

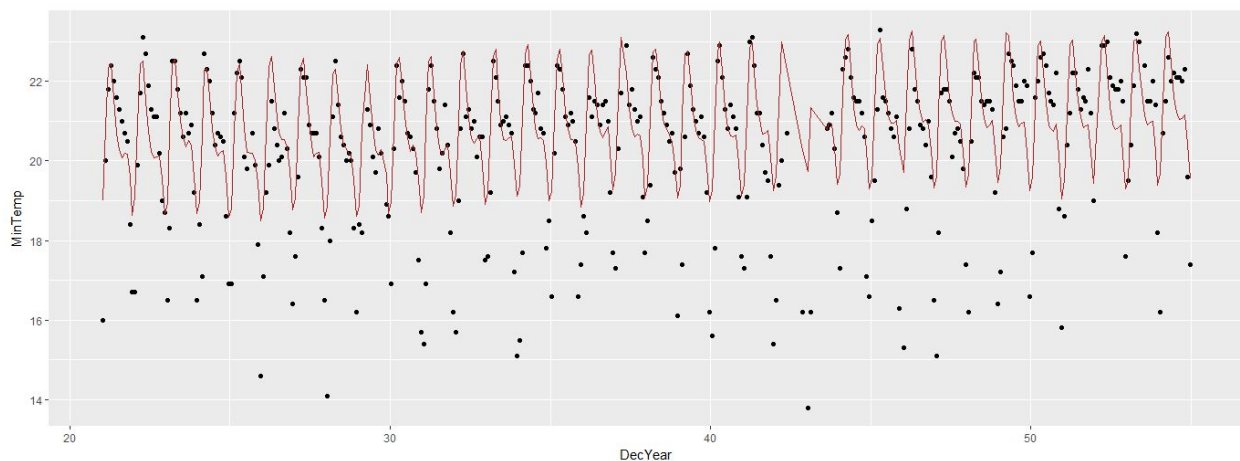
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## Sotouboua Final Model Report

### Summary Paragraph

The minimum temperature model did not fit the city of Sotouboua very well. While the periodicity of the minimum temperatures in Sotouboua was captured, the model had a tendency to miss the extremely low temperatures experienced in Sotouboua. The rainfall model had a similar issue in which the periodicity was captured but not the extremely heavy rainfalls. On the other hand, the maximum temperature model fit Sotouboua exceptionally well. This model had an “Our-Squared” value of 0.8751, meaning that 87.51% of the variability in the maximum temperatures in Sotouboua was explained by the model.

### Minimum Temperature Model

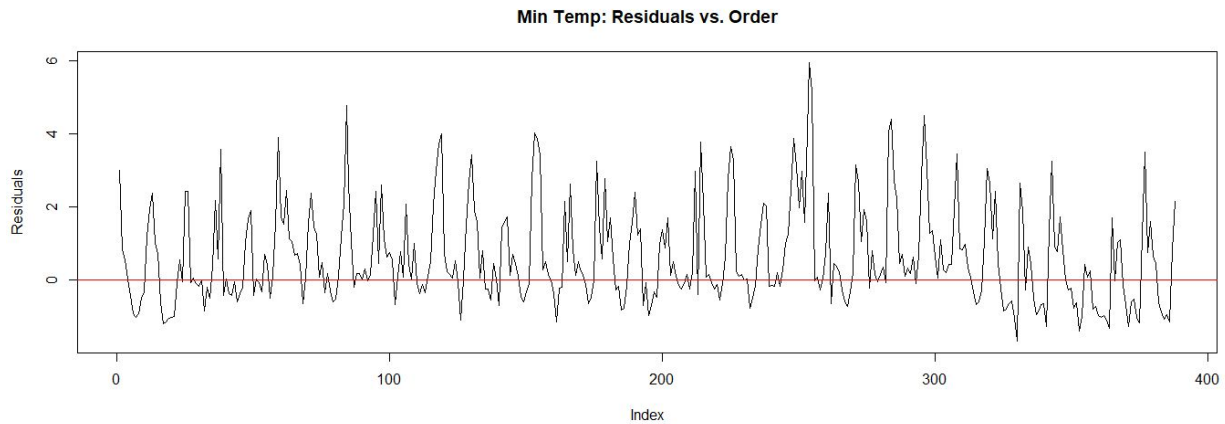


At a glance, the minimum temperature model does not seem like a good fit for Sotouboua.

