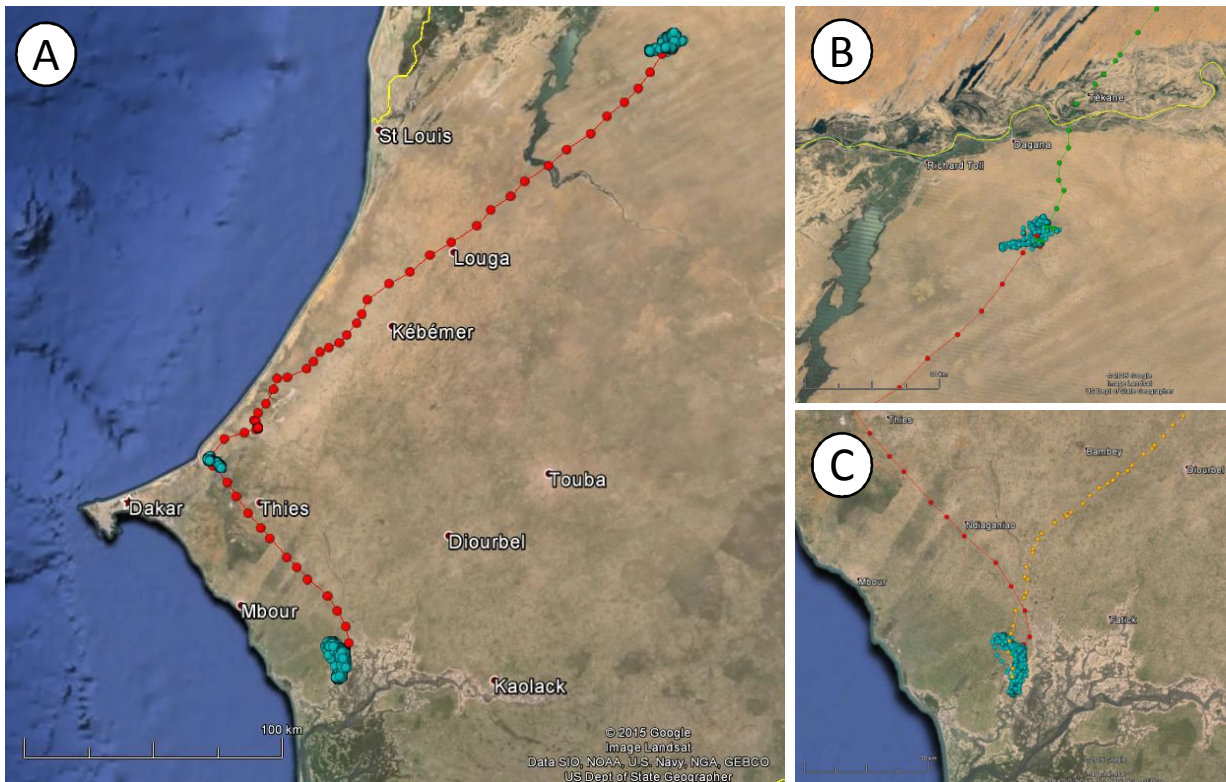
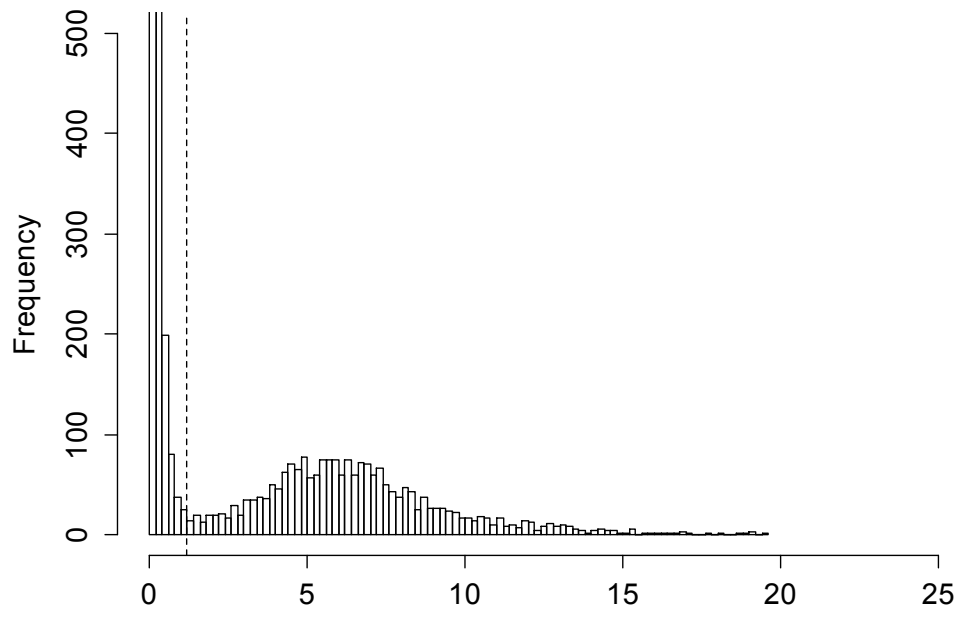


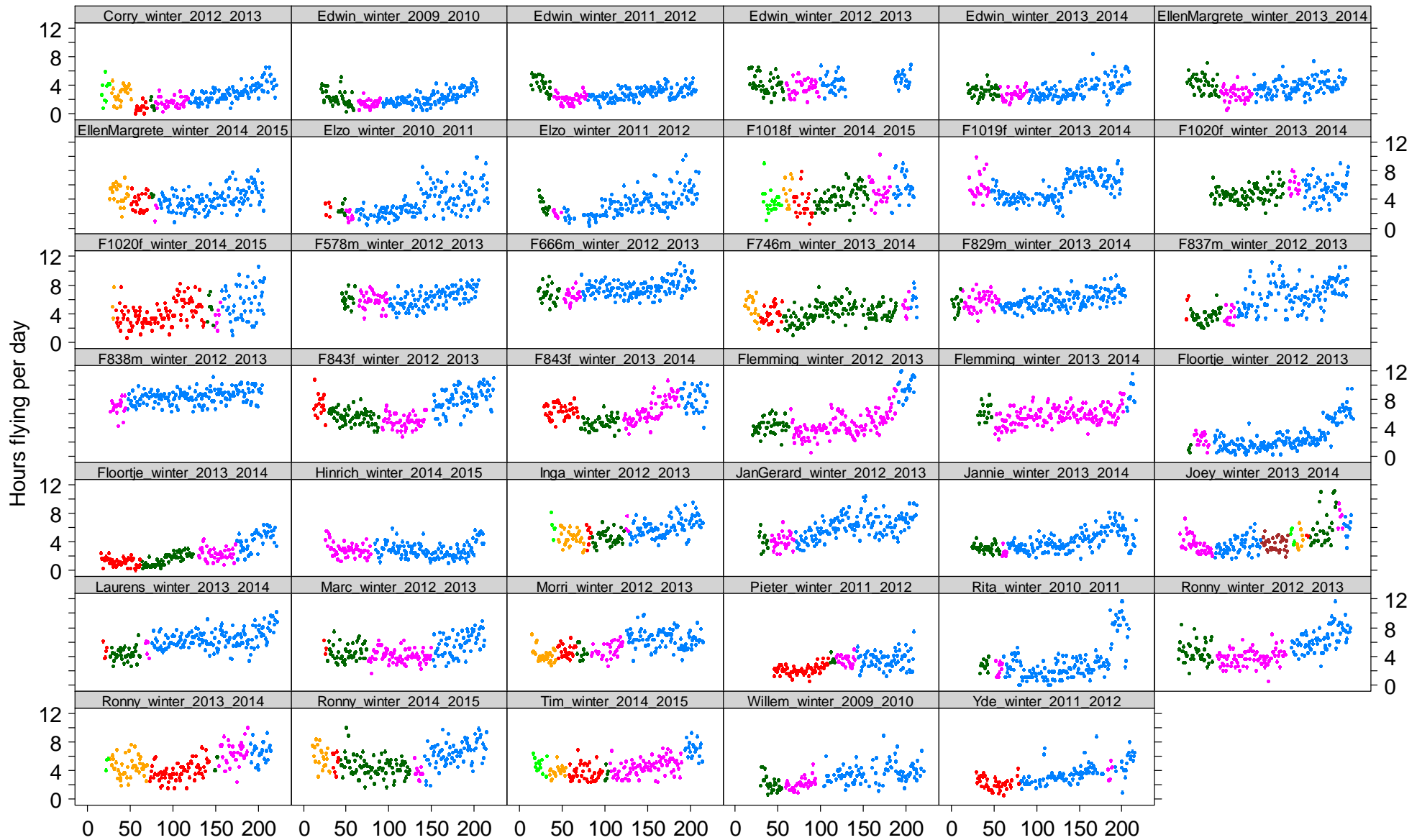
**Fig. S1:** Annual rainfall (mm) at Kaolack, Senegal (14.15°N 16.08°W). Data kindly provided by L. Zwarts. The years 2014 and 2015, during which the study took place, are indicated with red dots.



