Project acronym: PhenMis

Project title: Coping with phenological mismatch: how an insectivorous migrant shorebird may mitigate the negative effects of a warming Arctic by prey and patch selection

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Zackenberg Research Station (Greenland/Denmark)

A profound ecological consequence of ongoing climate change is the temporal uncoupling of trophic interactions. Phenological asynchrony between (avian) predators and their prey can result in hampered growth and fledging success of the predators' offspring if they do not adapt, possibly resulting in population declines. Especially in Arctic insectivorous birds, the mechanisms behind and variation in organisms' adaptability to advancing food peaks are understudied. Avian ecologists have often conveniently ignored movements of birds when they search for arthropod prey. Movements within the spatially heterogeneous landscape could help to avoid negative fitness consequences of a temporally mismatched reproduction. We will study the reproductive timing of a migratory shorebird breeding in the High Arctic, Sanderling Calidris alba, in relation to both spatial and temporal variation in arthropod abundance at Zackenberg Research station. We will particularly study to which extent the exploitation of spatiotemporal heterogeneity of arthropod abundance and prey preference may buffer the consequences of phenological mismatches between Sanderlings and their prey. We will radio-track Sanderling families with varying degrees of phenological mismatch to provide detailed measurements on growth, survival and habitat use of chicks. In addition, we will monitor the spatiotemporal heterogeneity of arthropod abundance on the tundra and assess chick diet using DNA barcoding of faecal samples. Families hatching late relative to the local food peak are expected to roam over larger distances to find remnant food patches and more often eat arthropod prey with a relatively late phenology, thereby possibly preventing reduced growth and impaired survival.