

Mathematical Statistics Stockholm University Bachelor Thesis **2020:3** http://www.math.su.se

## Forecasting the average global temperature anomaly for January 2020 using an ARIMA-ARCH model

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## Abstract

In this thesis we are interested in forecasting the monthly average global temperature anomaly (in °C) for January 2020 using data from the \*National Oceanic and Atmospheric Administration\* (NOAA). The data contains 1680 temperature anomalies from January 1880 to December 2019 and are given in relation to the 20th century average. By first differencing the data, to obtain weakly stationary behaviour, three ARIMA models are chosen as candidates to forecast the temperature anomaly for January 2020: one with AR components, one with MA components and one including both types of components. Their respective forecasting capabilities are then compared, wherepon the winner's residuals are used to model the conditional variance using an ARCH model. Lastly, a forecast is made and the conditional variance is used to give a forecast interval. The result is a forecasted temperature anomaly of 0.989 °C, which is a slight decrease compared to the previous month. However, the forecast interval shows that an increase is also possible.

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