SUPPLEMENTARY MATERIAL: Analysis of effect on airspeed estimate by length of intervals for calculated means

1. OBJECTIVE

The average airspeed in the present study was calculated based on 10 second intervals. Means of these 10 second intervals were calculated and the final mean airspeed for each complete tracking was calculated as the mean of these 10 seconds interval means. The speed estimate will potentially be affected by the length of the intervals and therefore we investigated the magnitude of this effect.

2. ANALYSIS

To study the effect of the chosen length of the mean intervals on speed estimates we processed data using different length of these intervals: 4, 8, 12, 16, 20, 24, 28, 32 seconds. We performed the analysis on a sub sample of summer roosting birds (n=89), since these tracks were less straight than those of migrating birds which is when speed estimates are expected to be sensitive to sampling rate.

3. RESULT

The analysis shows that using longer intervals to calculate the means result in a larger difference in estimated airspeed compared with the shortest interval (Fig. 1). The change in difference is non-linear, with largest change among the shorter intervals. Shorter intervals will pick up more of the noise of the radar, while longer intervals will possibly be too coarse to satisfactorily represent the true flight path. The large change between eight and four second interval presumably reflects the influence of noise on the estimates. This analysis can only give us an indication of what the correct length is and we believe that the chosen interval of 10 seconds is appropriate, since it may be a balance between the risk of influence from noise and under sampling of the true flight path.
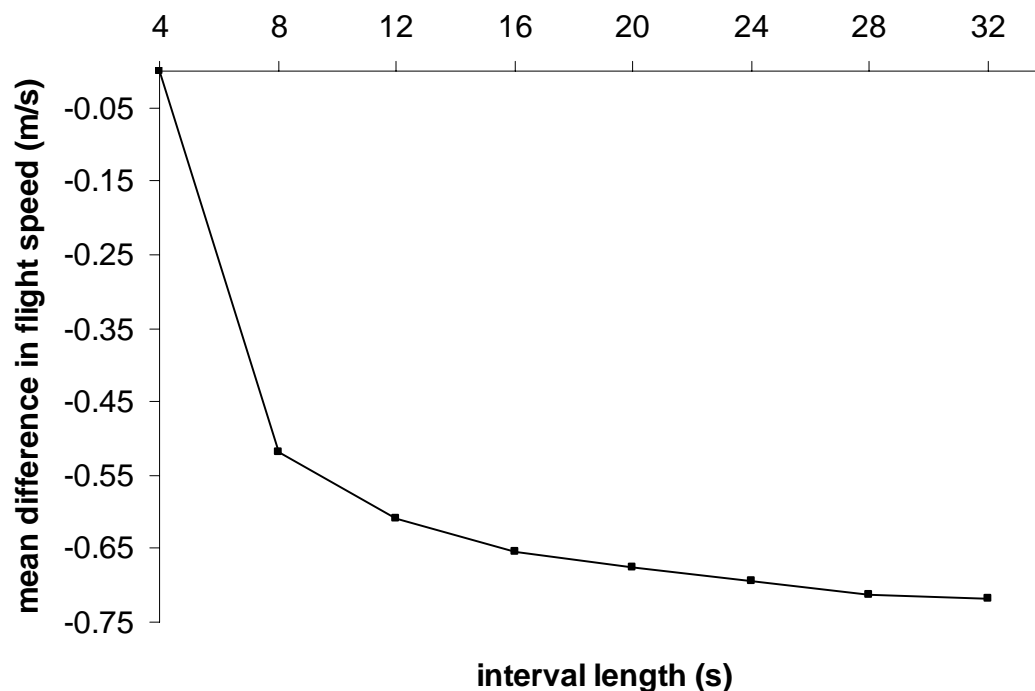

Figure 1. The average difference in speed estimate for different length of intervals for calculating means. Values show the difference compared with the four second interval.