



Structural time series models applied to monthly rainfall data sets in Galicia (NW Spain)

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Historical series of precipitation data can show characteristics like the trend, which represents the long-run movements in the series, and a seasonal pattern which repeats itself more or less every year. The structural time series models will capture these characteristics. They can be interpreted by regressions on time functions where the parameters change over time. The main objective of the present work was to fit structural time series models to rainfall data in Galicia, northwest of Spain. This region comprises four provinces: Coruña, Lugo, Orense and Pontevedra. Climate oscillates from temperate humid Atlantic to Mediterranean. Rainfall regime is characterized by a strong seasonality with low values in summer months and large values in autumn and winter months. Yearly amounts of rain as well as rainfall differences between seasons increase from the Atlantic to the Mediterranean areas. Therefore, differences in rainfall regime induced by topography, distance to the coast and other factors are apparent between different zones within Galicia. For example the coastal area, the inland River valleys or the mountain systems show characteristic rainfall regimes. We analyzed rainfall data in 21 weather stations distributed over the four provinces of Galicia. The period analyzed was different in each station. The maximum length of the data series was thirty years and the minimum length was eight years. A structural time series model was adjusted to the data of each of the studied weather stations. The model was used to forecast monthly rainfall during 2008. The results showed that mean levels of monthly rainfall in each province of Galicia were as follows: 83.10 mm in Coruña, 65.37 mm in Lugo, 64.98 mm in Orense and 125.75 mm in Pontevedra. Models showed a trend without slope for all the stations and the seasonality was in all the cases a deterministic component. The agreement between predictions and measured values of rain during 2008 is discussed.