

EARTH OBSERVATION SYMPOSIUM (B1)
Towards Implementation of GEOSS (6)

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WILD FIRES PROPOGATION MODELING BASED ON REMOTE SENSING DATA

Abstract

Modeling is a powerful tool to study various natural phenomena. Models can facilitate phenomena dynamics examining under different conditions and predict their characteristics. Models are regularly used to study terrestrial ecosystems dynamics under various disturbances like fires, droughts etc. Usually natural phenomena models are based on theoretical conceptions and observation data. To create adequate models that can predict those phenomena usually significant amount of observation data is required. For large scale models such observations require significant resources. In a last few decades of the Earth observation data from satellites became mature technique to be considered as real alternative to costly and time consuming field data. Existing remote sensing data can be applied to monitor ecosystems processes dynamic in a regular manner. But even now remote sensing data is rarely used to create new models for such systems. This work studies quality of model created using mostly satellite data. To simplify this study existing model was used and it was adapted to new conditions with satellite data. In this study natural fire model based on Canadian Forest Fire Behavior Prediction System was used and it was adapted to territory of Russia. To adapt wild fire model a set of model parameters was chosen and values of parameters were tuned to better fit observation data. Tuning was performed by optimization of their values for random set of fires from year 2011, with cost function based on fire area error. Algorithm Rgenoud from statistical language R was used for optimization. Information about fires was obtained from MODIS instrument. After optimization model quality was assessed for more than 40000 fires on territory of Russia for years 2007-2012. Overall, modeling quality improved for all years with nearly equal modeling errors for whole period. As a result of this work wild fire model adequate to conditions of Russia was produced, without need for field observations.