**Climate
of the Past
Discussions**

Interactive comment on "**Detecting instabilities in tree-ring proxy calibration**" *by* H. Visser et al.

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Tree-ring chronologies (dendrochronological time series) are the important source of the oblique high-resolution information about climate and environmental changes in the past and the present (Briffa, et al. 1998, 2002; 2008; Cook, Kairiukstis, 1990; D'Arrigo et al., 2004; 2007; Fritts, 1976; Fritts et al., 1991; 1995; Vaganov et al., 1999; 2006). Often the time series signals are associated with direct external periodic forcing (for example, annual irradiance), or with the internal oscillations of biological systems caused by age changes of last ones, for example (Mann, Lees, 1996). In most cases, the signal is a superposition of different internal and external influences (Allen, Smith, 1994; Wigley, Raper, 1990). Such complex interaction is a reason of different "non-linear" effects in different proxies. So typical regression approach in response function analysis could be used in several cases when strong limitations concerning strong linear correlations between tree-ring growth and climate factors, insignificant intraserial correlation

C76

between factors, etc. are carried out. The present paper describes a new statistical approach based on structural equations and its using in dendroclimatology. That technique allows to obtain satisfied modeling results even in "divergence" condition (Briffa, et al. 1998; D'Arrigo et al., 2004; Vaganov et al., 1999). In the paper all results are confirmed by corresponding statistical estimations.

Concerning recent paper we have next remarks:

1. In the paper Authors have used negative exponential (or straight-line curve) procedure to standardize a tree-ring chronologies (P. 233, par 20). But it is known such kind of standardization can produce a distortion at the ends of chronology which usually is shown as underestimating of tree growth (Melvin, Briffa, 2008; Briffa, Melvin, 2010). It will be desirable to compare paper results with similar ones obtained by other standartization techniques (e.g. signal-free approach).

2. In present paper discrete Kalman filter has been used to estimate trend and response weights (P. 229, par. 5). It is known this approach assumes that residuals should be distributed as white noise process (Kalman, 1960). But recent researches show a significant red noise component in most of dendroclimatological data (Allen, Smith, 1994; Mann, Lees, 1996; Thomson, 1982; Wigley, Raper, 1990) and such noise significantly influences on spectral characteristics of analyzed time series . Is it possible to test the model residuals for estimating of their distribution? If obtaining distribution differs from normal then probably it will be better to use other approaches (e.g. Ensemble Kalman filter (Anderson, 2001; Evensen 2004), hidden Markov model (Pachter, Sturmfels, 2005; Newberg, 2009) and others).

We recommend to accept the paper "Detecting instabilities in tree-ring proxy calibration" by H. Visser, U. Buentgen, R. D'Arrigo, and A.C. Petersen with minor revisions.

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Please also note the supplement to this comment:
http://www.clim-past-discuss.net/6/C76/2010/cpd-6-C76-2010-supplement.pdf