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Stability and contagion measures for spatial extreme value analyses

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(Submitted on 6 Jun 2012)

As part of global climate change an accelerated hydrologic cycle (including an increase in heavy precipitation) is anticipated. So, it is of great importance to be able to quantify high-impact hydrologic relationships, for example, the impact that an extreme precipitation (or temperature) in a location has on a surrounding region. Building on the Multivariate Extreme Value Theory we propose a contagion index and a stability index. The contagion index makes it possible to quantify the effect that an exceedance above a high threshold can have on a region. The stability index reflects the expected number of crossings of a high threshold in a region associated to a specific location i, given the occurrence of at least one crossing at that location. We will find some relations with well-known extremal dependence measures found in the literature, which will provide immediate estimators. For these estimators an application to the annual maxima precipitation in Portuguese regions is presented.

Subjects: **Statistics Theory (math.ST)**

Cite as: **arXiv:1206.1228 [math.ST]**

(or **arXiv:1206.1228v1 [math.ST]** for this version)

Submission history

From: Cecília Fonseca [view email]

[v1] Wed, 6 Jun 2012 13:57:44 GMT (665kb)

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