

Questions:

Authors use AVHRR NDVI, climate data and derived water deficit index to study how climate change and natural vegetation respond to climatic change from 1982 to 2006 along north-south transect of Eastern China. I recommend the paper be accepted with minor revision. The major unexpected and unexplained discovery in the paper is that growing season total NDVI increased while climate became dry in the middle of the transect within latitude 30 to 50N (lines 23 to 25 on page 6659). Authors need to have a more thorough analysis for why this happened in the region where many ecosystems are more limited by water availability but less limited by temperature during the growing season. Was that unexpected caused by the reduced potential ET (PET) and actual ET due to decreased solar radiation caused by increasing air pollution (implying more water available not less), and/or by nitrogen deposition from severe air pollution (fertilization effect), and/or reduced human interference into natural ecosystems because many rural people are migrating into cities?

Answer:

In the middle of the transect, the dry temperate grassland (TG), steppes (TMS, TGS) and shrubland (TDS) implied dominant control of growing season warming, showed upward Ti-NDVIg but downward growing season ETa. Considering these four types have long suffered from growing season precipitation decline and were in arid and semiarid regions (Fig. 5, 6), we speculated the upward trend of Ti-NDVIg was the effect of dramatic warming on prolonging growing season length. This is agreed with some previous studies that non-forest types phenology were more susceptible to warming (Piao et al, 2006a; Yu et al, 2010). Another reason for the disagreement between NDVI and ET0 trends was that we used evapotranspiration instead of plant transpiration, which is more closely correlated to vegetation activities. ET components participation is important particularly for low coverage vegetations, because the soil evaporation, interception evaporation may result in the inconsistent trends in ETa and plant transpiration. In general we agreed the main limitation of ET in these four types was water (McVicar et al., 2012b), because ET0 in these types were considerable high.

The disturbance from human activities can be excluded, because the vegetation types that I selected to analyze based on a couple of GIS measures just to ensure its purity, for example, buffering. This had been introduced in section 2.2, *datasets and spatial interpolation*.

Questions:

Following this comment, author should discuss the limitation of their PET and ET calculations since their methods of ET and PET calculations do not account for solar radiation, an important variable controlling surface water flux which may decrease (not increase) due to rapidly increasing air pollution in China.

Answer:

I changed the original Harmon method to a ‘fully physically based’ PET model: FAO-56 (Allen et al., 1998) to calculate PET in the specific form of reference ET (ET₀). The FAO -56 model is Penman based model considering all four important variables including wind speed. The air pollution was not considered in this study.

Questions:

There are also many English issues in the paper. For example, line 1-2 on page 6652; line 12-15 on page 6653; line 16 on page 6656 (Moreover not More over); line 3 on page 6658; line 14 on page 6665;

Answer:

I revised the m/s.