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# Climatic impacts on the runoff generation processes in British Columbia, Canada

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Abstract. The potential impact of future climate change on runoff generation processes in two southern British Columbia catchments was explored using the Canadian Centre for Climate Modelling Analysis General Circulation Model (CGCMa1) to estimate future changes in precipitation, temperature and cloud cover while the U.B.C. Watershed Model was used to simulate discharges and quantify the separate runoff components, i.e. rainfall, snowmelt, glacier melt and groundwater. Changes, not only in precipitation and temperature but also in the spatial distribution of precipitation with elevation, cloud cover, glacier extension, altitude distribution of vegetation, vegetation biomass production and plant physiology were considered. The future climate of the catchments would be wetter and warmer than the present. In the maritime rain-fed catchment of the Upper Campbell, runoff from rainfall is the most significant source of flow for present and future climatic conditions in the autumn and winter whereas runoff from groundwater generates the flow in spring and summer, especially for the future climate scenario. The total runoff, under the future climatic conditions, would increase in the autumn and winter and decrease in spring and summer. In contrast, in the interior snow-covered Illecillewaet catchment, groundwater is the most significant runoff generation mechanism in the autumn and winter although, at present, significant flow is generated from snowmelt in spring and from glacier runoff in summer. In the future scenario, the contribution to flow from snowmelt would increase in winter and diminish in spring while the runoff from the glacier would remain unchanged; groundwater would then become the most significant source of runoff, which would peak earlier in the season.

Keywords: climatic change, hydrological simulation, rainfall, snowmelt, runoff processes

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