

Comment on “Recent global decline of CO₂ fertilization effects on vegetation photosynthesis”

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Abstract

Wang et al. (Science 370, 1295–1300, 2020) report a significant decline in CO₂ fertilization effects using photosynthesis proxies from long-term satellite records. We find that small systematic biases in AVHRR data impact their analysis to the degree that the key finding is not robust.

Supplementary Figures/Material:

Our analysis code is available in the supplied folder.

Description:

SVD analysis:

We performed a SVD decomposition of the NIRv data-cube in Wang et al (axes are space and time). The first component is related to spatially consistent changes in the global average, while higher orders cause regionally dependent variations. We found that the 1st temporal Eigenvector shows interannual variations that closely resemble the PICS sites as well as global annual averages as used in Wang et al. To compute a corrected NIRv dataset, we replaced the first temporal eigenvector by a linear fit to it and reconstructed the data cube from the SVD components.

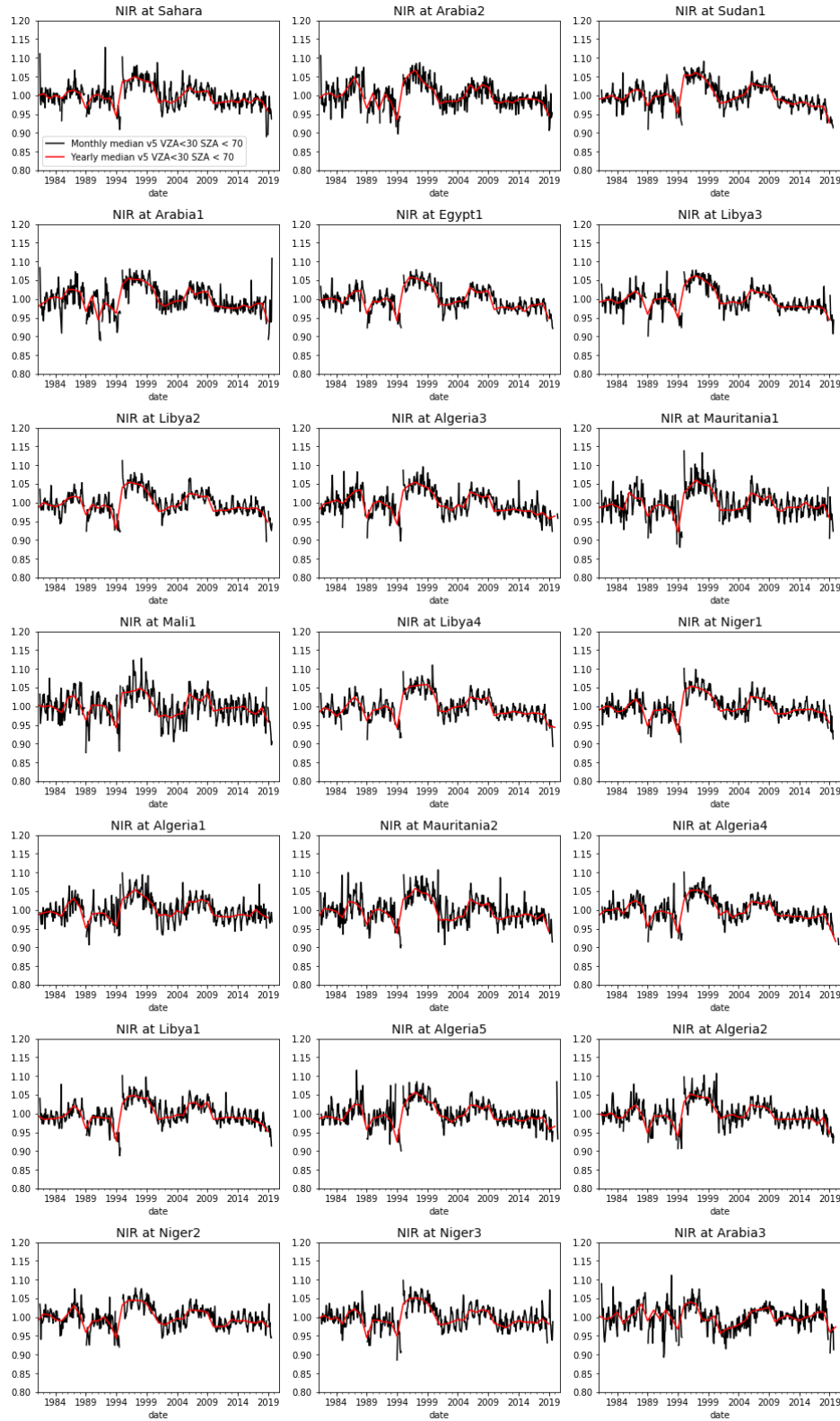


Figure S1: Extracted normalized NIR reflectance from the LTDR v5 archive over PICS sites.

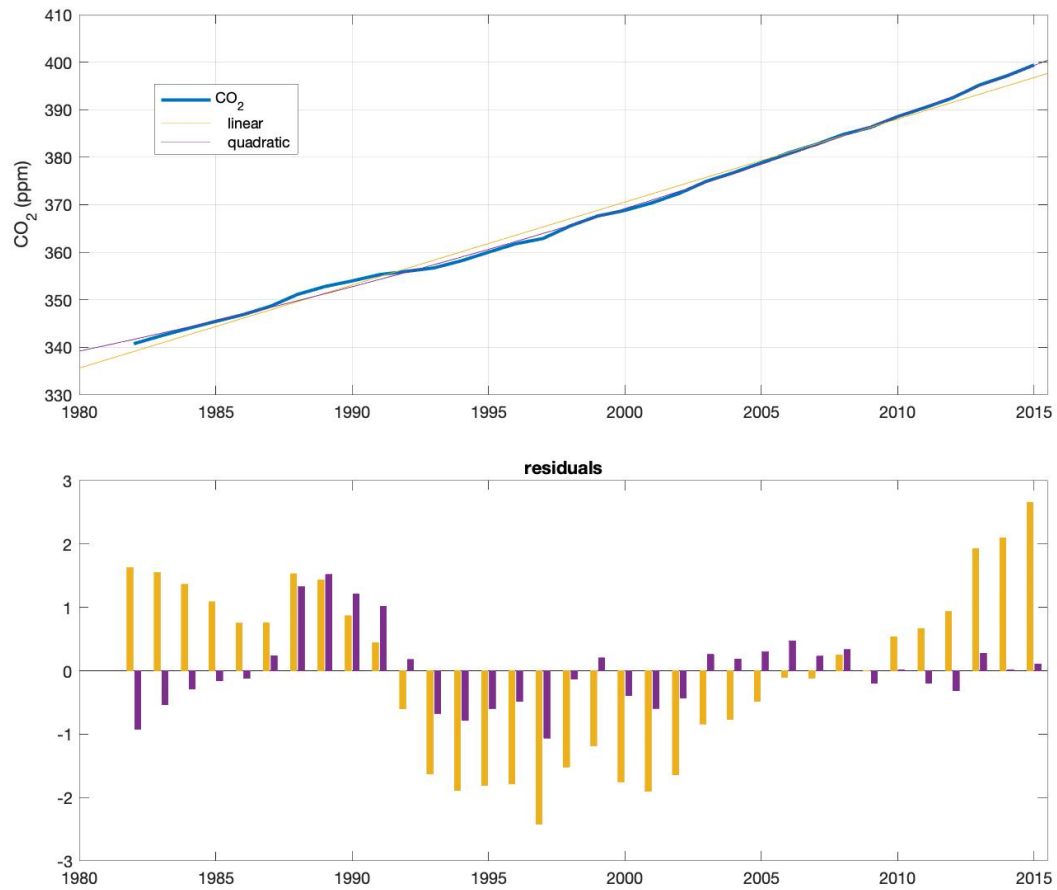


Figure S2: Time-series of Wang et al CO₂ data and a linear as well as quadratic fit to it. The quadratic fit maintains the entire trend but eliminates some stronger IAV, which can alias into the fitted slope.