Hydrology and Earth System Sciences Discussions

Interactive comment on "Snow distribution over the Namco lake area of the Tibetan Plateau" *by* M. Li et al.

M. Li et al.

Received and published: 24 May 2009

Reply to M. Malik (Referee)

Interactive comment on 8220;Snow distribution over the Namco lake area of the Tibetan Plateau8221; by M. Li et al. M. Malik (Referee) malik14406@itc.nl Received and published: 19 May 2009 General Comments: The work presented in the paper is good for understanding the lake effect snow and it is worthful for publishing after some modifications. The phenomena 8220;lake effect snow8221; discussed in the paper for Namco Lake area needs to be investigated and/or presented in more details. Because the results presented here lack in describing the physical processes involve in lake effect snow for Namco lake area. Furthermore, the results need to be validated. For this, some comments have been suggested in the following document. English and terminologies of the paper needs to be improved. 1) Does the paper address relevant

scientific questions within the scope of HESS? Yes S605 2) Does the paper present novel concepts, ideas, tools, or data? The literature review part in the paper is weak. It does not give clear view on what has been discussed in the past research for modeling lake effect snow. What methods and data have been used/explored in the previous research? What limitations have been pointed out in modeling this effect? How these limitations have been addressed in the study? And why the combination of WRF and NOAH has been selected for this study.

Because field observation can not deeply understand the snow distribution over the Namco area, numerical simulation method is validated to study it.

3) Are substantial conclusions reached? The conclusion of the study needs to be improved. For suggestions, please refer questions 5 and 10.

Re: thank you for your suggestions. Replies please refer reply to question no 5 and 10.

4) Are the scientific methods and assumptions valid and clearly outlined? The method that has been used to study the phenomena is not outlined clearly. The setup of the models, discretization of the model domain have not been discussed in details. It is also not mentioned clearly why the terminologies of control and sensitive experiments have been used in the study and what is the main difference in both modeling approaches. From the paper, it seems that only the difference between the two experiments is the observation of lake surface temperature. In the sensitive experiment remotely sensed lake surface temperature has been used but it is not mentioned how the lake surface temperature has been retrieved from the brightness temperatures, which sensor or product has been used. How these remote sensing observations have been used and how the scaling issues have been addressed in the study. A brief explanation is also required on how the snow distribution over the model domain has been simulated using WRF and NOAH.

Re: FY-2C was launched on 19 October 2004 . FY-2C had an onboard visible and infrared spin scan radiometer (VISSR), which senses four infrared channels: (IR1,

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10.3-11.3μm; IR2, 11.5-12.5 μm; IR3, 6.3-7.6μ; IR4, 3.5-4.0μm) and a visible channel (0.55-0.90 μm). In this study, we use 11 micrometer brightness temperature (T11) as surface temperature of Namco Lake (Tsfc) during clear sky condition.

5) Are the results sufficient to support the interpretations and conclusions? The main objective of the paper is to simulate distribution of lake effect snow on Namco lake area. Therefore, it will be better to validate the simulated amount and coverage of snow for both the experiments. For this purpose, remote sensing snow products could be explored. From this study the only conclusion that can be drawn is that the accumulation of snow is more on lee shore in both the experiments. But whether this conclusion is right or wrong we cannot comment on it. We also cannot say which simulation control or sensitive is better. The comparison of the simulated and observed temperature, wind speed and direction need to be discussed in more details.
S606

Re: remote sensing snow products could be explored in the next study.

6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? From the text, it is very difficult to reproduce/apply the approach presented in the paper to produce comparable results. The method need to be precisely described. Detailed description is needed for what and how different datasets have been used. For details please refer question no 4.

Reply please refers reply to question no 4.

7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Please refer question no 2.

Reply please refers reply to question no 2.

8) Does the title clearly reflect the contents of the paper? Yes

9) Does the abstract provide a concise and complete summary? Overall structure of the abstract is ok. But the results (from line number 7 to 12) can be improved for better

and precise readability. Please refer minor comments.

Re: we have revised it in the revised paper. 10) Is the overall presentation well structured and clear? Regarding the structure of the paper, it will be good if the study area and datasets used in the study should be presented before Model description and experimental design. Study area needs a bit more explanation on geographic setting, topography, and then it will help in understanding the discretization of the model domain. The heading8220;Results 8221; on page 848 could be written as 8220;Results and Discussion8221;. Whereas the heading 8220;Summary and discussion8221; on page 850 could be replaced with 8220;Conclusions8221;. In the conclusion/summary, it will be more effective if a take home message is presented.

