



Weather patterns and drought: frequencies, persistence and forecasting

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Time series methods for drought forecasting generally rely on exploiting the target variable's relationship with exogenous information (such as relating a drought index to sea-surface temperature), or on exploiting any persistence in the system. This presentation takes the latter approach in the context of a weather-pattern classification. A set of objectively defined Met Office weather patterns represents the 30 most common types of broad-scale atmospheric circulation over the North Atlantic Ocean and Europe. This data set has several advantages over other classifications, in particular the objective method used to construct the patterns and in using a much larger domain, useful for capturing weather systems over the Atlantic. We analyse how this classification relates to drought in the UK by examining changes in pattern frequencies. Next, we explore whether there is any long-term persistence in the time series via an empirical counting approach and using a novel Markov model. These methods identify weekly to multi-month persistence and are designed to account for temporary atmospheric deviations from the longer-term situation, for example several stormy days in the middle of an otherwise anticyclone-dominated period. Finally, we construct a weather pattern forecast model based on historical analogues and use these to derive precipitation forecasts.