

## Accepted Manuscript

Nonparametric estimation of the small-scale variability of heteroscedastic spatial processes

Rubén Fernández-Casal, Sergio Castillo-Páez, Pilar García-Soidán

PII: S2211-6753(16)30117-8

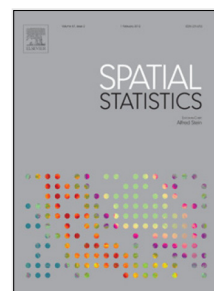
DOI: <http://dx.doi.org/10.1016/j.spasta.2017.04.001>

Reference: SPASTA 223

To appear in: *Spatial Statistics*

Received date: 28 October 2016

Accepted date: 5 April 2017



Please cite this article as: Fernández-Casal, R., Castillo-Páez, S., García-Soidán, P., Nonparametric estimation of the small-scale variability of heteroscedastic spatial processes. *Spatial Statistics* (2017), <http://dx.doi.org/10.1016/j.spasta.2017.04.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Nonparametric estimation of the small-scale variability of heteroscedastic spatial processes

Rubén Fernández-Casal<sup>a</sup>, Sergio Castillo-Páez<sup>b,c</sup>, Pilar García-Soidán<sup>b,\*</sup>

<sup>a</sup>*Dept. of Mathematics, Universidade da Coruña (Spain)*

<sup>b</sup>*Dept. of Statistics and Operations Research, University of Vigo (Spain)*

<sup>c</sup>*Universidad de las Fuerzas Armadas ESPE (Ecuador)*

---

## Abstract

The current study aims to provide nonparametric estimators of the conditional variance and the dependence structure of a heteroscedastic spatial process. When assuming zero mean along the domain, the approximation of the variance can be addressed by linear smoothing of the squared observations. Then, the variogram can be estimated from the standardized data. In the presence of a non-zero deterministic trend, we suggest a modification of the latter method that involves the residuals obtained from a local linear estimation of the trend, together with corrections of the biases derived from the use of these residuals. This work includes the results of numerical studies carried out to check the performance of the proposed approach. In addition, the proposed methodology is applied to monthly precipitation data collected on the continental part of USA.

*Keywords:* Bias correction, heteroscedasticity, local linear estimation, variogram

*2010 MSC:* 62H11, 62G05

---

## 1. Introduction

For inference on geostatistical data, the underlying random process is usually assumed to be homoscedastic and, therefore, that the variance of the spatial

---

\*Corresponding author at Faculty of Social Sciences and Communication, CP 36005 Pontevedra, Spain

*Email addresses:* [ruben.fcasal@udc.es](mailto:ruben.fcasal@udc.es) (Rubén Fernández-Casal),  
[sacastillo@espe.edu.ec](mailto:sacastillo@espe.edu.ec) (Sergio Castillo-Páez), [pgarcia@uvigo.es](mailto:pgarcia@uvigo.es) (Pilar García-Soidán)

Download English Version:

<https://daneshyari.com/en/article/7496453>

Download Persian Version:

<https://daneshyari.com/article/7496453>

[Daneshyari.com](https://daneshyari.com)