



Reconstructing Post-1979 Forest Fire Activity and Area Burned in Russia: NOAA AVHRR Analysis

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Forest fire has been a major disturbance regime in boreal forests for millennia. Located at high northern latitudes, the boreal zone is particularly sensitive to climate change, and studies to date project significant increases in natural disturbance regimes in this region, including increases in forest fire frequency and severity. Forecasting future fire impacts requires coupling outputs from general circulation models with baseline data on climate/fire relationships in recent history. This has been done in Canada and Alaska, where fire records are quite accurate over the past 5 decades. However, Russian fire records over this period have been inaccurate and incomplete, leading to this ongoing attempt to reconstruct Russian fire activity using NOAA AVHRR satellite records, which have been archived since 1979.

When completed, this fire record will represent the best estimate of Russian area burned on which to base future climate change impacts projections, including carbon loss and emissions. It will also permit the best possible circumboreal estimates of recent forest fire activity and impacts. The AVHRR imagery archive, that has been constructed for this study, spans over 30 years and consists of over 70,000 images. We will discuss the methodologies, which are designed to provide consistent and objective results year over year, that are being employed to extract the multidecade fire record from AVHRR. While the focus of this research is constructing the Russian fire record, there are numerous underlying aspects of the remote sensing and image processing that play an important role in this study. Some of these fundamentals will be examined as well.