

Contribution Details

Type of Submission: Oral Presentation

Land Condition And Management Options in China Drylands

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Land & Environment: 32396 - Land Degradation Surveillance of Drylands in China

Abstract

Land condition results from land use in a managed territory. However, the reverse holds too: only a subset of land uses can be applied given a state of land condition. Such reciprocal feedbacks can be of utmost importance for assessing the land management options of a territory.

This was the main hypothesis of this study. To test it, we explored associations and dependencies between land condition states and land cover classes in the China drylands. More precisely, the study area was the Potential Extent of Desertification in China (PEDC), determined after applying the FAO-UNEP aridity index to an archive of climatic surfaces. The study period was 2002-2012. Land condition states resulted from the application of the 2dRUE method to an archived time-series of Net Primary Productivity (NPP), derived from MERIS satellite data by the CASA algorithm. Such states describe ecological maturity in terms of aboveground vegetation biomass and turnover, and lend well to an ordinal scaling. Land cover classes resulted from the aggregation of thirty-eight classes of level II built for China for the year 2010 following the Land Cover Classification System of the FAO. Land uses were excluded from this preliminary run. The spatial resolution for all the analyses was of 4 km.

We performed two statistical tests on the described data set, stratified by aridity zones. First, associations between land condition states and land cover classes were determined by chi-square tests, using the Monte Carlo method. Wherever significant associations were found between these variables, we interpreted the standardized residuals to determine the significance and sign of individual combinations of the corresponding contingency table. The second test was a non-parametric ANOVA with unequal samples, using the Kruskal-Wallis and Median test. We also determined homogeneous groups of land cover classes (in terms of land condition) through non-comprehensive search of land condition differences in pairwise combinations of them.

The associations between land condition and land cover resulted significant for all the dryland aridity zones. In general, areas of low vegetation cover such as desert or bare soil were positively associated with more degraded states, whilst higher vegetation cover was positively associated with states of higher maturity and complexity. As for the second test, it was significant too and two homogeneous groups of land cover could be formed for all the aridity levels.

The results, as reported in this abstract, are somewhat limited because of the exclusion of proper land uses. The land cover classes used here were only five (Deserts and bare soils, Grasslands, Shrubs, Open forests and Forests) and these are likely to be controlled in balanced terms by physical gradients and human intervention. Still, 2dRUE detects land condition states after a climate correction, and both mature and reference states have been found in real deserts of North Africa, for example. This suggests that significant associations in this study between class Deserts and land degradation involves human management to some extent. In other words, this class might be a mixture of proper zonal deserts and desertified areas that were possibly with a denser vegetation cover in earlier times.

The approach will be repeated using a full classification of land uses. Meanwhile, we can preliminarily conclude that it produces interpretable results that will help determining interconversion pathways between land cover classes, which in turn supports the paradigm that land degradation can be defined as loss of management options.

Submitted File(s)

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Session Details

WS#5 ID.32396: Degradation Surveillance of Drylands

Time: **Wednesday, 26/Jun/2019: 8:30am - 10:00am**

Workshop: **LAND & ENVIRONMENT**

Session Chair: **Prof. Laurent Ferro-Famil**

Session Chair: **Prof. ErXue Chen**

Room: Glass 2, first floor