Spatio-temporal data integration in R-INLA

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# Abstract

# Introduction

In recent years there has been a proliferation of ecological data from a variety of sources, with increasing uptake and delivery of citizen science schemes as well as new technologies (Johnston, Matechou, and Dennis 2022). Concomitantly there has been increasing interest in how to make the most of these disparate data sources to increase our insight into ecologically important mechanisms. Species distributions are of great interest to many for understanding our changing world, and seems a promising candidate for the use of model-based data integration (Isaac et al. 2020). The concept behind model-based data integration is that different data sources are observing some latent state, here the species distribution, using a variety of different observation models. Therefore, by jointly modelling the datasets together with their observation models the latent species distribution can be inferred. However, while this approach can in some cases deal with bias in the different data sources in many other cases integration alone cannot be enough to integrate out bias in the data collection (Simmonds et al. 2020).