

PhD program in Statistics

DSS Statistics Seminar

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In person Room 34 (CU002)

Webinar <https://uniroma1.zoom.us/j/83625004899?pwd=bXCtz0mp759PUh2lkqT0BUoVa0Uegg.1>

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On the Estimation of Climate Normals and Anomalies

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The quantification of the interannual component of variability in climatological time series is essential for the assessment and prediction of the El Niño - Southern Oscillation phenomenon. This is achieved by estimating the deviation of a climate variable (e.g., temperature, pressure, precipitation, or wind strength) from its normal conditions, defined by its baseline level and seasonal patterns. Climate normals are currently estimated by simple arithmetic averages calculated over the most recent 30-year period ending in a year divisible by 10. The suitability of the standard methodology has been questioned in the context of a changing climate, characterized by nonstationary conditions. The literature has focused on the choice of the bandwidth and the ability to account for trends induced by climate change. The paper contributes to the literature by proposing a regularized real time filter based on local trigonometric regression, optimizing the estimation bias-variance trade-off in the presence of climate change, and by introducing a class of seasonal kernels enhancing the localization of the estimates of climate normals. Application to sea surface temperature series in the Niño 3.4 region and zonal and trade winds strength in the equatorial and tropical Pacific region, illustrates the relevance of our proposal.

Joint work with Alessandro Giovannelli, Università dell'Aquila.



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