Perhaps Sotouboua is an anomaly compared to the other cities in Togo, but Sotouboua has many data points that are dramatically lower than the model fits. Sotouboua’s minimum temperatures

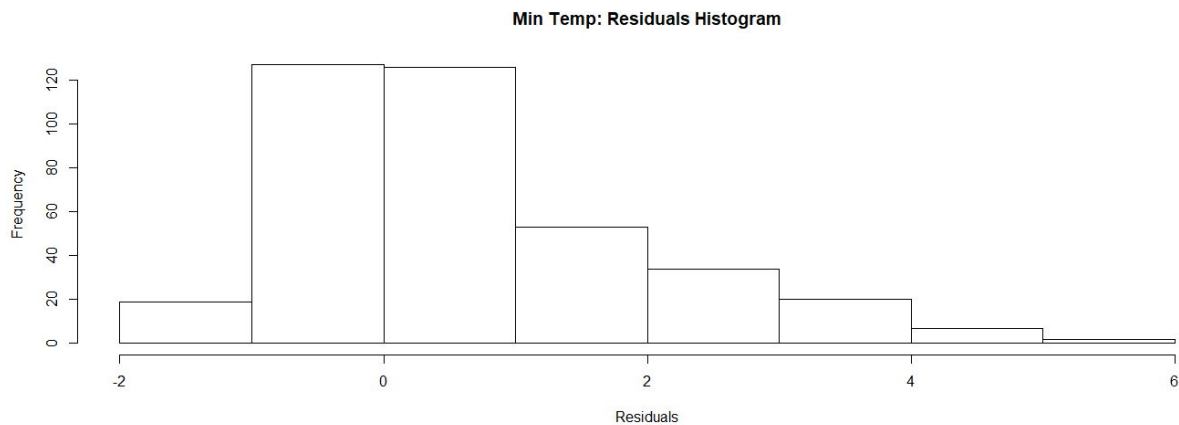
may simply vary more dramatically than other cities in Togo. However, it seems as if the periodicity has been captured well.

