

Interactive comment on “On reconstruction of time series in climatology” by V. Privalsky and A. Gluhovsky

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Review on a paper titled “On reconstruction of time series in climatology” by V. Privalsky and A. Gluhovsky. This paper is a good example of how one should deal with reconstructing a scalar time series on the basis of a relatively short bivariate time series of simultaneous observations. I was surprised to see how much space the authors gave to an elementary fact from random processes: the cross-correlation coefficient does not characterize relations between time series. Yet, the proof that includes a suggestion by the founder of dendrochronology and a classical study in information theory did not seem to impress the three anonymous reviewers who mostly pretended not to have seen it. The authors chose the parametric analysis (which is reasonable for several reasons, in particular, because the available bivariate time series is short) and

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preferred the physically sound AR models, that is, the stochastic difference equations which can be regarded as discrete analogs of the differential equations of fluid mechanics. The time series analysis part is done quite thoroughly, including proper attention to selecting an optimal model for the bivariate time series. The model has been analyzed and proved to have a smaller innovation sequence (“error”) variance than the linear regression model, which is indeed inappropriate for time series analysis. The coherence function corresponding to the selected model was shown to be the highest and even close to 1 at the lowest frequencies with the highest spectral energy, which means that the respective coherent spectrum would be close to the full spectrum. The authors correctly selected a physically realizable way to restore the time series, restored it, and proved the efficiency of the approach within both time and frequency domains. As I read the anonymous comments, I noticed that they have a common basis: the lack of knowledge in random processes and, in particular, in multivariate time series analysis. In my opinion, the paper should be published as is. Prof. Alexander Benilov, Chief Scientist, Applied Marine Physics Acute Solutions, NYC & Highlands, NJ

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