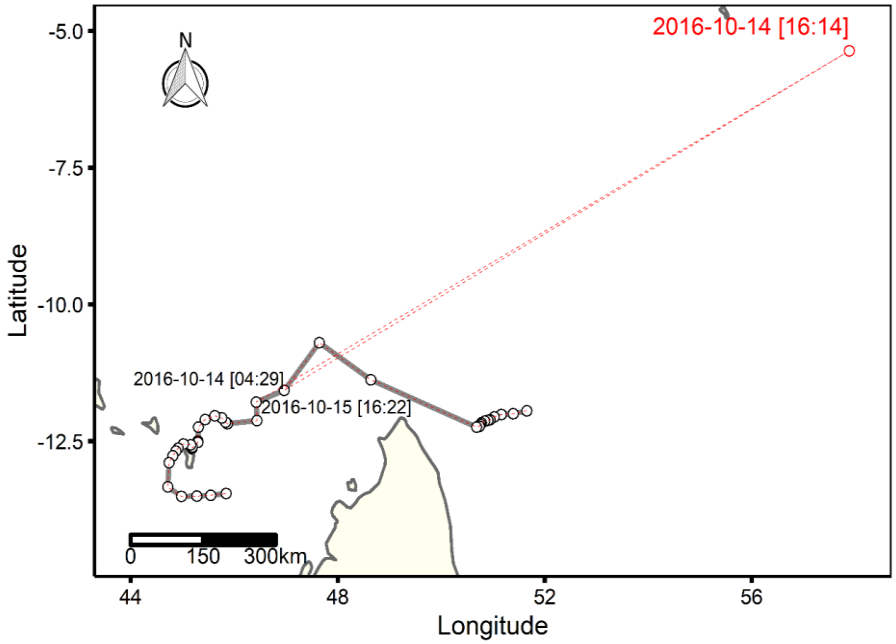
[4] International Seafood Sustainability Foundation (ISSF), Washington DC, United States of America

[5] Collecte Localisation Satellites (CLS), Parc Technologique du Canal, 11 Rue Hermès, 31520 Ramonville-Saint-Agne, France

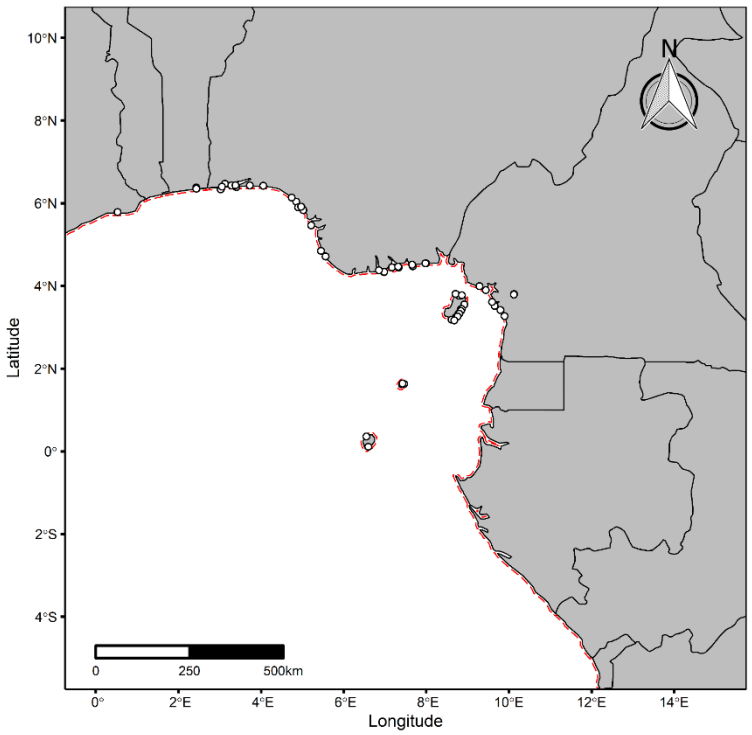
Email address for contact author: yannick.baidai@ird.fr