**Our-Squared Value = 0.6250485**

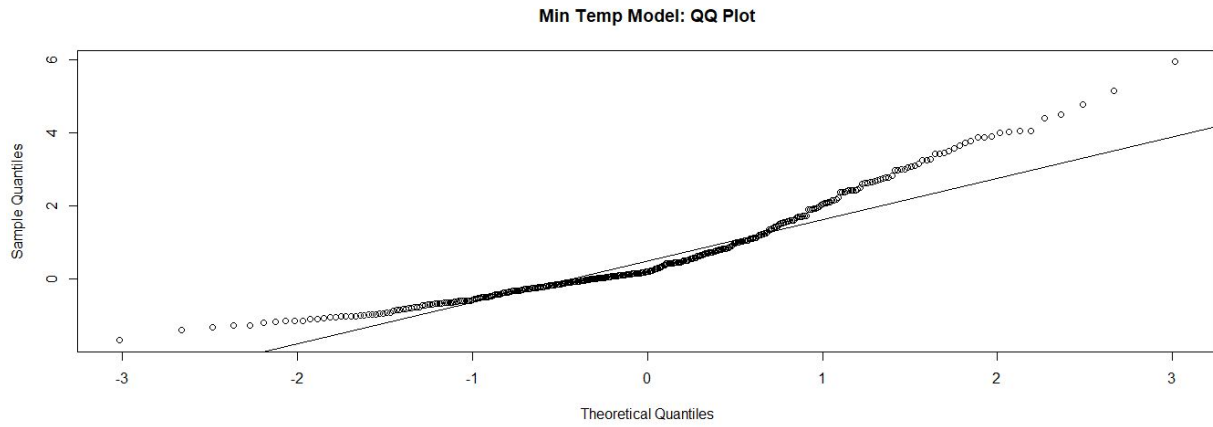


$$(Residuals = Predicted - Actual)$$

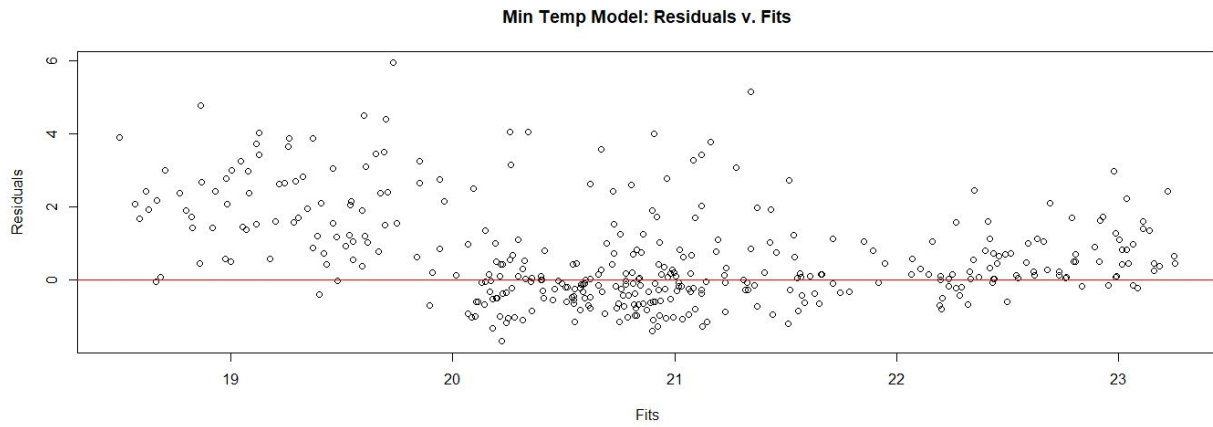
The residuals versus order plot highlights some periodicity in Sotouboua that had not been captured in the model. It is obvious the minimum temperature data is not independent, which is to be expected since this is a time series.



The histogram of residuals is strongly right-skewed. The data is clearly not normal.

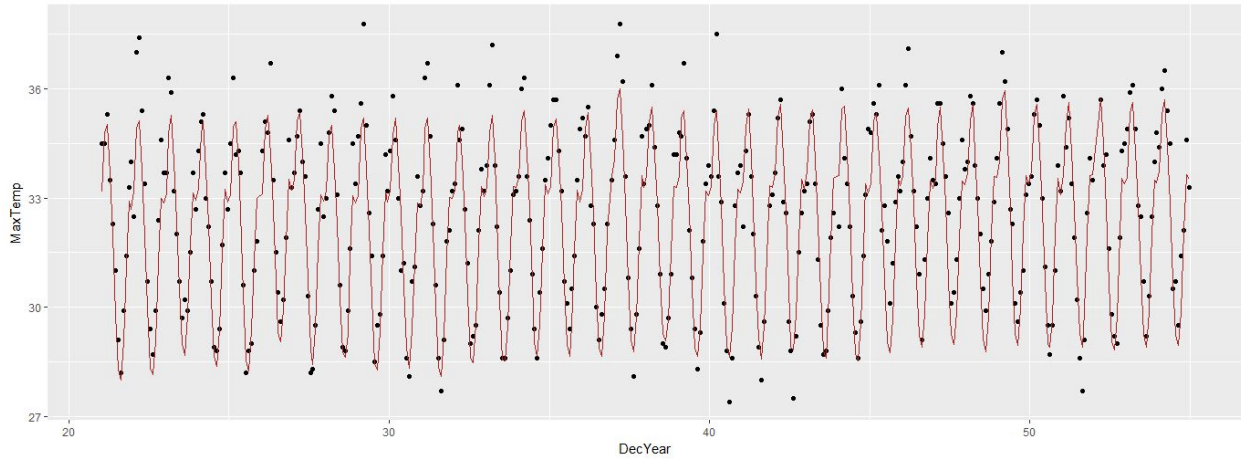


The QQ plot makes the extreme lack of normality even more apparent.



