

DIVING OF ATLANTIC PUFFIN (*FRATERCULA ARCTICA*)

Heimaey is a volcanic island belonging to the Vestmannaeyjar archipelago located 10 km off the south coast of Iceland. The island has one of the largest puffin colonies in the world and therefore an ideal spot for studying patterns in the puffin's diving behaviour. The Vestmannaeyjar Research Centre in cooperation with Star-Oddi has been using Data Storage Tags to obtain information on the diving of Atlantic Puffin.



The main goal of this study was to monitor the feeding behaviour of the Puffin using Data Storage Tags (DST) programmed to measure temperature and pressure over time, but also to estimate diving parameters such as diving frequency, ascending and descending speed, average dive duration, the main foraging depth and the relationship between depths, dive duration, duration of pauses and diving speed.



The tagging took place in July 2003 when the majority of the chicks in Stórhöfði had hatched and their parents were occupied feeding them. To increase the likelihood of recapture, only birds with chicks or with eggs about to hatch were tagged. The relatively small size of the Puffin means that the DST-tag could affect the birds' abilities to dive and therefore cause the data recorded to be inaccurate, but observation of the Puffins with the tag revealed no evidence of strange behaviour or reduced flying abilities.

The DST tag was programmed to take measurements in two phases T1 and T2. The main measuring phase (T1) was with frequent measurements for close monitoring of the diving and feeding pattern. The T1 phase was with measurements at 4 seconds interval which lasted for 5 minutes at a time. The secondary measuring phase (T2) was with measurements at 300 seconds interval which lasted for 25 minutes. The T2 phase was mainly used to prolong the main measuring phase to a total of 24 hours.



Graph one below shows a 5 minute diving profile taken by a DST milli tag with 4 second interval (T1). The puffin dives two times below 40 m with only about 48 seconds resting time between the two dives. The duration of pauses after and before each dive should give some indication of physiological stress due to deep dives or a long diving time. According to our data, dives down to at least 35 m do not prolong the duration of pauses between dives, but dives below 40 m seem to increase this time slightly.

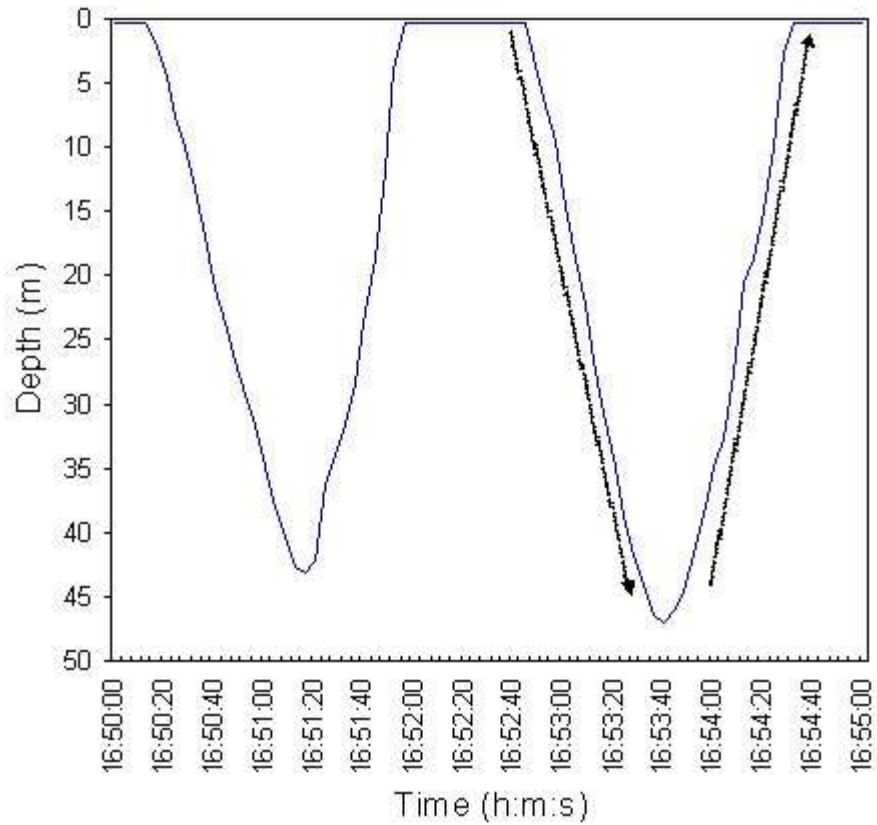


Fig. 1. Five minutes of the diving profile, measurements taken with 4 s intervals.

The temperature and pressure were also used to categorise the movements of the bird above the surface. The temperature was used as an indicator of whether the bird was actively feeding; resting on the surface or inside its burrow. A steady rise in temperature above 13° C was considered to indicate that the bird was no longer foraging at sea, but if the temperature rose above 19 °C the bird was assumed to be inside the burrow. An activity chart divided into morning, day, evening and night gives an idea how the puffin spends its time during these 24 hours the tag took measurements (graph 2).

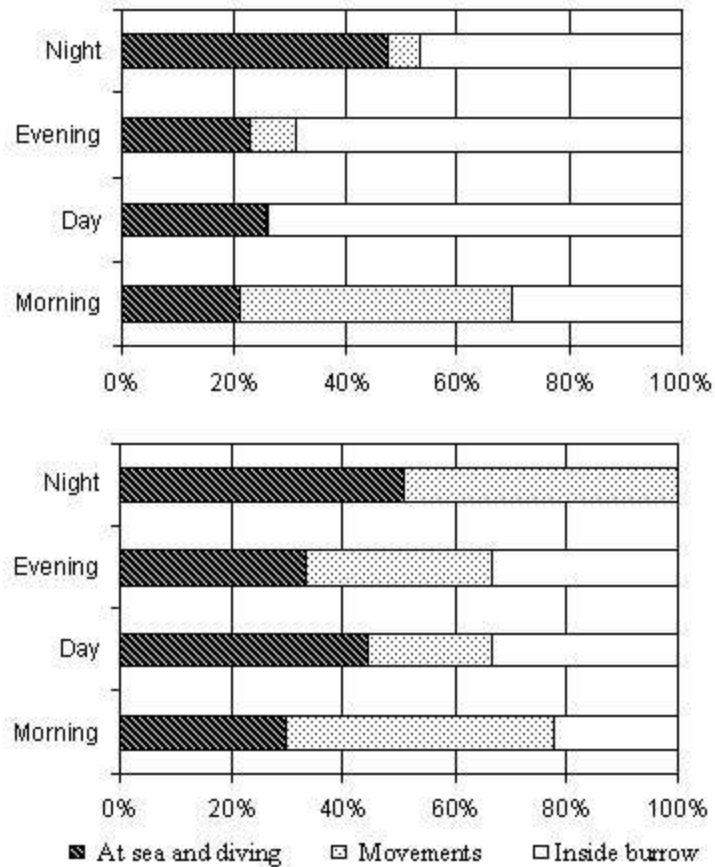


Fig. 2. Activity Chart from two puffins

Results are from 2003, work is still being processed and will be submitted together with the data that this summary is based on.

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