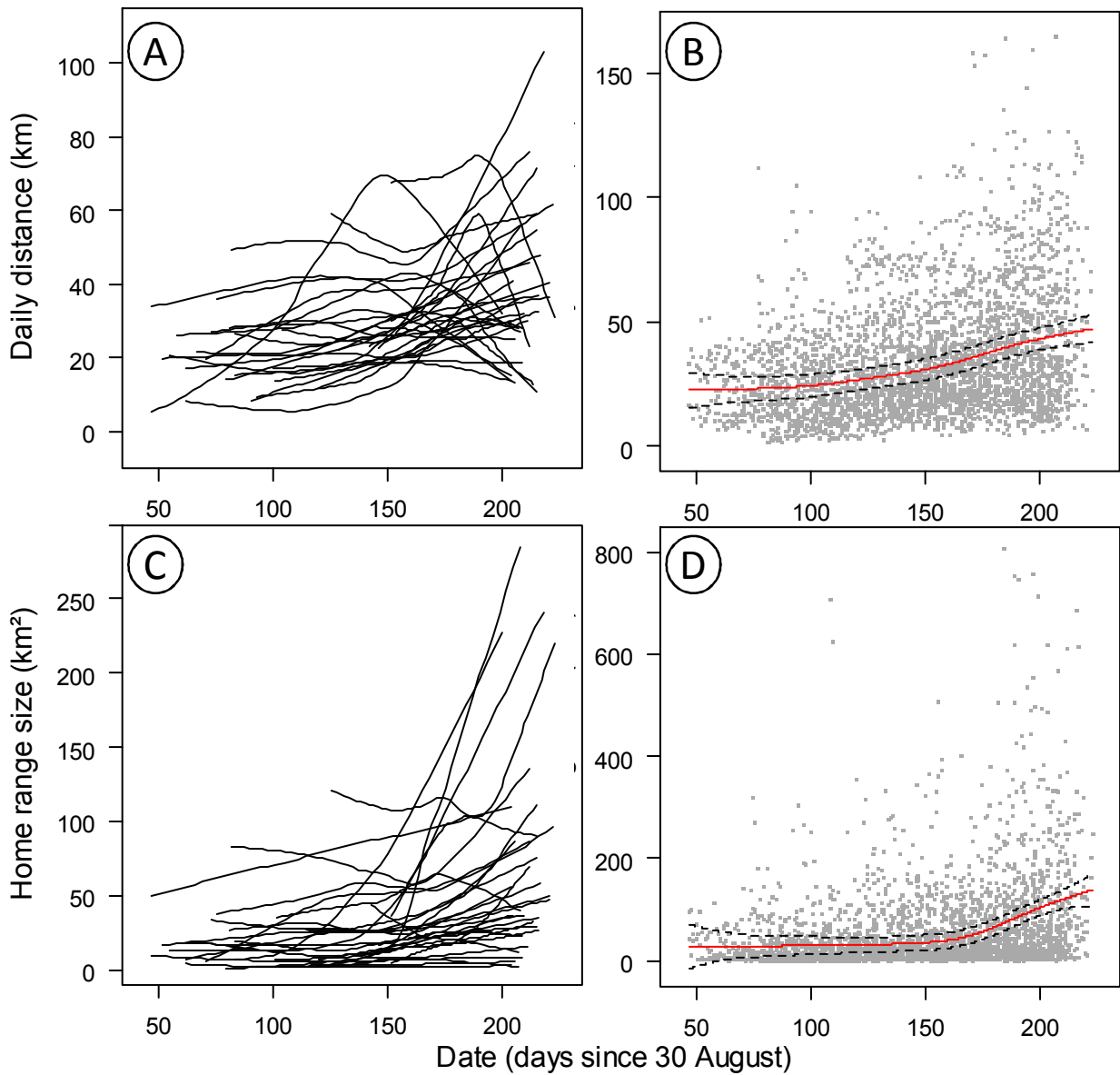
**Fig. S2:** Example of a typical winter season of a male Montagu's Harrier wintering in Senegal. **A:** The consecutive wintering sites (light blue) with travel days between sites (red) of male *Edwin* in winter 2013/2014. **B:** Arrival day (green) to first site on 17.09.2013. **C:** Departure day (yellow) on 27.03.2014, clearly distinguishable from stay at site three (light blue).