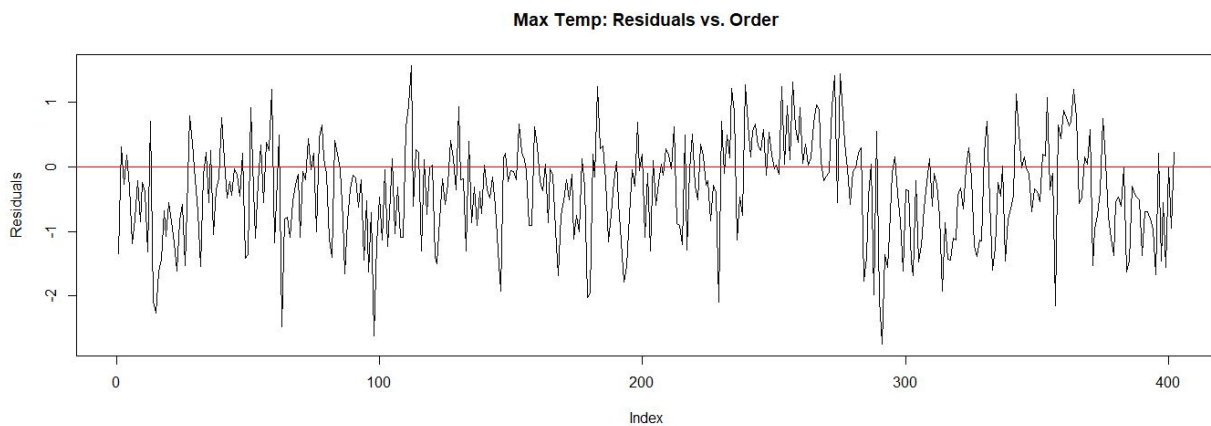
There are some **very** large residuals. The points are not randomly scattered around zero.

## Maximum Temperature Model



The maximum temperature model seems to fit Sotouboua much better. The periodicity seems to fit nicely and there aren't as many values far outside the range of the model.

