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Comparison of energy fluxes at the land surface-atmosphere interface in an Alpine valley as simulated with different models

G. Grossi and L. Falappi
Università degli Studi di Brescia, Dipartimento di Ingegneria Civile, Via Branze, 38, I-25123 Brescia, Italy
E-mail for corresponding author: grossig@ing.unibs.it

Abstract. Within the framework of a research project coupling meteorological and hydrological models in mountainous areas a distributed Snow-Soil-Vegetation-Atmosphere Transfer model was developed and applied to simulate the energy fluxes at the land surface – atmosphere interface in an Alpine valley (Toce Valley - North Italy) during selected flood events in the last decade. Energy fluxes simulated by the distributed energy transfer model were compared with those simulated by a limited area meteorological model for the event of June 1997 and the differences in the spatial and temporal distribution. The Snow/Soil-Vegetation-Atmosphere Transfer model was also applied to simulate the energy fluxes at the land surface-atmosphere interface for a single cell, assumed to be representative of the Siberia site (Toce Valley), where a micro-meteorological station was installed and operated for 2.5 months in autumn 1999. The Siberia site is very close to the Nosere site, where a standard meteorological station was measuring precipitation, air temperature and humidity, global and net radiation and wind speed during the same special observing period. Data recorded by the standard meteorological station were used to force the energy transfer model and simulate the point energy fluxes at the Siberia site, while turbulent fluxes observed at the Siberia site were used to derive the latent heat flux from the energy balance equation. Finally, the hourly evapotranspiration flux computed by this procedure was compared to the evapotranspiration flux simulated by the energy transfer model.

Keywords: energy exchange processes, land surface-atmosphere interactions, turbulent fluxes

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