

Rejoinder*

Garrit L. Page^{†§} and Fernando A. Quintana^{‡¶}

1 Introduction

We would very much like to thank Marina Vannucci, the Editor of *Bayesian Analysis*, for the opportunity of receiving additional feedback regarding our work on spatial product partition models. The comments made by the discussants were insightful and thought provoking. For this we would like to thank Robert Gramacy, Herbie Lee, Brian Reich, Montserrat Fuentes, Carlo Gaetan, Simone Padoan and Igor Prünster for the time spent on reading and critiquing the paper. Our rejoinder is organized according to specific comments made by each discussant.

As a general preliminary comment we would like to emphasize that our main goal was to develop a probability model for partitions that takes into account spatial dependence when forming clusters. This, however, does not preclude the use of various types of sampling models that may be used in tandem with the sPPM prior, including areal and even count data, which may require the use of models beyond Gaussian processes. Therefore, the sPPM prior generically introduces spatial dependence in a statistical model and as a result complements additional spatial structure that may be considered at other stages of a hierarchical model.

2 Gramacy and Lee

Gramacy and Lee (GL)’s comments focused on comparing methods that incorporate regional partitions to produce flexible nonstationary spatial models to the sPPM. The nonstationarity is induced by fitting independent “local” models (e.g., Gaussian process) at each regional partition. Among the methods that were mentioned are local approximate Gaussian processes and treed Gaussian processes (tgp). We would like to thank GL for bringing these methods to our attention as they were not discussed in the main article.

The tgp approach builds a partition by recursively splitting the space so that subset boundaries are parallel to coordinate axes. Within partitions, tgp fits a Gaussian process to the set of responses. A variation of this idea was considered in Kim et al. (2005) with partitions defined in terms of Voronoi tessellations. The sPPM prior provides support that in addition to these, includes subsets of potentially different shapes, according to the spatial features encouraged by the definition of cohesion functions adopted. We

*Main article DOI: [10.1214/15-BA971](https://doi.org/10.1214/15-BA971).

[†]Department of Statistics, Brigham Young University, Provo, Utah, page@stat.byu.edu

[‡]Departamento de Estadística, Pontificia Universidad Católica de Chile, Santiago, Chile, quintana@mat.uc.cl

[§]Partial support provided by FONDECYT Grant 11121131 and ANILLO Project SOC 1107.

[¶]Partial support provided by FONDECYT Grant 1141057.