



Temporal and Spatial Wildfire Dynamics of Northern Siberia: Larch Forests and Insect Outbreak Areas

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Wildfire number and burned area temporal dynamics within all of Siberia and along a south-north transect in central Siberia (45 – 73°N) were studied based on NOAA/AVHRR and Terra/MODIS data and field measurements for the period since 1996. In addition, fire return interval along the south-north transect was analyzed. Third, pest outbreak (Siberian silkmoth) impact on the wildfires was studied. Both, number of forest fires and burned area in Siberia increased during recent decades. Significant correlations were found between forest fires, burned areas and air temperature ($r = 0.5$) and drought index (SPEI) ($r = -0.43$). Within larch stands along the transect wildfire frequency was strongly correlated with incoming solar radiation ($r = 0.91$). Fire danger period length decreased linearly from south to north along the transect. Fire return interval increased from 80 years at 62°N to 200 years at the Arctic Circle (66°33'N), and to about 300 years near the northern limit of closed forest stands (~71+°N). That increase was negatively correlated with incoming solar radiation ($r = -0.95$). Siberian silkmoth outbreaks leads to an order of magnitude increase in burned area and fire frequency. Multiple fires turns former "dark needle conifer" taiga into grass and bush communities for decades.