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Interactive comment on “Analysis of land cover change and its driving forces in a desert oasis landscape of southern Xinjiang, China” by T. Amuti and G. Luo

Anonymous Referee #1

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I think that this paper is worthwhile and has interest for the scientific community. It is easy to read and shows some interesting results. Nevertheless, I think that it needs some clarifications to be perfectly understood, particularly, for an international audience, many of them not familiarized with RS and GIS. But also some re-structuration to be more organized and to provide more interesting and appropriate discussion and conclusions. In fact, I can see that, in this paper there are two different and almost independent studies: 1- RS and GIS: changes in land cover/use. 2- Driving forces Both are separated. In fact, it has no sense to finish the discussion section, and to start with the “driving forces” as that: are they results? Are results and discussion? Above all, because they can be used to explain RS results, in a deep discussion section. In

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my opinion, this could be the strength of the paper. On the contrary, its contribution may be poor. Linking and mixing both, the paper will get much more scientific power. But please, give sources and references for all data that you do not obtain from your results. This is an important lack. Nevertheless, I will get into this flaw later. Abstract It is fine but you have to concentrate in your results and conclusions. For example, you say: “. . . which led to accelerated soil salinization . . .”, and in your results, you have no data about the soil quality change. At least, you do not give them. Maybe you got them from NDSI, but data are not presented! The same with conclusions.

Introduction: You provide a nice introduction speaking about oasis, ecotones, land cover changes, but you have also provide a minumun state of the art about driving forces, that are core of your paper. Please, when you give data, provide source, for example, line 14, page 3: “. . . encompasses 34.6% of the total land territory”, where did you get this data? Page 5, line 10, goals of the study. The reality is that the second objective includes the first, don't you think so? On the other hand, I think that in this state, you have not achieve drivers nor consequences proposed in third goal. I hope you do it after recommendations. 2.1.1 Study area Page 6, lines 6, 7 and 8: I do not understand, why you give two averages for all data. Please clarify. Page 6, line13: you say that the natural vegetation is distributed in the ecotone, that you later classify, by remote sensing: low density grasslands. But you are speaking here about Populus, Tamrix or Phragmites, which are not grass and also requires an important amount of water, that I imagine that is not in the ecotone area. This seems riparian vegetation, not ecotone vegetation. Please, if your study focus specially in the ecotone, provide the vegetation of this area. I think that this section requires also more information, about, for example: landforms, highest and lowest points, average height, plot distribution in agriculture (size average, or mode, etc). Readers have to know how the territory is. Here you have to summarize the most important to give a proper idea.

2.1.2 Data Page 7, line 1: tell us something about this socioeconomic data and hydro-climatic data, please. Also how are you going to relate these data with those obtained

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by remote sensing (in method you have to explain how you are going to proceed, to get new data, what is the purpose of your third goal). Any reader need enough information to reproduce the study.

2.2.1 Data pre-processing Page 7, line 18: you can avoid all of this deep explanations. They are standards in RS, so are not necessary to be so ample. Provide only references to the procedures and the bare necessary to know what you did.

2.2.3 Land cover classification Page 9, line 18: Why 200 plots? Why at least 15 for each class for training? Why do not use the maps and images to train the system? You can get different plots to obtain the confusion matrix and accuracy. Are you able to properly differentiate in landsat pixels FC composites, low or medium grassland? Imagine 15% vs 25% of coverture. Please, explain a bit more. I do not have clear what do you introduce in the system to get the classes: bands? The 7-6 or 8 bands? Index? All of them: bands and index? Page 10, line 9: How do you unmix bare-agricultural lands from dessert? It is a common confusion in RS classifications. Even with low density-grassland, when is not in spring (or the rainy season). I do not know how is the vegetation (specially grass) in the time of images acquisition (green, yellow, or nothing). Page 10, line 11: why only this original class (low-density grassland) for ecotone? Why medium-coverage is not part of this ecotone class? Provide more information, but please, support this key decision. Page 10, lines 14-15: this sentence is not clear. I do not understand what you did.

2.2.4 Accuracy assessment Page 10, line 23: why this number of control points? Why is different for each map? Are points of plots? 30x30? Or 3x3 pixels? Page 10, line 23: are synchronous these images with yours (ikonos, quickbird/ with your Landsat, but also with map)? You say that the map was produced in 1990, but was information used for its production, from 1990? For all cases, if acquisition date is different, vegetation phenology could give differences in what you classify in each image of the same year. Grasslands are very changing with seasons, and you say that ecotone is a type of grassland.

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3.1 Land cover classification Page 12, lines 10-13: you do not provide data comparing both classifications. They could be another goal. This is related to one of my formers comments. Page 12, lines 20-23: I can not understand well this sentence. Please, rebuild it. Page 12, line 23: Normally, tables and figures are set in order. You give table 5, before tables 3-4. Please, reorder.

3.2 Land cover change Page 13, line 20: “..transformed to desert mainly due to being desertified by wind erosion, water deficiency and overgrazing.” Firstly, this is a discussion of your results, because this is not your result, then it should be in other point. But also, how do you know it? If you give not further explanations or if you do not cite sources, you are speculating, and this is a scientific paper where everything have to be supported. Idem with line 29, for example. Page 13, line 26: please, explain this 44.9%, because I have been doing operations and I don’t know where this data comes from.

3.3 land cover change patterns Page 14, line 21-22: “grasslands and forests along ...” but you don’t have forests in you classification, after merging them. Please, give explanation of their source.

4 discussion You have to discuss your results. For example: “The radiometric rectification nearly eliminated the effects of varying atmospheric conditions on multi-date images” Have you analyse it? If you have not these data in your results, do not matter to this paper. Please, do not provide a summary of the paper nor of your results. Write a proper discussion. It is not complicated, since it seems that you knows well the process, causes, problems, consequences, etc.

Here you have to include data of driving forces, but including support of your considerations, and cite other studies to give further and scientific support. On the contrary, as I said before, you are speculating.

5 Driving forces

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Firstly, you have to speak about them in introduction, but specially, in data section. Secondly, you have to provide sources of all of your data, since it seems that are not yours. Thirdly, and insisting, you have to use all of this data to discuss your results in the discussion section, since both are linked in your goal nr 3.

Tables:

Table 1: please explain why these thresholds: 5-20; 20-50; >50. Be aware that 20% is in two categories. Where are areas with less that 5%? They have not been specified.

Table 4: Please, explain how to interpret: 240703 ha change from oasis to oasis? 52646 ha from ecotone to ecotone in those 8 years? I don't understand without explanation how can change from one category to the same. I imagine that this is the unchanged area, but you have to say. Also, you can include this data in figure 3, and will inform better.

Figures:

Figure 3: as I suggest before, maybe is better to include change data between brackets, in each category. Figures 6-8: please, include data sources of all your data.

I hope that these comments are interpreted in a constructive way, as is my pretention. I am sorry if sometimes my English is not as proper as it should be. If you require more information, I am open to help as much as I was able.

Interactive comment on Solid Earth Discuss., 6, 1907, 2014.

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