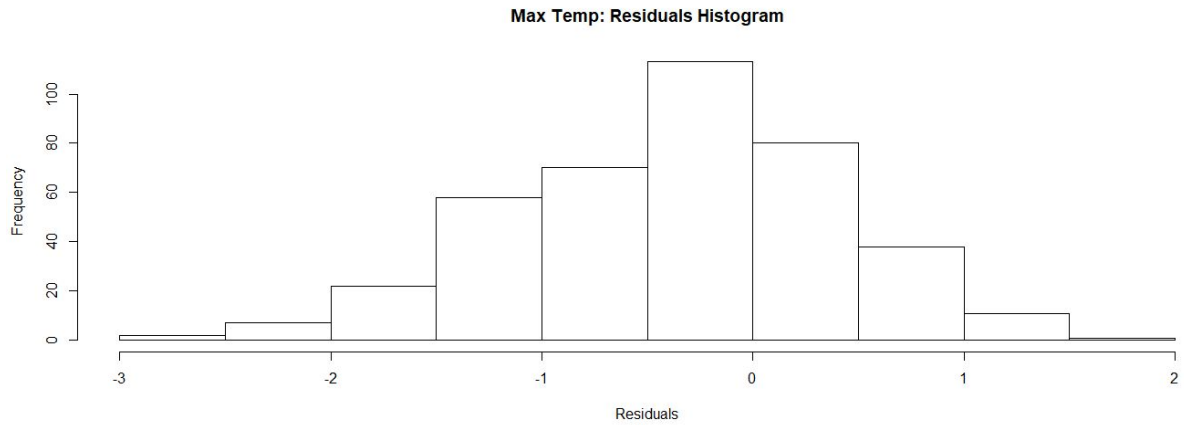
**Our-Squared Value = 0.8751226**



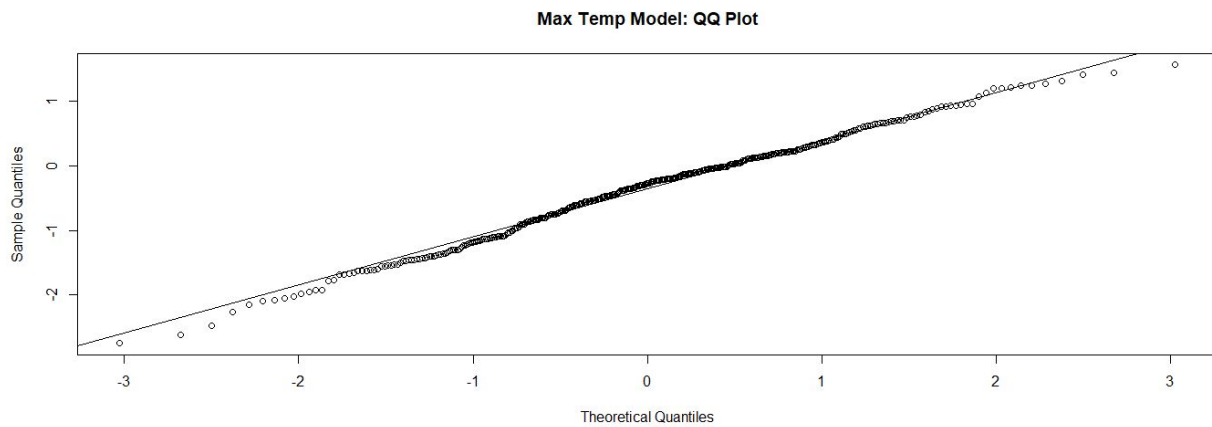
$$(Residuals = Predicted - Actual)$$

The residuals versus order plot shows some periodicity that is not being captured by the model.

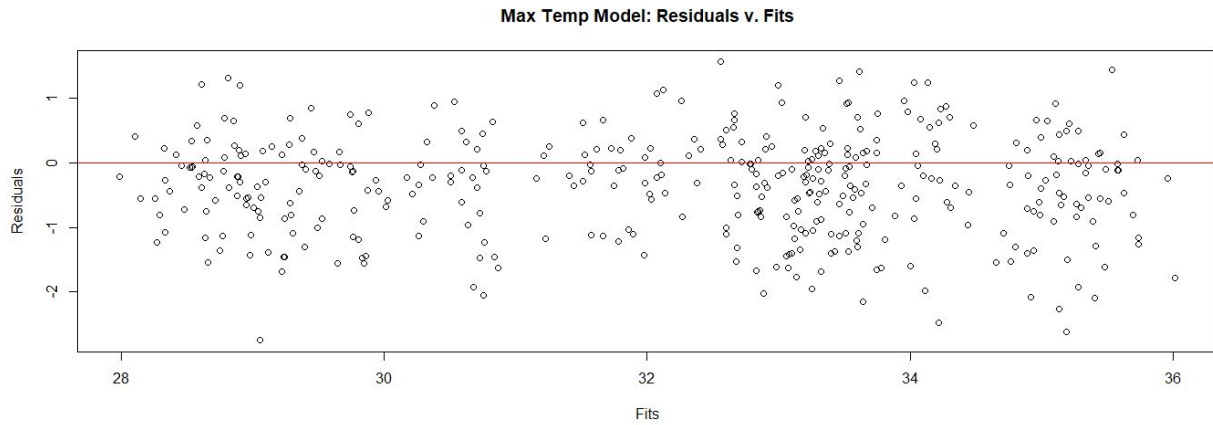
The assumption of independent observations is not met.



The histogram of the residuals plot looks potentially normal with perhaps a slight skew left.

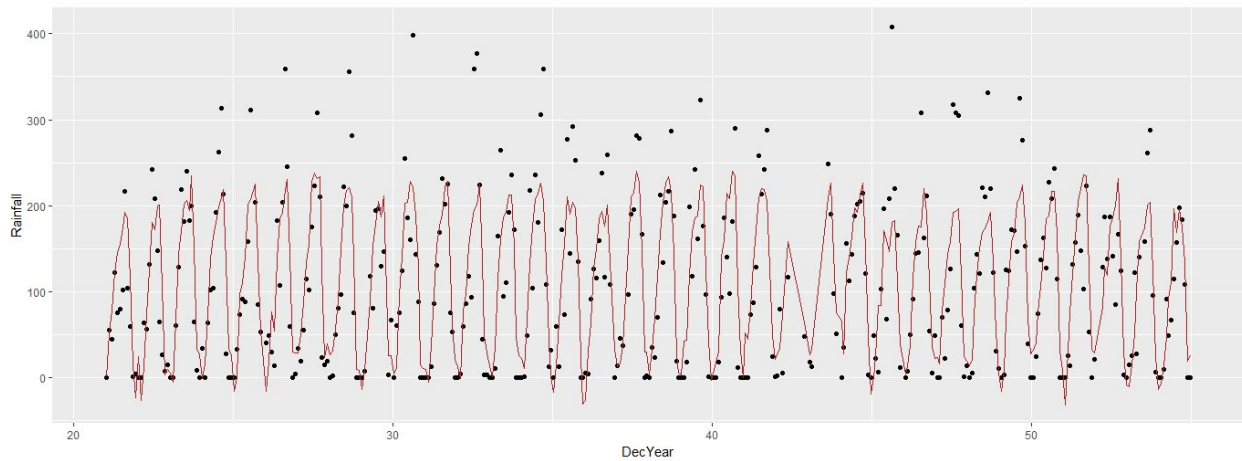


The QQ-plot looks much better for the maximum temperatures than the minimum. It does look roughly normal except for the departures near the left tail.



