Hydrol. Earth Syst. Sci. Discuss., 11, C702–C703, 2014
www.hydrol-earth-syst-sci-discuss.net/11/C702/2014/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Attribution of satellite observed vegetation trends in a hyper-arid region of the Heihe River Basin, Central Asia" *by* Y. Wang et al.

Anonymous Referee #3

Received and published: 30 March 2014

This study demonstrated one approach how to identify and quantify the factors for the satellite observed 'greening' trends during 2000-2012 over a region within the Heihe River Basin in northern China. The study of this kind is very important and definitely needed, particularly for the water resource management and policy development. The content of this study suits the audience of HESS well. This manuscript is well written and the structure is generally well designed. However, there are a few major issues that need to be addressed before considering for publication in HESS.

Major issues:

1. One highlight of the MODIS observation (10+ years) is to provide a spatial distribution of long-term trends in land surface vegetation status. The authors should present a few spatial maps in this manuscript, e.g. spatial map of annual average NDVI over the growing season, and spatial map of annual change in NDVI during 2000-2012. Apart from the change in mean NDVI, it is probably a good idea to add the spatial map of averaged annual max NDVI and change in annual max NDVI during 2000-2012.

2. Over the hyper-arid regions, satellite based NDVI products always have higher uncertainty. The authors may would like to add some discussion in this regard.

3. The spatial map of annual precipitation change rate is also missing from the current manuscript. It is necessary to present and compare these spatial maps from various precipitation datasets and also with spatial map of annual NDVI change. The authors only presented the time series of precipitation over the entire study area. The spatial pattern match is also very important in the study to identify the contribution of climate change (e.g. precipitation) to the observed change. Otherwise, the 'correct' results may come from the 'wrong' reasons.

4. The authors identified that the increasing precipitation and irrigation as the primary reasons for the observed 'greening' trends. But the irrigation is highly dependent on the increasing river runoff which is largely a contribution from the surrounding mountain regions. The audience may be wondering whether this increasing irrigation trend is sustainable or not. I suggest to add one paragraph to discuss the possible reasons for the increasing river runoff from surrounding regions, e.g. precipitation increase, temperature increase leading to more snow melt, or both combined, or something else.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 1529, 2014.