Significance Testing for a Linear Correlation with Smoothed Time series

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We find that in some cases, applying some smoothing (*e.g.* 12-month running mean) to a CO2 flux time series induces a stronger linear correlation with some climate index. However, routines from Python (and likely other programming languages) does not account for autocorrelation in the smoothed time series when computing significance. This is problematic, because the degrees of freedom are reduced drastically after smoothing due to autocorrelation.

For this test, we will use CO2 flux output from the California Current for simulation one.



Both the unfiltered time series (gray) and 12-month smoothed time series (blue) will be compared to the NPGO index from the same simulation.

