Interactive comment on "A multi-model analysis of teleconnected crop yield variability in a range of cropping systems" *by* Matias Heino et al.

Daniel Kirk-Davidoff (Referee)

dkirkdavidoff@gmail.com

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This manuscript describes a regression analysis that seeks to identify the global spatial response of modeled crop yields to global teleconnection pattern index variations. The ability of the authors' analysis to quantify the role of irrigation in damping the oscillations of crop yield due to climate variability seems potentially important. However, the results show some surprisingly strong responses in areas far afield from the action centers of some of the teleconnection patterns. For example, a strong response in the yield of maize to the Indian Ocean Dipole is observed along the US-Canadian border, while a strong response in the yield of maize and soybeans to the North America Oscillation is observed in Southeastern Australia. These are surprising, since I can't find any evidence of a significant relationship between the IOD and sensible weather in North

America, or between the NAO and sensible weather in Australia in global maps of these teleconnection patterns. It seems likely that these results are spurious, an accidental result of the large number of regions being modeled.

Before recommending this work for publication in Earth System Dynamics, I would like to see the a deeper exploration of the reliability of the relationships displayed. For example, it would be good see some scatterplots of the index values versus more directly relevant meteorological factors in each region (growing season length or precipitation) and of these factors versus yield, as well as between yield and index values, to get a sense of the predictive power of the relationships. Some other simple statistical tests would also be helpful. It would be good to see the whether the patterns of response of yield to teleconnection pattern presented in figures 1 and 2 are consistent when the timeseries are split into two parts (first half and second half). Finally, the authors should discuss at greater length the relative predictability of the various teleconnection patterns and how that convolves with level of uncertainty in the unlagged annual relationships presented here. If the NAO can only be predicted a few months in advance, what remaining skill is available for forecasting of the NAO's associated crop yield variability in advance of the harvest? It's one thing to note that if a strong NAO will be present, crop yields in some parts of the world will be a few percent above normal, but how much knowledge of crop yield anomalies is left if we only know that there's a 20% higher than normal chance of a strong NAO index averaged over next growing season?

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