



Assessment of the reliability of climate predictions based on comparisons with historical time series

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As falsifiability is an essential element of science (Karl Popper), many have disputed the scientific basis of climatic predictions on the grounds that they are not falsifiable or verifiable at present. This critique arises from the argument that we need to wait several decades before we may know how reliable the predictions will be. However, elements of falsifiability already exist, given that many of the climatic model outputs contain time series for past periods. In particular, the models of the IPCC Third Assessment Report have projected future climate starting from 1990; thus, there is an 18-year period for which comparison of model outputs and reality is possible. In practice, the climatic model outputs are downscaled to finer spatial scales, and conclusions are drawn for the evolution of regional climates and hydrological regimes; thus, it is essential to make such comparisons on regional scales and point basis rather than on global or hemispheric scales. In this study, we have retrieved temperature and precipitation records, at least 100-year long, from a number of stations worldwide. We have also retrieved a number of climatic model outputs, extracted the time series for the grid points closest to each examined station, and produced a time series for the station location based on best linear estimation. Finally, to assess the reliability of model predictions, we have compared the historical with the model time series using several statistical indicators including long-term variability, from monthly to overyear (climatic) time scales. Based on these analyses, we discuss the usefulness of climatic model future projections (with emphasis on precipitation) from a hydrological perspective, in relationship to a long-term uncertainty framework.