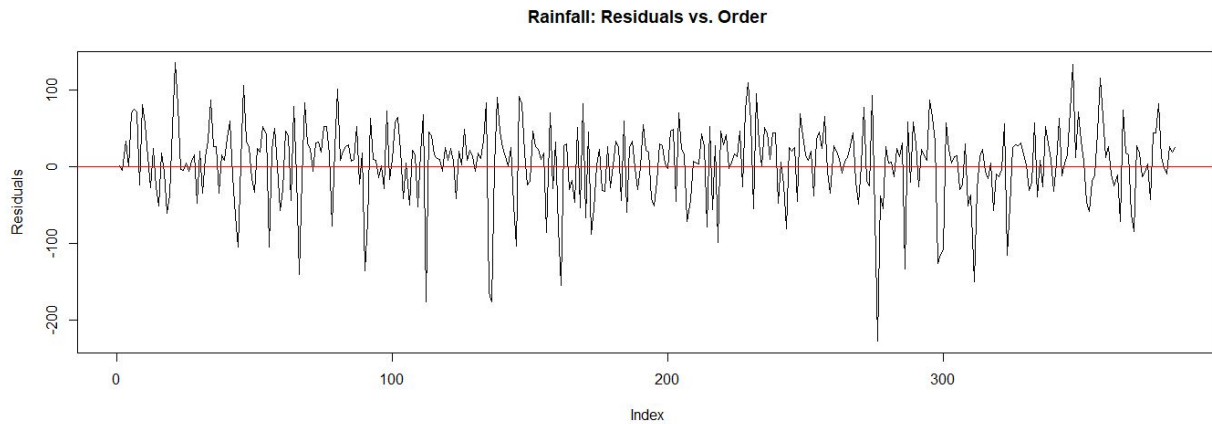
I am actually pretty happy with the residuals versus fits plot. The residuals are nicely and seemingly randomly centered around zero and the variability seems constant.

### Rainfall Model



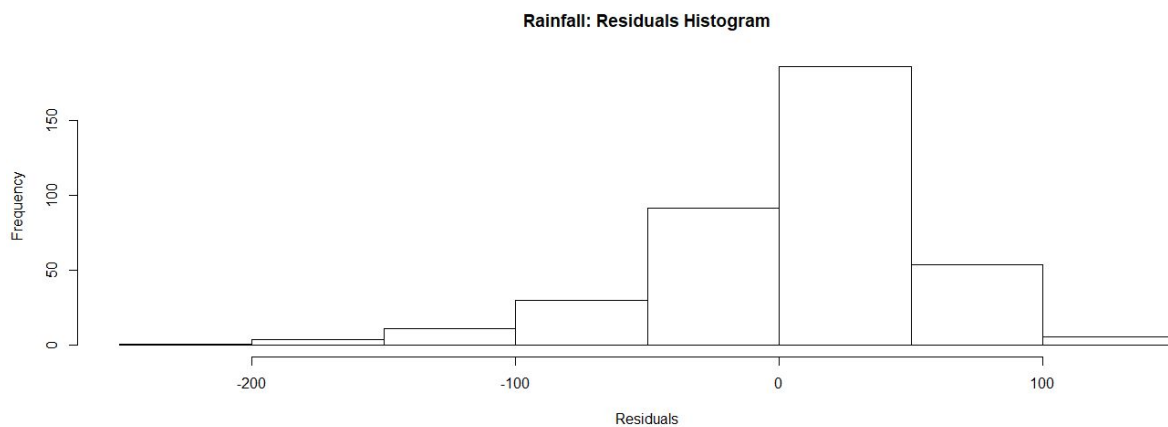
The rainfall model seems to fit moderately well to Sotouboua. The extremely heavy rainfalls are not being captured by the model. I think the periodicity of the rainfall is being captured even though the very heavy rainfalls are being underestimated.

