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EFFECTS OF SEASONALLY FROZEN GROUND IN SNOWMELT MODELING

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ABSTRACT: The Swedish HBV-3 runoff model was used for simulations of runoff during snowmelt periods in the Chena River Basin in interior Alaska. The model was calibrated using data from 1969-1974. The initial simulations showed a poor ability to simulate both snowmelt runoff and rainfall runoff events. Because frozen soils have much lower infiltration and storage capacities than unfrozen soils, the soil moisture routine in the model was modified to accept seasonally varying soil parameters. This modification substantially improved the runoff simulations. The model was tested with meteorological data from 1982-1985 using the modified soil moisture routine. The simulations in the test period were of approximately same prediction quality as the simulations in the calibration period, and provided good estimates of runoff generated by both snowmelt and rainfall.
(KEY TERMS: runoff model; snowmelt; soil moisture; seasonal frost; frozen soil)