



## Spatio-temporal models for skewed processes

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In the analysis of most spatio-temporal processes in environmental studies, observations present skewed distributions. Usually, a single transformation of the data is used to approximate normality, and stationary Gaussian processes are assumed to model the transformed data. However, the choices of distribution and underlying covariance structure are key for spatial interpolation and temporal prediction. We propose a spatio-temporal model for skew-normal data that precludes the use of data transformation. The process is decomposed as the sum of a purely temporal structure with two independent components that are considered to be partial realizations from independent spatial Gaussian processes, for each time  $t$ . Our model allows the asymmetry parameter to vary with location and time. Inference procedure is performed under the Bayesian paradigm. Initially we perform a brief simulation study to investigate our ability in recovering the true values of the parameters of the model, and compare the performance of the proposed model with standard models. Next we analyse monthly average temperature between 2001 and 2011 observed at 21 locations in the South of Brazil. Our proposed model outperforms standard models commonly used in the literature.

**Keywords:** Covariance function; Isotropy; Gaussian Process; Non-stationarity.