Stable isotopes instead of rings – new tool in the passerine migration study toolbox

Background

Due to very low recovery rates, regular ringing of small migratory birds is highly ineffective, particularly when the birds can be expected to fly into sparsely populated areas. New technologies, e.g. GPS based tags, are currently too heavy to be carried by these small birds. So why not use built-in markers?

Stable isotopes are unevenly distributed across the globe, e.g. the proportion of Deuterium in precipitation is determined by effective distance to the sea, elevation and temperature. The local signature of isotopes in precipitation is altered by geophysical and biological processes before it is built into biological tissue. For inert tissue, e.g. bird feathers, the mixture of isotopes remains the same and reflects the isotopic signature of the place where the tissue was formed. Consequently, birds can be assigned to their area of birth or moult based on the stable isotope content in their feathers even if the bird is caught far away from its origin.

The Boreal Ornithology Group at VFM studies long-distance migration of boreal passerines by feather stable isotope analyses. Focal species are declining species with a strong W – E component in their migration strategy, e.g. Rustic Bunting.

Methods

You will be given access to a set of feather stable isotope analysis data from across boreal Eurasia. These feathers have been collected by a network of ornithological research stations in Fennoscandia, Russia, South Korea and Japan. Your task is to geographically assign the data from the various sampling locations with IsoMAP, post-process the output of IsoMAP in GIS and draw conclusions on the migratory connectivity.

Requirements

Experience of GIS software (preferably ArcGIS or QGIS) is essential, as is the capacity to write scientific texts in English.

Extent 30 credits.

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