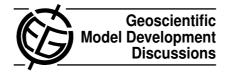
Geosci. Model Dev. Discuss., 3, C225–C230, 2010 www.geosci-model-dev-discuss.net/3/C225/2010/ © Author(s) 2010. This work is distributed under the Creative Commons Attribute 3.0 License.



**GMDD** 

3, C225-C230, 2010

Interactive Comment

Interactive comment on "ESCIMO.spread – a spreadsheet-based point snow surface energy balance model to calculate hourly snow water equivalent and melt rates for historical and changing climate conditions" by U. Strasser and T. Marke

U. Strasser and T. Marke

ulrich.strasser@uni-graz.at

Received and published: 30 July 2010

Comment: The utility of ESCIMO.spread in the field has been explained in more detail in the updated manuscript.

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Interactive Discussion



Comment: Thank you very much for this suggestion. The transparency of the climate change parameters in ESCIMO.spread has been improved by adding more detailed descriptions to the manuscript. Of course, the parameters used to define climatic changes (changes in temperature and precipitation) are as well suitable for carrying out a comprehensive sensitivity analysis, we have added this information to the manuscript. As the trends in temperature and precipitation used in the current study are not chosen arbitrarily, but represent best knowledge of currently expected changes in the region considered (e.g. IPCC, 2007), the authors would like to keep the caption 'Application in climate change conditions'.

Comment: Thank you very much, we have added additional information on the calculation of the mass balance to the manuscript.

Comment: Thanks, the manuscript has been updated accordingly.

# **GMDD**

3, C225-C230, 2010

Interactive Comment

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Interactive Discussion



Comment: Thank you very much. To more clearly relate each efficiency criterion to a single reference and to provide additional information on the criteria applied, the respective section in the manuscript has been edited.

Comment: The authors share the opinion of reviewer #2 and do not consider ES-CIMO.spread to be an ideal platform for the implementation of increasingly complex computing algorithms. The authors would like to emphasize the models utility when applied in the framework of student courses or directly in the field. Both of these model applications strongly limit model complexity.

Comment: Thank you very much, we have modified the manuscript accordingly.

. . incoming short and long wave radiation', because outgoing components will be calculated by the  $\mbox{model}$ 

Comment: Thanks again, we have modified the manuscript accordingly.

# **GMDD**

3, C225-C230, 2010

Interactive Comment

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Interactive Discussion



store energy. . .)

Comment: Thanks, you are totally right here. All calculations are carried out for the snow surface not considering the storage of energy within the snow pack.

Comment: Thanks, we have added your suggestion to our manuscript.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Review: P630, line25: As mentioned in table 1 k is a constant. It depends not really on the value of air temperature, but it can be assigned to two different values k1 and k2, classified by positive or negative air temperature

Comment: Thank you very much, the manuscript has been modified accordingly.

Comment: Thank you very much for this suggestion, the manuscript has been modified accordingly.

Comment: Thanks, the manuscript has been modified accordingly.

**GMDD** 

3, C225-C230, 2010

Interactive Comment

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Interactive Discussion



Comment: Thank you, we have modified the manuscript accordingly.

Comment: Thank you for pointing out this flaw, we have corrected the calculation of the coefficient of determination in the manuscript.

Comment: Thanks for your comment, but as k is used to multiply n (n = the number of days since the last considerable snowfall) the notation 'factor' seems to be adequate.

Comment: Thanks, the respective section in the manuscript and also Table 1 has been modified accordingly.

Comment: Thank you very much. The emissivity of the snow surface can easily be adjusted in ESCIMO.spread, we have corrected the value in the manuscript.

#### Comment:

Thanks, you are totally right. As snow consists of ice and air, we have used the specific

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3, C225-C230, 2010

Interactive Comment

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Interactive Discussion



Interactive comment on Geosci. Model Dev. Discuss., 3, 627, 2010.

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3, C225-C230, 2010

Interactive Comment

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