

## **On modeling and estimating spatial data with skew-t marginal distribution**

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We propose a model for regression and dependence analysis when dealing with spatial or spatio-temporal data with possibly heavy tails and asymmetric marginal distribution. We first propose a stationary process with  $t$  marginals obtained through scale mixing of a Gaussian process with an inverse square root process with Gamma marginals. We then generalize this construction by considering a skew-Gaussian process obtaining a process with skew- $t$  marginal distributions. For the proposed (skew)  $t$ , process we study the second order and geometrical properties and in the  $t$  case we give an analytic expressions for the bivariate distribution. In an extensive simulation study, we investigate the use of the weighted pairwise likelihood as method of estimation. Finally, the effectiveness of our methodology is illustrated by analyzing a georeferenced dataset on maximum temperatures in Australia.