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**Assessment of statistical downscaling methods - application and comparison of two statistical methods to a single site in Lisbon**

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Climate change impacts are very dependent on regional geographical features, local climate variability, and socio-economic conditions. Impact assessment studies on climate change should therefore be performed at the local or at most at the regional level for the evaluation of possible consequences. However, climate scenarios are produced by Global Circulation Models for the entire Globe with spatial resolutions of several hundred kilometres. For this reason, downscaling methods are needed to bridge the gap between the large scale climate scenarios and the fine scale where local impacts happen. An overview on downscaling techniques is presented, referring the main limitation and advantages on dynamical, statistical and statistical-dynamic approaches. For teams with limited computing power and non-climate experts, statistical downscaling is currently the most feasible approach at obtaining climate data for future impact studies. To assess the capability of statistical downscaling methods to represent local climate variability it is shown an inter-comparison and uncertainties analysis study between a stochastic weather generator, using LARS-WG tool, and a hybrid of stochastic weather generator and transfer function methods, using the SDSM tool. Models errors and uncertainties were estimated using non-parametric statistical methods at the 95% confidence interval for precipitation, maximum temperature and minimum temperature for the mean and variance for a single site in Lisbon. The comparison between the observed dataset and the simulations showed that both models performance are acceptable. However, the SDSM tool was able to better represent the minimum and maximum temperature while LARS-WG simulations on precipitation are better. The analysis of both models uncertainties for the mean are very close to the observed data in all months, but the uncertainties for the variances showed that the LAR-WG simulation performance is slightly better for precipitation and that both model simulations for minimum and maximum temperature are very close from the observed. It is also presented the simulations for the A2a SRES scenario for the 2041-2070 periods showing that both methods can produce similar general tendencies, but an uncertainties analysis on the scenarios is also advised.