

WILDFIRE-INDUCED FOREST COVER CHANGE IN THE BARGUZINSKY NATURE RESERVE

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Abstract. Every summer, wildfires caused by human activity and extreme weather conditions are ravaging vast areas of Siberian boreal forests. Due to its links to ecosystem change and carbon balance, it is particularly important to research forest recovery after these events. This work attempts to integrate remotely sensed and fieldwork data in order to explore the variability of after-fire succession due to environmental factors and burn severity in the Barguzinsky reserve. Additionally, we assess the applicability of spectral indices as a means of the forest regrowth estimation. Three key areas impacted by numerous fires since 1961 were selected for surveying, and a broad Landsat 5–7 imagery analysis had been carried out prior to it. Change of summer values of NBR spectral index provided information about burn severity, while annual changes in summer and early spring (illustrative of evergreen conifers) NDVI – about the intensity and direction of after-fire forest cover change. The results show high heterogeneity in succession processes, which can be attributed to environmental conditions. Boggy plains are characterised by slow but successful recovery of the larch (deciduous) and Siberian pine (establishing late and growing slow) forest, which, however, is poorly noticeable on satellite imagery. Drier areas within the plains and hill-slopes show a different pattern: they are rapidly occupied by pioneer species such as birch and fireweed, which constitute a full ‘recovery’ of NDVI after as little as 5–7 years after the fire. Resulting mixed birch and Scots pine stands with Siberian pine saplings highlight a substantial difference between secondary and intact coniferous taiga. Mountain fire site has much slower rates of recovery, the mosaic of which is majorly influenced by relief and microclimate. Suggested by imagery analysis differences in after-fire death rates of different species have also been confirmed by field data.

Keywords: after-fire forest succession, NDVI, Baikal region, remote sensing, wildfires, burn severity, boreal forest.

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