Re: we have revised it in the revised paper. 11) Is the language fluent and precise? The language needs to be improved, especially the grammar and use of correct terminologies as indicated in the minor comments.

Re: We have revised them indicated in the miner comments.

12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? The unit of 8220;mixing rate of snow8221; in Fig 5 on page 856 needs to be checked or explained.

Re: the unit of mixing rate of snow is kg/kg see WRF manual. 13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Few comments on the figures can be referred to in the minor comments.

Re: We have revised them according to the minor comments.

14) Are the number and quality of references appropriate? More references are required in the text on page 845. Please have a look on minor comments.

Re: Thank you for your suggestion.

15) Is the amount and quality of supplementary material appropriate? Yes

Minor comments: Page 844 Line 11: "Modified" is not appropriate term here, because in the text skin temperature has been retrieved from remote sensing.

Re: It should be revised.

Line 12: Skin temperature is a state variable Re: we have revised it in the revised paper.

Line 19: 8220;Factors8221;: What are these factors? These factors include thermal effects of the Tibetan Plateau (TP), the height of the Tibet Plateau and so on.

Line 19: maintenance of Asian summer Line 26: maintenance of the Tibetan High or Asian monsoon

Re: maintenance of the Tibetan High should be maintenance of Asian monsoon.

Page 845 Line 6: from the lower to the upper? Please explain Line 6: please put references here for evidences

Re: It means upwards. Please see reference 8216;Luo, H. and Yanai, M., The large-scale circulation and heat sources over the Tibetan Plateau and surrounding areas during the early summer of 1979. Part 1: Precipitation and kinematic analysis. Mon. Weather Rev., 1983, 111, 9228211;944.8217;

Line 7: Snow cover and snow depth are two separate state variables. We can write snow depth/snow water equivalent but not snow cover/snow depth

It should be snow depth/snow water equivalent. Line 10: references? what these studies show and how is you study differs from them?

I think this study focuses on the lake temperature effect snow. Line 16: In this study, lake effect snow is analyzed using WRF model

It should be lake temperature effect snow

Line 19: lake surface temperatures are compared Line 19: what is base simulation? it

has not been discussed in the methodology

Lake surface temperature is constant 300 k as initial condition in the base simulation.

Line 24: is used in this study.

Re: we have revised it in the revised paper.

Line 26: helping verb is required Re: we have revised it in the revised paper.

Page 846 Line 8: The snow model of Noah LSM has only one layer of snow and simulates

Re: we have revised it in the revised paper.

Line 11: skin temperature is a state variable Re: we have revised it in the revised paper.

Line 12: Detailed scheme and physical processes Re: we have revised it in the revised paper.

Line 13: model are described by former literature

Re: we have revised it in the revised paper.

Page 847 Line 3: skin temperature is always 300K. This is interesting please explain? Line 3: see below. Never use soft referencing Re: WRF model uses a constant value as a skin temperature over the lake.

Page 848 Line 11: simulations for the period 6 October through 8 October 2005. Simulation period is not clear. What is the date for the simulation to end. Line 14: simulation period the model agrees

Re: It should be simulations for the period 6 October through10 October 2005

Page 849: Line 4: Mountain area is lower than land area. Please explain? Re: It should be 8220;The surface temperature of mountain area is lower than it on the land area.8221;

Line 11: this sentence needs to be clarified. What is larger in control experiment? The mixing rate of the control experiment(figure 5a) was larger than it in the revised experiment(figure 5b).

Page 850: Line 4: I think in the paper surface skin temperature has not been modified. But it is used from satellite data It should be revised.

Line 5: increase modeled ability. For what? It improved local circulation and snow simulation.

Line 11:for long term monitoring Namco station as well ? not clear 8220;monitoring Namco station as well8221; should be deleted.

Line 12: be a powerful tool to help determine. Grammatical mistake Re: we have revised it in the revised paper.

Page 854: In the graphs y-axis can be labeled as: Fig a: Temperature at 2m (OC) and remove label from other side Fig b: wind speed (m/s) and remove label from other side Fig c: Wind direction (deg.) and remove label from other side Re: we have revised it in the revised paper.

Page 856: Fig 5: please check units of snow mixing rate. Its rate?

It is right.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 843, 2009.

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