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Groundwater Flow in Mountain Watersheds

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Mountain watersheds are unique high-relief environments that exhibit geological, landscape, climate, and other characteristics that are distinctive from other types of watersheds/basins. As such, they give rise to complex groundwater systems that circulate water over a range of spatial and temporal scales. This presentation highlights the results of two modeling studies that were conducted to investigate deep groundwater flow processes within mountain watersheds in British Columbia, Canada. The first study focuses on a headwater catchment, and demonstrates that extending the model domain into the bedrock and allowing groundwater to exit the catchment does not compromise the calibration. Deep groundwater loss is estimated at up to 6% of the annual water balance. The second study focuses on deep groundwater flow within the mountain block, which contributes to mountain front recharge. Mountain front recharge is an important source of water to valley-bottom aquifers. Mountain front recharge derives from both mountain streams, which gain water as baseflow from deeply circulating groundwater, and mountain block recharge, which is the subsurface discharge of deep groundwater from the bedrock mountain block to the valley bottom sediments. Baseflow in the mountain streams is found to be sensitive to changes in groundwater recharge across the mountain block.