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Identifying land use trends in residuals of modelled streamflow: A case study in Santa Lucía basin, Uruguay

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The Santa Lucía river is the main source of potable water for Uruguay, representing more than 60% of the country's population water supply. After 1995, some of the upstream areas have been characterized by substantive land use change (mostly agricultural intensification and afforestation), which along with climate change, can cause trends in hydrological behavior. Therefore, analyzing and understanding these trends is a priority to preserve the quantity and quality of the resource. This leads to the objective of this paper: how can hydrological trends resulting from land use change be identified? A method based on studying the residuals of rainfall – runoff simulations by a Generalized Additive Model (GAM) is proposed. Furthermore, a case study is presented, for which the data consists of three gauging stations in sub-catchments ranging from 690 to 4900 km2 during 1981 – 2016 period. The first findings showed a trend in the residuals of GR4J model and the non-stationarity of the parameters. The results of this study will support appropriate water resource management strategies that can be implemented in land use change policies.