



A Reply to “On Spurious Causality, CO₂, and Global Temperature”

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Stips et al (2016) demonstrated the existing causal relationship between Green House Gases (GHG) concentrations and Global Mean Surface Temperature (GMTA) based on the Information Flow (IF) methodology. Critics on the application of the Information Flow concept as developed by Liang (2008, 2016) has focused on the underlying assumption of uncorrelated residuals (noise) between the time series. However, this assumption can only make sense for a system with two components, as for a multi-dimensional system unobserved noise may well exist. Fundamentally, there can be no such thing like correlated noise at all. It can seemingly only appear because of some hidden process(es). For investigating this in detail a multivariate information flow analysis has been developed. We will show that in our tests using processes with correlated noises, the preset causalities can be well reproduced. Further, it will be demonstrated that reducing autocorrelation within the time series by pre-whitening, confirms the achieved causality directions. Finally, we question the validity of the proposed alternative measure using forecast error variance decomposition based on vector autoregression by Goulet and Goebel (2021), because in their method causal directions can be simply reversed by reordering. A physically faithful causal measure should be generally independent of ordering.

Coulombe, P. G. and Goebel, M. 2021. On Spurious Causality, CO₂, and Global Temperature. *Econometrics*, 9(3), 33.

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