MODELING OF CRITICAL EPISODES OF AIR POLLUTION FOR PM10 IN SANTIAGO DE CHILE. COMPARISON OF THE PREDICTIVE EFFICIENCY OF PARAMETRIC AND NON-PARAMETRIC STATISTICAL MODELS

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Backgrounds and aims: To evaluate the predictive efficiency of two statistical models (one parametric and a non-parametric one) to predict critical episodes of air pollution levels by PM10 the after day above national standard. A suitable prediction of such episodes allows the authority to apply restrictive measures that diminish the gravity of the episode with the objective to protect to the health of the community.
Methods: We used PM10 concentrations registered by Net of Air Quality Monitoring during 2001 to 2004, and meteorological information collected during this period considering 14 variables and 152 observations. We fitted a parametric Gamma using STATA v10 software and a non-parametric MARS models using a demo version of Salford-Systems for the construction of predictive models.
Results: In general, both models presented a high correlation between observed and predicted values. However, Gamma model predict in a better way values < 240 ($\mu g/m^3$) of PM10 better than MARS. The last one was more efficient to predict values above 240 ($\mu g/m^3$) of PM10 during the period studied.
Conclusion: MARS model are more efficient to predict extreme values and therefore it would be considered by the sanitary authority to take a more precise decision in a preventive way to avoid critical episodic conditions of air pollution by PM10 in short time and consequently the probable effects on health status. This would be explained because MARS corrects the changes of the series throughout the time fitting the best to the curve associated with the concentration of PM10.