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Assessment of wildfire impact on hydrological extremes in eastern Siberia

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Abstract MODIS imagery was used to select two middle-scale fire-affected permafrost watersheds within the Lena River basin. A paired-watershed method and modelling approach was employed for change detection study of the watersheds to quantify effects of wildfire on the hydrological regime. Results showed that the Vitimkan River watershed with a burnt area percentage of 78% had a profound response to wildfire disturbance. It was reflected in a considerable increase of daily and monthly flow and decline of spring snowmelt runoff depth during the year after the fire. The larger Vitim River basin with a burnt area percentage 49% did not have a detectable hydrological response to fire. The results of the Hydrograph model application to the Vitimkan River watershed revealed the existence of an additional fire factor that influenced the formation of river flow during the year after the fire and was not accounted for by the model.

Key words the Hydrograph model; wildfire; paired-watershed approach; change detection