**Our-Squared Value = 0.7332977**

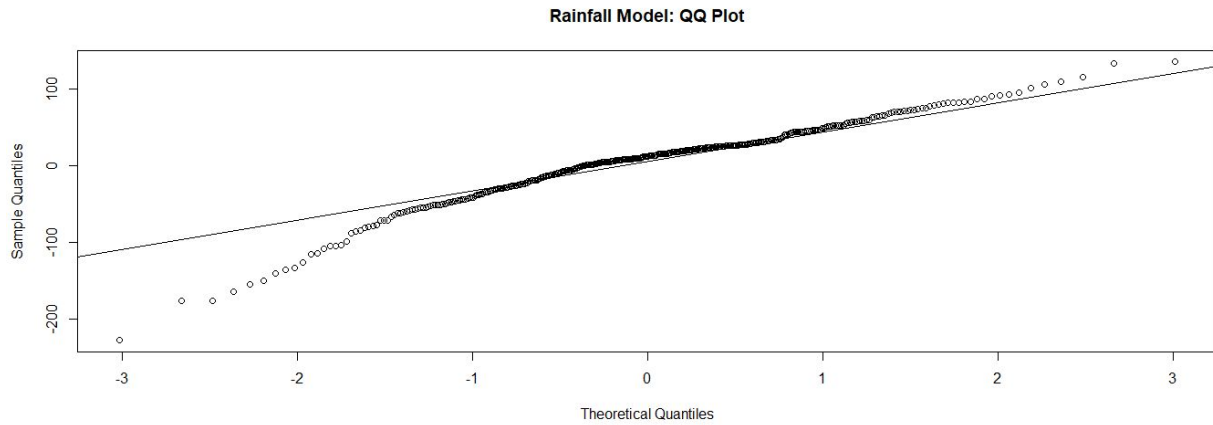


$$(Residuals = Predicted - Actual)$$

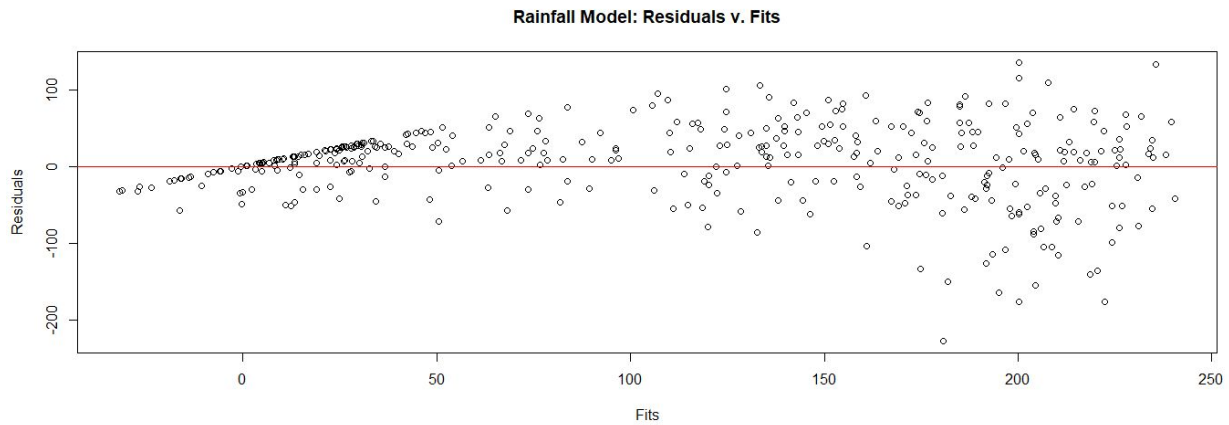
The missed heavy rainfalls are highlighted in the residuals versus order plot. It does seem as if they aren't just anomalous data points as there seems to be a pattern to them. Again, the assumption of independent observations is not met.



The histogram of the residuals is skewed left, clearly not normal.



The QQ-plot again shows severe departures from normality with the skewed left tail.



The residuals versus fits plot looks a bit like a megaphone. The variability is not constant throughout. There is also a hard cut-off, but this is not surprising since rainfall data has a natural bottom limit of zero.