Study on forest fuel moisture content estimation from MODIS data

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Fuel moisture content (FMC) is an important parameter in determining fire risk and fire behavior. Direct measurement of FMC in the field is very costly and time consuming, and remote sensing provides an effective method to quantify spatial differences of live fuel moisture. Since short wave infrared (SWIR) reflectance is negatively related to leaf water content. A combination of SWIR and NIR is necessary to retrieve EWT at leaf level (Pietro, 2001). We developed a new method to predict forest FMC and used it to estimate the fire-spread direction with MODIS data. We think MODIS is the best way to monitor forest fire. Live fuel moisture was sampled in Wusutu National Forest Park at 40.85oN, 111.57oE during 2004 and 2005.Vegetation sampled at clear day. Leaves and small branches have been sampled, and each sample is about 400-500 gram. The samples were dried at 800C with three days. From this study the combination of SWIR and NIR retrieve the FMC of forest at canopy level. We found that the R2 can be 0.39 when NIR and SWIR bands are combined. Though it is a little smaller than grassland and bush, but this method can still provide efficient fuel moisture spatial distribution. This is helpful to predict fire behavior since in Northeast China the forest area is so big that little information is known due to sparsely measure instrument. Remote sensing can provide an economic and timely method to monitor the FMC status. Here are many other factors that affect the FMC at canopy level, such as dry matter, canopy structure and LAI etc.. The results will be more precise if these factors considered.