

Interactive comment on “Derivation of land surface temperature from Landsat Thematic Mapper (TM) sensor data and analyzing relation between land use changes and surface temperature” by S. Zareie et al.

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General Comments

The present manuscript tells an interesting story of land use change, particularly the loss of vegetation as detected by NDVI, corresponding with increases in land surface temperature, all detectable by remote sensing. It is novel in its combination of methods and application to a hot and semi-arid to arid region. However, there are several grammatical and organizational issues that should be addressed before acceptance for publication. One critique in this regard is that the writing should expand on what is

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unique to this study and direct readers to the references for more information on the established methods upon which this study is building upon. Second, the organization needs to more clearly separate the tests validating the spatial models and the analysis for how land use has changed and its implications for local surface temperature. However, the main issue preventing acceptance is the lack of information about the data collected on the ground, used to calibrate and validate the models. Without this, the basis for the conclusions cannot be evaluated.

Specific Comments

1. The title could be improved. Perhaps something like “Using Landsat to detect change in land surface temperature in relation to land use change in Yazd, Iran” may more clearly communicate the focus of the research.
2. The abstract needs to be more to the point. The background in the first half can go in the paper’s introduction, but the abstract needs to focus on the work done in this research and its outcomes.
3. The introduction is currently one long paragraph. This should be broken into multiple paragraphs.
4. The majority of the methods text is spent on reviewing equations presented in previous papers, upon which the present research is building upon. This should be condensed and more heavily cited, allowing the reader to refer to those papers for more information.
5. After reducing the content in the methods section about previously established equations, text needs to be added fully explaining the original work in this study. How was information for the calibration and validation points collected? How many were there in each category and where were they located? Without this information it is difficult to assess if the results are sufficient to support the interpretations and conclusions.
6. The results and discussion section is poorly organized, mixing model validation

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and interpretations in a confusing way. I would recommend making the results and discussion separate. This way, the results can focus on the validation of the models converting the Landsat data into information about land use change, vegetation vigor (NDVI), and land surface temperature. The discussion can then go into interpretations of the relationships between these things.

7. Be consistent in the use of decimal places. Significant digits may not be clear in these circumstances of modeling, but thousandths place is likely not meaningful.

8. Figures 4 and 5 are not illustrating sequential relationships between the attributes of the x-axis. Therefore, a line graph is not appropriate. Recommend using a grouped bar graph.

Technical Corrections

P1, L20 and 21 – remove “the” before singular place names, i.e. “Iran” and “Yazd.” Also, one can use “city of Yazd” instead of “Yazd city” to clarify that Yazd is a city, but thereafter, only “Yazd” is needed. If referring to the province of Yazd, then “Yazd Province” would be used.

P1, L24 – replace “relation” with “relationships”

P1, L28 – insert “land use” after “industrial”

P1, L33 – “The main problem” is a strong statement, “A problem” may be more appropriate, unless there really are no other big problems for the city of Yazd

P1, L36 – delete “that”

P1, L37 – replace “during” with “for cooling” and delete “cooling” after “buildings”

P2, L1 – replace “mapping” with “map”

P2, L2 – Insert “The” before “LST indicator”

P2, L11 – move “different” to before “land surface”

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P2, L13 – change “LST index provide” to “The LST index provides”

P2, L36 – the I in NDVI stands for index, so delete “index” after “NDVI”

P3, L7 – insert “The” before “study area”

P3, L9 – change “amount” to “amounts” and “precipitations” to “precipitation”

P3, L11 – insert “the” before “Caspian Sea” (I realize this appears to contradict the earlier correction for city and country names, but that’s the way English is. Here are some helpful guides: <https://www.englishclub.com/grammar/nouns-proper-no-the.htm> <https://www.englishclub.com/grammar/nouns-proper-the.htm>)

P3, L15 – insert “the” before “present study”

P3, L17 – delete “pixel scale (pixel) and the following ()”, to read “Natural surfaces at the resolution of 30 meters are heterogeneous”

P3, L23 – insert “the” before “following”

P3, L35 and L36 – delete “The” before “high” and replace “vegetation density and health” with “dense and healthy vegetation”

P4, L1 – insert “of” before “calibrated”

P5, L27 – insert “between images, it” after “land use classes”

P5, L29 and L30 – delete “that’s mean these land use categories have more area in 2009 compared to the year 1998” (grammar would need fixed, but is redundant from the first half of the sentence anyway)

P5, L31 – delete “clearly” (subjective), replace “had a” with “increased”, and delete “changes”

P5, L32 – insert “of” before “parks”

P6, L1 – non sequitur. The following content is an evaluation of the classification

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model's accuracy, not an example of the previous paragraph's evaluation of land use change.

P6, L1 – Once the exact date of the image has been defined in the methods section, there is no need to repeat the full date. Referring to the respective images as the “1998 image” and “2009 image” will suffice and will be more concise.

Figure 8 - x-axis labels have misspellings. change to "measured"

Please use these specific grammar tips to improve English writing throughout the paper.

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