



Quantile regression analysis of Arctic sea ice extent

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Surface and satellite-based observations show a decrease in the Arctic sea ice extent during the past 46 years with a minimum in 2007. Climate models are in near universal agreement that Arctic sea ice extent will decline through the 21st century as a consequence of global warming and many studies predict a seasonal ice free Arctic as soon as 2012.

Much of the analysis of the ice extent time series, as in most climate studies from observational data, have been focussed on the computation of deterministic linear trends by ordinary least squares which characterizes the rate of change of the conditional mean. However, in climate data and climate change studies a broader description of the data is desirable, namely concerning changes in the spread or shape of the distribution over time. Quantile regression extends the classical linear regression framework of estimation of conditional mean models to the estimation of conditional quantile models.

Here, quantile regression is applied to analyse the time series of Arctic sea ice extent from January 1979 to December 2007, available at the National Snow and Ice Data Center.