



A Fractional Climate Forecast for Southern and Southwestern United States

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We have previously shown that climate variables are self-similar in nature, and thus represent long-memory processes. Therefore, these processes need to account for fractional differences in the time series. This requires that we make use of fractal analysis in time series and use fractional differencing. To begin, it is possible to make short term predictions using fractional differencing auto-regressive moving-average models, which can then be used to make appropriate policies for each region. For predictions, we use reconstructed temperature, precipitation, and Palmer Drought Severity Index data of the southern and southwestern United States (US). It is important to note that the global climate patterns are not on a linear scale but rather behave non-linear on a multi-scale pattern and thus we cannot just use the ordinary toolset given by statistic and time series analysis. These findings provide a different view of climate change for the coming years in the US.