Seminarios

Primavera 2012 Nº10

RHMA
Recursos Hidricos y Medio Ambiente

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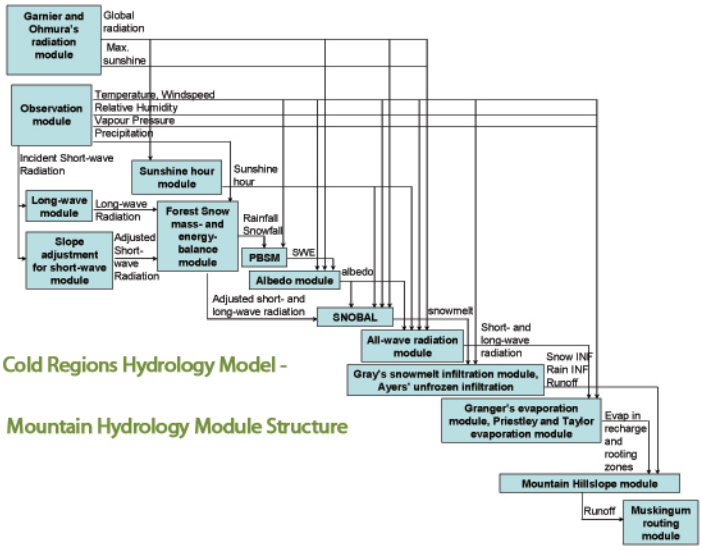
Typical scene in the Canadian Rocky Mountains



Cold Regions Hydrology Model -

Mountain Hydrology Module Structure

Mountain snow hydrology processes and modelling

Resumen

Intensive field and multi-scale modelling studies in the Canadian Rocky Mountains have been directed to advance the understanding of snow hydrology processes and to improve hydrological models. Multi-scale modelling studies of blowing snow over alpine terrain are being used to predict the spatial distributions of snow water equivalent in complex environments. The models calculate snow accumulation as a residual of snow transport, melt and sublimation and show that all of these processes must be considered to determine alpine snow accumulation. Studies of snow interception in forest canopies show that over half the seasonal snowfall is intercepted by and subsequently sublimated from evergreen canopies – unloading of intercepted snow to the ground decreases with increasing canopy density. A coupled interception-sublimation-unloading algorithm is able to simulate this process. Radiation for snowmelt is strongly affected by the canopy, which decreases shortwave and increases longwave components. Applying these algorithms for hydrological modelling in poorly gauged mountain basins with sparse meteorological and land surface information is a challenge that has been addressed by aggregating landscape units into hydrological response units which can be characterized on physiographic, vegetation, soils, aquifer, hydraulic and aerodynamic characteristics. The method of aggregation of information into hydrological response units can be informed by fully spatially distributed modelling in research basins and then extended to similar basins where there is sparser information available. Comparisons of the outputs of a comprehensive hydrological model using the new snow and other physically-based algorithms and the hydrological response unit basin discretization to observations of snow accumulation, soil moisture, groundwater levels and streamflow in a research basin suggest that this approach can reliably simulate the hydrological cycle in snowy mountain basins.

Sala 25-S del edificio Escuela, Beauchef 850
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