

Vertiefungsrichtung

Alpine Hydroklimatologie

Literaturseminar



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Warum?

ALPINE3D: a detailed model of mountain surface processes and its application to snow hydrology

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Current models of snow cover dynamics are often based on very simple parameterizations of surface processes. While these models can be useful for the purpose of reproducing catchment runoff, they are not suitable for detailed hydrological assessments, provided that they are carefully calibrated and validated. The main advantage of more detailed models is, however, that they are useful to understand the underlying physical processes and to assess the impact of climate change on snow cover status and soil moisture.

We introduce a new three-dimensional (3D) model of mountain surface processes, in particular snow cover dynamics. The model can be run with meteorological fields created by running a meteorological model or by using observed meteorological data. The model consists of a radiation balance model (which includes shortwave and longwave emission from terrain and tall vegetation) and a saltation transport equation. The model is run in three dimensions and is coupled to a distributed (in the hydrological sense) one-dimensional model of vegetation, snow and soil moisture. The model can be run with a choice of modules, thus generating more or less detailed simulations. The model is designed for runoff generation simulations. The model modules can be run in a parallel architecture to allow computationally demanding tasks. In a case study from the Swiss Alps, we demonstrate that the model is able to simulate snow distribution as seen in a very high-resolution radiometer image. We then analyse the sensitivity of simulated snow cover dynamics to the use of different surface process descriptions. We compare model runoff data from 10 consecutive years. The quantitative analysis shows that terrain influence on the runoff generation has a significant influence on catchment hydrology dynamics. Neglecting the role of vegetation dynamics, on the other hand, had a much smaller influence on the runoff generation dynamics. We conclude that ALPINE3D is a valuable tool to investigate surface dynamics in mountains. It is currently used to investigate snow cover dynamics for avalanche warning and permafrost development and vegetation changes under climate change scenarios. It could also serve to test the output of simpler soil–vegetation–atmosphere transfer schemes used in larger scale climate or meteorological models and to create accurate soil moisture assessments for meteorological and flood forecasting. Copyright © 2006 John Wiley & Sons, Ltd.

KEY WORDS ALPINE3D; modelling; snow hydrology

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Wer?

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Wer findet sich hier nicht, will aber mitmachen?

→ Bitte Mail an uns im Anschluss!

Was und wie?

- Wir behandeln spannende Paper zu den Themen Klima, Schnee, Hydrologie
- Jede/Jeder bekommt ein Paper (alle sind gleich gut 😊)
- Vorgestellt wird über 20 Minuten (Power Point, Tafel, wie immer) inkl. **Kurz**vorstellung der Autoren
- Diskutiert wird über ca. 20 Minuten (**alle!**)
- Wir starten mit den ersten Vorträgen am 17.4.2017, abgegeben wird das Vorstellungsmaterial (**per Mail am Freitag davor bis 9:00 Uhr an beide LV-Leiter**)
- Bewertet werden Vortragsweise, Inhalt, Diskussion, Zeiteinhaltung, zeitgerechte Abgabe...
- Es muss keine Seminararbeit abgegeben werden
- Wir werden pro Einheit zwei Paper behandeln, die Terminplanung wird von uns an alle verschickt
- **Alle lesen alle Paper!**

Papervergabe

- Alle 20 Paper liegen unter:
<http://geography-ahc.uibk.ac.at/Lehre/PaperSeminar.zip>
- Ihr schaut Euch die Paper (Abstracts) durch und sucht Euch 1-3 Papers aus die Euch zusagen
- Versucht nun Euch unter folgendem Link für Euer Paper einzutragen:
<https://tinyurl.com/PaperSeminar>
- Die Paper werden nicht unbedingt entsprechend der Reihenfolge im Doodle nach und nach vorgestellt (nicht nach der Zeit im Semester entscheiden ;-))

Na dann...

Gibt es Fragen?



... ansonsten viel Spass bei der Paperauswahl!