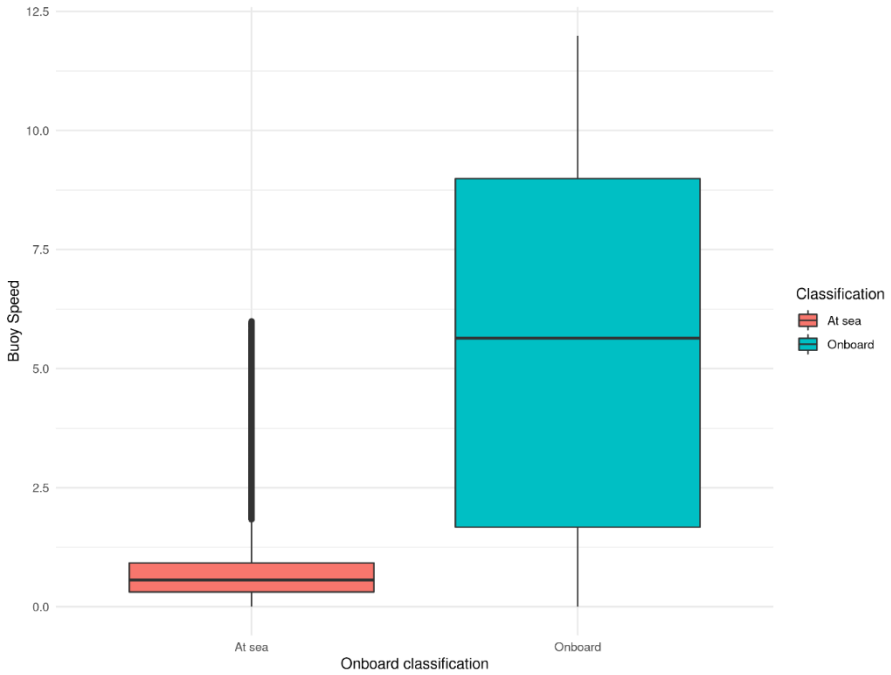
Supplementary figure 1: Example of ubiquitous buoy positions. The two red points correspond to two distinct positions provided by the same buoy at the same timestamp (October 10, 2016 at 00:33).



Supplementary figure 2: Example of an isolated buoy position. The red points correspond to the position of a buoy separated from its closest neighbors by an inconsistent distance (the speed required to achieve this distance is far greater than the speeds of both tuna purse seine vessels and ocean currents).

