Publicatie

Bird Radar Validation in the Field by Time-Referencing Line-Transect Surveys

Samenvatting

Track-while-scan bird radars are widely used in ornithological studies, but often the precise detection capabilities of these systems are unknown. Quantification of radar performance is essential to avoid observational biases, which requires practical methods for validating a radar's detection capability in specific field settings. In this study a method to quantify the detection capability of a bird radar is presented, as well a demonstration of this method in a case study. By time-referencing line-transect surveys, visually identified birds were automatically linked to individual tracks using their transect crossing time. Detection probabilities were determined as the fraction of the total set of visual observations that could be linked to radar tracks. To avoid ambiguities in assigning radar tracks to visual observations, the observer's accuracy in determining a bird's transect crossing time was taken

into account. The accuracy was determined by examining the effect of a time lag applied to the visual observations on the number of matches found with radar tracks. Effects of flight altitude, distance, surface substrate and species size on the detection probability by the radar were quantified in a marine intertidal study area. Detection probability varied strongly with all these factors, as well as species-specific flight behaviour. The effective detection range for single birds flying at low altitude for an X-band marine radar based system was estimated at ~1.5 km. Within this range the fraction of individual flying birds that were detected by the radar was 0.50±0.06 with a detection bias towards higher flight altitudes, larger birds and high tide situations. Besides radar validation, which we consider essential when quantification of bird numbers is important, our method of linking radar tracks to ground-truthed field observations can facilitate species-specific studies using surveillance radars. The methodology may prove equally useful for optimising tracking algorithms.

Referentie

- Dokter, AM, Baptist, MJ, Ens, BJ, Krijgsveld, KL, van Loon, EE. 2013. Bird Radar Validation in the Field by Time-Referencing Line-Transect Surveys. PLoS ONE e74129.

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Jaar van uitgave:

2013

Uitgever:

PLoS ONE

Publicatiemedium:

Artikel

Publicatietaal:

Engels

Links
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