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INFLUENCE OF SPATIAL RESOLUTION ON THE DISTRIBUTED SURFACE ROUTING RESPONSE OF THE DES ANGLAIS RIVER BASIN (CANADA)

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Summary. Digital elevation models (DEMs) at different resolutions (180, 360, and 720 m) are used to examine the impact of different levels of landscape representation on the hydrological response of the des Anglais river basin (Canada). Frequency distributions of local slope, plan curvature, and drainage area are calculated for each grid size resolution. This landscape analysis reveals that DEM grid size significantly affects computed topographic attributes which in turn explain some of the differences in the hydrological simulations. The investigation is carried out by analyzing the main hydrograph features (peak flow, time to peak, and total volume) at the main outlet of the catchment over-3-year simulation period. The simulation results, generated with the surface routing module of a coupled surface--subsurface model, indicate that time to peak decreases as grid resolution is coarsened due to a decrease in flow path lengths, that peak flows increase as grid resolution is refined due to an increase in local slopes, and that the simulated runoff volumes increase at coarser grid resolution due to the aggregation of cells at the border of the catchment..