ABSTRACT

Wildfires significantly affect the boreal ecosystem of Siberia. However, records on burnt areas and fire impact are still not satisfactory in Russia. The dense smoke from active burning and the persistent cloud covers impeded the application of optical sensors to the detection of burnt area in Siberia forest during the summer fire season. The high resolution SAR data are of limited use for burnt area identification because of the enormous size of boreal Russia. In this paper, the medium resolution (150 meters) ENVISAT wide swath SAR data (ASAR_WSM) were investigated through analyzing the backscatter dynamics of fire scars in Siberia boreal forest. We firstly compared seven time series backscatter of ASAR data in burnt forest and adjacent unburnt forest, then applied Principle Component Analysis to pre and post fire images for detecting the burnt area change and finally we compared the visibility on ASAR images among fire scars formed in different years. Results show that 1.) ASAR WSM is very useful in detecting burnt area in Siberia forest; 2.) the period from May to early July is optimal time for detecting fire scars by ASAR wide swath in boreal forest of Siberia and the detectability corresponded with local weather conditions; 3.) Multitemporal images are more useful in detecting older fire scars. The results suggest that ENVISAT wide swath SAR is a useful data source for operational burnt area identification over large areas.