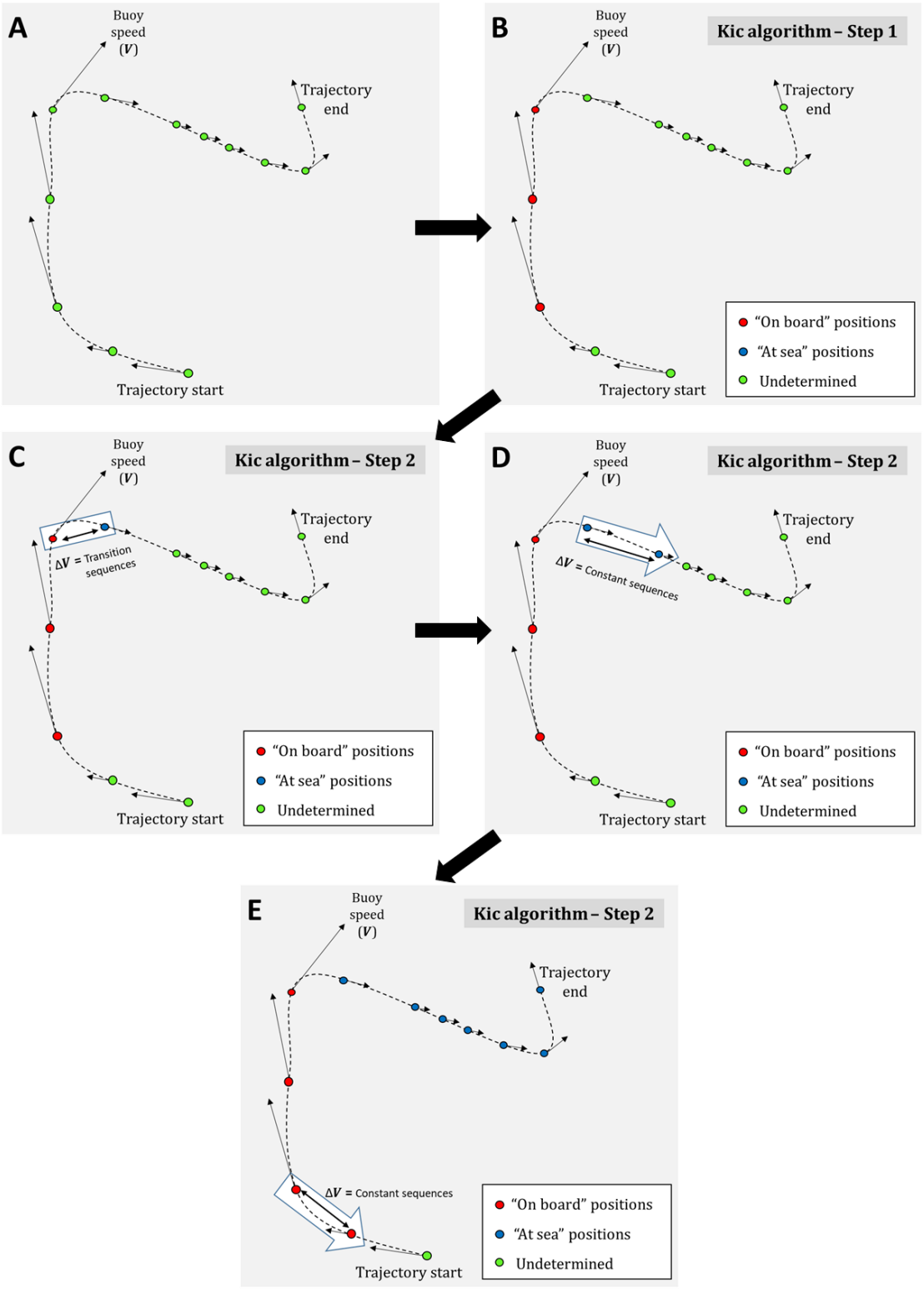


Supplementary figure 3: Land positions. The white points corresponds to sample of buoy positions detected on land using a 0.05° buffered shoreline data from the GSHHG database (Global Self-consistent, Hierarchical, High-resolution Geography; Wessel and Smith, 1996)[1]. The red dashed line represents the buffer zone around the shoreline.



Supplementary figure 4: Boxplots of on-board and at-sea buoy speeds (in knots) from the training data used to build the random forest classification algorithm. The training data consisted of location data provided by buoys equipped with sensors that automatically detect their immersion in seawater.

[1] Wessel, P., et Smith, W. H. F. F. 1996. A global, self-consistent, hierarchical, high-resolution shoreline database. Journal of Geophysical Research: Solid Earth, 101: 8741‑8743. http://doi.wiley.com/10.1029/96JB00104.



Supplementary figure 5: Schematic description of the kinetic classification algorithm (KiC). (**A**) The green points represent the different positions with undetermined status, recorded along a buoy trajectory. The length of the black arrows roughly reflects the value of the speed associated with the position. (**B**) The red points correspond to buoy positions classified as "on board" after the first step of the KiC algorithm, given their buoy speed above 6 knots. (**C**) The step 2 of the KiC algorithm relies on the comparison of changes in buoy speed with those found for "constant" and "transition sequences. Here, the value of the speed change between the first undetermined position following a classified position is consistent with a transition sequence. The undetermined position is therefore classified as "at sea". (**D**) The operation is performed along the buoy segment, classifying positions from neighbor to neighbor. (**E**) The same procedure is then carried out backwards (from the end of the trajectory to the beginning), considering the remaining unclassified positions

Exchange format for buoys data location

This document proposes a standard format for the buoy location database. This format has been used as input for the methods developed for processing buoy location data.

The data should be saved in a .csv format (semicolon separated file), with no missing information for some fields (see mandatory fields in Table 1). For other fields, where information is missing, an empty string of length zero should be added between the semicolons.

Supplementary table 1: Standard data format for buoy location data.

Type	**Variable**	**Code**	**Format/Unit**	**Mandatory**
Buoy	Brand	BRAND	Character string	☐
	Model	MODEL	Character string	☐
	Buoy identification code	ID	Character string	☒
Operation data	Latitude	LATITUDE	Decimal degrees	☒
	Longitude	LONGITUDE	Decimal degrees	☒
	Timestamp	TIMESTAMP	YYYY-MM-DD HH:MM	☒