

Assimilation of MODIS snow data in a detailed model of Alpine snow dynamics and snow hydrology

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Conference Theme: Data assimilation and integration of remote sensing with dynamic process models

Snow as a water resource in mountains becomes more and more important as dryer and hotter conditions prevail in many continental areas worldwide. Even maritime or temperate zones such as western and central Europe experience extended hot and dry periods in the summer (e.g. Summer 2003). Therefore, the understanding of the mountains providing fresh water to the low lands needs to be augmented. In this context, the processes dominating the snow cover dynamics and hydrology in mountains are particularly important. In our contribution, we introduce data assimilation to Alpine3D, a very detailed model of Alpine surface processes. Alpine3D consists of modules of snow transport, detailed surface energy balance including terrain effects, vegetation, snow, soil and runoff. The model focuses on snow dynamics and has a very detailed and accurate description of snow – atmosphere interactions and snow mass- and energy fluxes. The presentation discusses the possibilities and limitations of data assimilation in such a detailed model. We focus on the assimilation of MODIS derived snow cover maps with a simple, nudging-like assimilation method. The considerable influence of the assimilation on timing, magnitude and dynamics of runoff is shown.