ASSESSING INTER-POPULATION VARIATION IN SURVIVAL USING MARK-RECAPTURE DATA

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We describe a statistical model for the analysis of survival from individual monitoring data at the multi-population scale that allows (1) the quantification of the synchrony among populations in the pattern of temporal variation in survival and (2) the assessment of the extent to which synchronization results from the impact of environmental factors operating at large spatial scales or of spatially auto-correlated local environmental factors.
We adopt a mixed modelling approach to quantify covariance among survival time series and the contribution of environmental factors to covariance. The influence of environmental covariates is accommodated by fixed effects. In addition, the model includes a random part that is structured according to the distinct geographical units considered. This random part captures variances in the distinct geographical units and covariance among geographical units not explained by the covariate(s) in the fixed effects part of the model. We employed a Bayesian approach using MCMC simulations to estimate all the model parameters.
We analysed mark-recapture data of Atlantic puffins (*Fratercula arctica*) at four widely dispersed colonies in the northeast Atlantic for which a previous analysis reported an influence of sea surface temperature (SST) around the breeding colonies on adult survival, and consider whether local SSTs or other undetected environmental factors could act as synchronizing agents on adult survival over a large part of the latitudinal range of the species.