SPECIAL FEATURE

The effects of weather conditions on avian movements

INTRODUCTION

The capacity for flight lends birds great mobility. They are capable of traveling great distances, sometimes at the global spatial scale, and use various resources over land, water, and in the air. During their journeys, their flight (or travel) direction, the timing of their departure, and their destinations may be affected by various weather conditions including rain, snow, horizontal wind direction and strength, and thermals. Birds also exhibit the capacity to make active use of such conditions for efficient, energy saving flight. To fully understand the spatio-temporal movement patterns of birds, it is essential to consider how weather conditions affect avian movements.

Observing the movements of free-ranging birds has its limitations, thus in the past it has been challenging to obtain information on the spatio-temporal movements of subject species. However, recent advances in technology have allowed ornithologists to track birds with great accuracy by using animal-borne devices such as global positioning system data-loggers and Argos Platform Transmitter Terminals. Furthermore, various institutes now provide numerical and graphical weather data (sometimes for free). The time is ripe, therefore, for ornithologists to consider engaging in this area of study.

Recent global climate change has been reported to alter atmospheric and weather conditions; in turn these changes will likely influence ongoing changes and/or affect the distribution and movement patterns of birds. From environmental and ecological perspectives, it is important to understand the current relationship between the effects of weather conditions and bird movements, allowing us to provide projections of the potential impacts of climate change on birds.

The first paper, by Nourani et al., reviews the behavioral characteristics of migratory soaring birds at various spatial scales with regard to horizontal and vertical air movements. The authors discuss different aspects of the migratory behavior of soaring birds, addressing separately land birds and seabirds. In the second paper, Yamamoto et al. examine how wind conditions affected the foraging trip durations of tropical Brown Booby fledglings by direct observation of nest attendance and by monitoring their flight behavior at sea by means of attached video camera loggers. They found that the Brown Booby’s aerodynamic performance is impaired by strong wind conditions. The third paper by Matsumoto et al. examined the sex-related differences in foraging behavior of a sexually size-dimorphic seabird, Streaked Shearwaters, and the effect of a windy strait confining their foraging movement. Their results imply there may be a trade-off between the cost of traveling with unfavorable winds and the energy intake at the studied sea area. The forth paper, by Yamaguchi et al., describes how the movement patterns of Rough-legged Buzzards in winter and spring match the spatial distribution of snow cover. In the fifth paper, Manda et al. introduce user-friendly atmospheric data for ornithological studies. This review should be extremely helpful for ornithologists just beginning research into this subject.

We hope that this special feature will stimulate future research in the field of avian movement ecology especially among Asian ornithologists.

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