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Potential predictability of rainfall in the greek region

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The statistical approach and research of rainfall in a region is always important for climatological and environmental purposes. In consequence, studies concerning the prediction of rainfall in a region are always of scientific interest. To this end, estimates of the potential predictability of monthly and daily rainfall were made, based on an idealized view of the interannual variability comprised by two components (e.g. standard error of average rainfall, changes in external conditions). The natural variability of daily (25 stations) and monthly (36 stations) rainfall across Greece was estimated for each of the four seasons using a two-state first order Markov chain process. By computing the actual interannual variability and comparing it with natural variability the proportion of the interannual variance that is potentially predictable can be estimated. For these reasons, this study attempts to estimate the climatic potential predictability of the rainfall in the Greek region by estimating the magnitude of the natural variability. This is secured by examining the variance of rainfall associated with daily weather fluctuations and would be present even within an unchanging climate. Its magnitude is closely dependent on the persistence of daily weather fluctuations. While, the standard error of time averaged rainfall resulting from daily weather fluctuations is only predictable at lead times less than dynamic predictability limits and therefore, can be referred to as “climatic noise”. We also calculate the interannual variability that may exist in excess of the “climate noise”. By using the mathematical (probabilistic) model, estimates of the magnitude of the natural variability for daily amounts of rainfall time series from five stations were made. Our results show that most interannual variations result from the natural variation of the monthly rainfall. There is an indication of a possible connection between potential predictability of monthly rainfall and external conditions, e.g. North Atlantic Oscillation (NAO), radiative forcing and/or greenhouse effect.