



How probable was the 20th century global warming?

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The increase of global mean temperature during the 20th century, according to the Intergovernmental Panel on Climate Change (IPCC), is very plausible due to the anthropogenic greenhouse gas emissions. In addition, climate model projections suggest that the global mean temperature will further rise during the 21st century. While the vast majority of scientists have endorsed IPCC's conclusions, not a few individual scientists, have expressed a disagreement regarding the validity of climate model projections. In this study, the answer to a fundamental question is sought. That is, how probable was the global warming of the 20th century considering only recorded and reconstructed global mean temperatures values, and assuming that the global mean temperature is a stationary stochastic process. In order to answer this question, a stationary stochastic model is set that incorporates (a) the observed autocorrelation structure of the global mean temperature, (b) past observations of global mean temperature and (c) global, regional and site-specific reconstructions of global mean temperature changes during the last two millennia. Based on an intense Monte Carlo simulation, the probability of a global mean temperature trend with equal or greater slope than the observed one in the 20th century is presented.