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Hydrology and Earth System Sciences Discussions

Interactive comment on "European summer climate modulated by NAO-related precipitation" *by* G. Wang et al.

Anonymous Referee #1

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Review of "European summer climate modulated by NAO-related precipitation" by G. Wang, A. J. Dolman, and A. Alessandri.

Major comments

1. On general grounds the statement that a statistical technique can determine the direction of influences cannot be true. If all the information available is two co-varying fields, no statistical technique can ever show causality. In particular, one can never exclude that a third factor influences both fields. As an example, El Niño causes both drought in September–October in Indonesia, and often fewer

hurricanes over the Atlantic Ocean. Given precipitation fields of Indonesia and hurricane tracks over the Atlantic Ocean, no statistical method can ever show that both are influenced by El Niño as this is information not available to the analysis.

In particular, the method of Eqs (1)–(4) reduces to linear regression in the case of 1×1 fields, i.e., time series. Linear regression of time series does not have the property of isolating directional influence. This is in contrast to the general remark that for all cases this method detects directional interactions, which is therefore false.

2. Doing a normal MCA analysis on the fields without the CMT technique (and without EOF pre-filtering) gives pretty much the same results. The first SVD mode explains 28% of variance and looks very similar to Figs 1bc, see Fig.1 of this review.

   The JFM precipitation pattern is highly correlated with the NAO time series ($r = 0.73$). Still, the linear correlation of the JFM NAO index on JJA T_{mean} is compatible with zero, and on T_{max} about 0.2 in France, in contrast with the title of the manuscript, see Fig.2 of this review.

   The analysis of the authors therefore just recovered the well-known weak local correlations between JFM precipitation and Tmean and Tmax in France, Fig.3 of this review.

   The same holds for the scPDSI index, which is higher if there has been lower precipitation in winter at the same grid point.

   To summarise, the authors use a novel statistical technique with improbable claims, but essentially recover simple results that can just as easily be shown using simple correlation analysis: late winter precipitation is correlated to locally drier summer soils in large parts of Europe, which in turn are correlated to local higher mean and maximum temperatures in France. The NAO can be a source of this precipitation variability.

HESSD
7, C2459–C2464, 2010

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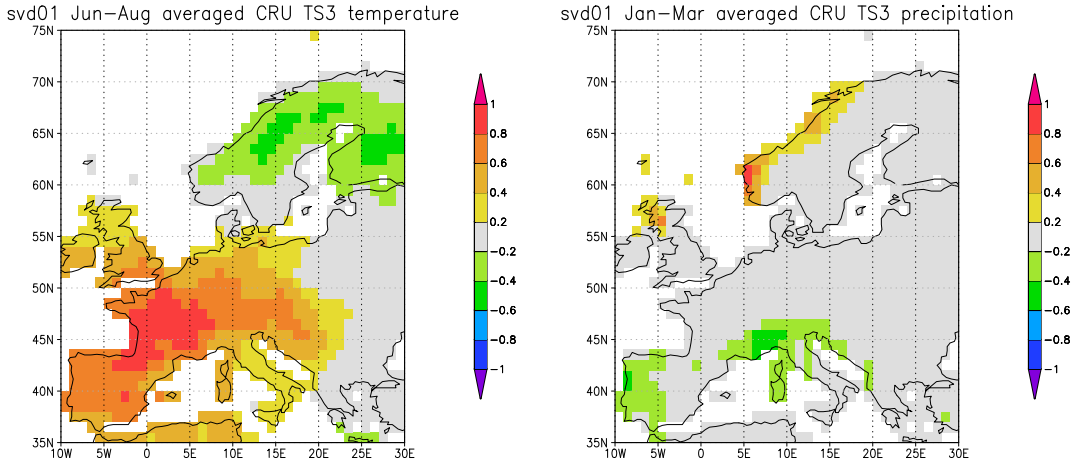

Fig. 1. First SVD of CRU TS 3 JJA Tmean and JFM precipitation

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7, C2459–C2464, 2010

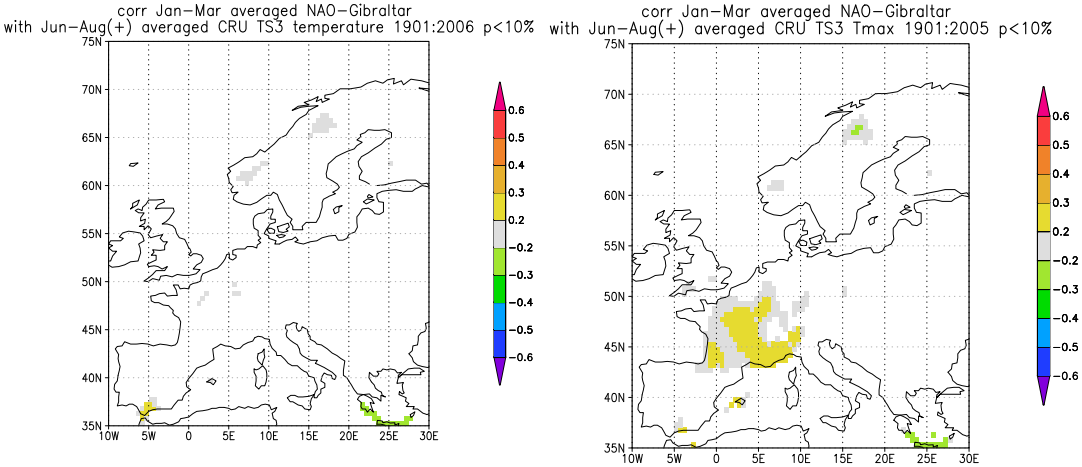

Fig. 2. Correlation of JFM NAO with summer Tmean and Tmax

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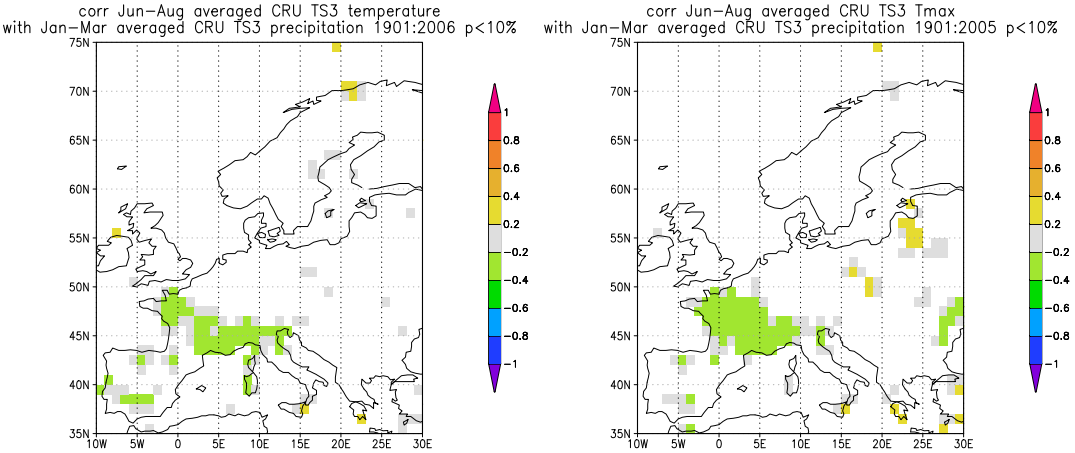

Fig. 3. Correlation of local JFM prcp with Tmean and Tmax

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