Arctic birds migrate earlier under climate change

New research has found that birds migrating to a breeding ground in northern Norway are arriving on average 0.41 days earlier every year, in response to rising spring temperatures. Studies such as these are useful indicators of the ecological impact of climate change.

In general, studies on migratory birds have found a trend towards earlier arrival dates in European breeding grounds over the last three to four decades, linked to increasing ambient temperatures. In this new study, arrival dates were analysed for birds migrating to Troms in Norway, which is within the Arctic Circle and is the northernmost breeding region in Europe. A previous study in this region had been unable to identify a trend.

The study collected data from a Norwegian database on the date that individuals from 42 species were first sighted each year between 1980 and 2010. This included 11 years of more recent data than the earlier study. The researchers then compared the trends in bird sightings with monthly atmospheric temperatures in Troms and in two locations along the migratory pathway, Nordland and northern Sweden.

For 38 of the 42 species, arrival dates were considerably earlier in 2010 than in 1980, advancing by an average of 0.41 days per year. Species that overwinter in southern and eastern Europe advanced their arrival dates more than those migrating from Africa. Species that tend to appear earlier in the year also advanced their arrival dates more than those appearing later. This is despite a much larger temperature increase over the study period for May than for March or April. Interestingly, the results revealed a stronger link between arrival times and temperatures in Nordland and Sweden, suggesting that conditions experienced en route northwards are more important in determining arrival time than conditions at the destination.

The progression towards earlier arrival dates has not occurred at a steady pace. For approximately 70% of species, the rate of change was slow before 1995-1999 (approximately 0.34 days per year) and increased rapidly thereafter (around 1.2 days per year). This ‘break’ in the trend is also reflected in the temperature data in Troms for May. This pattern may explain why the earlier study (until 2000) did not detect a strong trend in arrival time, but contrasts with results from other regions that have found continuous advancement over the last 30-40 years. This suggests that the signs of global warming and the response of migratory birds have occurred more recently in this region of Norway than elsewhere in Europe.

The study suggests that, since migration is clearly affected by short-term temperature change (i.e. since the late 1990s), further advancement in arrival dates can be expected if local temperatures continue to rise in response to climate change.

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