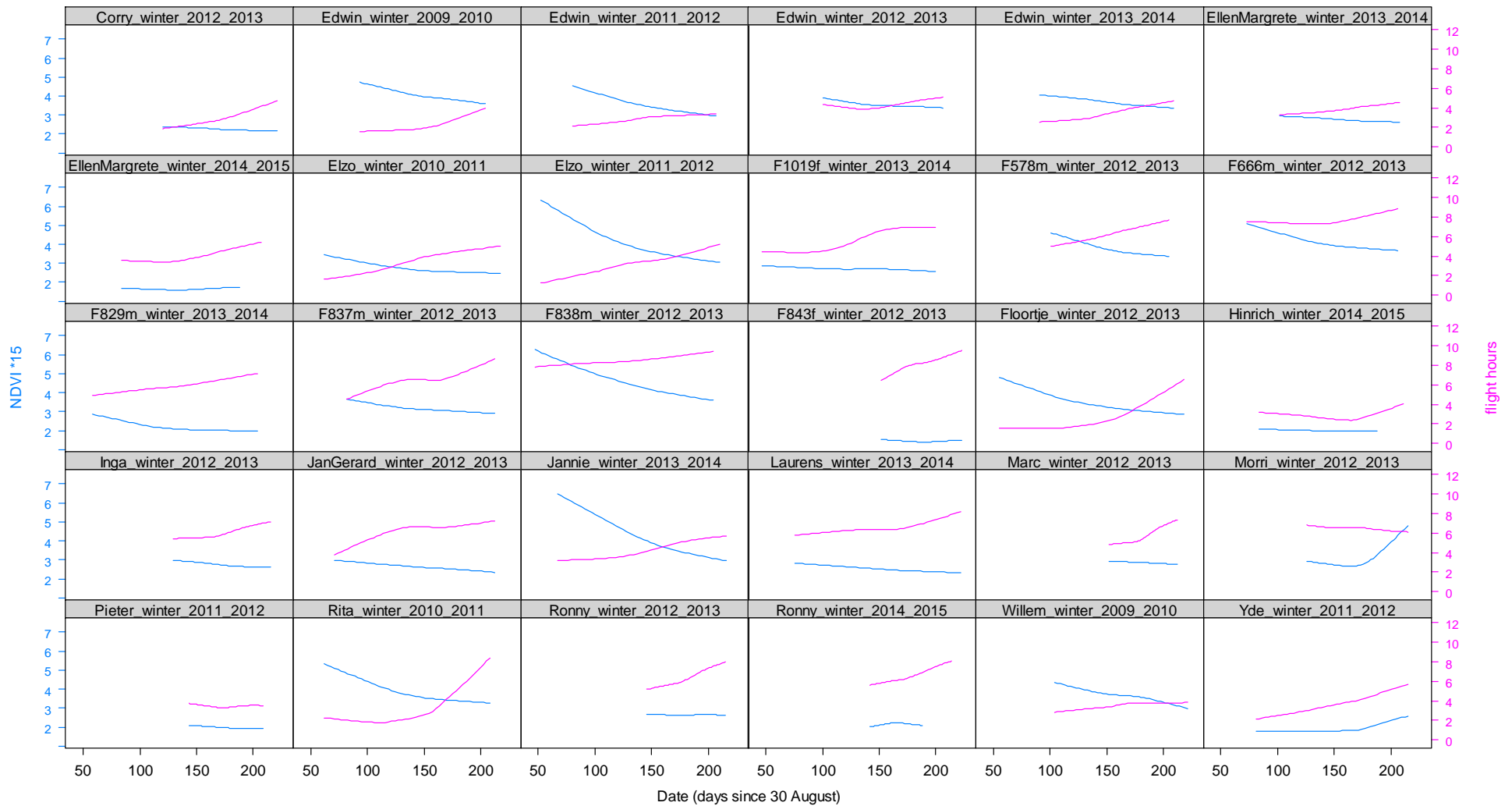
**Fig. S3:** Example of a frequency distribution of instantaneous flight speeds (in m/s). A threshold of 1.2 m/s was used to distinguish between flying and sitting (dashed vertical line).



**Fig. S4:** Daily hours spent flying of GPS-tracked Montagu's Harriers during the whole wintering season. Different colors indicate different wintering sites, the final site is shown in blue.



**Fig. S5:** **A/B:** Cumulative distance of GPS-tracked Montagu's Harriers at their final wintering site. **C/D:** Kernel home range size (95%) of GPS-tracked Montagu's Harriers at their final wintering site. Given are loess smoothed raw data per individual on the left and raw data overlaid by predicted values of GAMMs (red) with two times standard errors (dashed lines) on the right. Scales differ between left and right panels. Due to scaling, 8 and 7 points are not shown on the right on top and bottom, respectively.



**Fig. S6:** Daily time spent flying (pink, right axis) and Normalized Difference Vegetation Index (NDVI)\*15 (blue, left axis) used as proxy for grasshopper abundance at the final wintering site of Montagu's Harriers. Lines show loess smoothed raw data.