An application of Bayesian Small Area Estimation for Diurnal Data

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Abstract. *In this application, we are interested in obtaining predictions of the daily distributions of the departures of recreational anglers along the coasts of the United States, as a function of the type of fishing trip, its location and time of year. In order to reflect the circular nature of the departure times, we model them as projected bivariate normal random variables. We propose a new latent hierarchical Bayesian regression model, which makes it possible to incorporate covariates and allows for spatial prediction and inference. We investigate a number of issues related to model specification, model selection and computational efficiency. The approach is applied to a large dataset collected by the US National Oceanic and Atmospheric Administration.*

Keywords. *Hiearchical Bayesian model; small area estimation; spatial prediction.*