

A new fire risk indicator for Indonesia

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Fires in dry season of Indonesia has become a serious problem. Most of Indonesian land is covered with peat moss, which occurs the expanding of fires due to the burning itself. Furumoto et al. showed that seasonal changes of soil water content in Indonesia estimated through the vegetation index of NDVI (Normalized Difference Vegetation Index). However, there's a time lag of 1-2 months between the change of rainfall and NDVI values, which makes it difficult for us to judge immediately whether the fires will occur. Thus, the soil water content, reflecting the amount of precipitation in the area, can become the indication of the risk of fires. Our study aims to develop a new remote sensing index reflecting the fire risk using through the directional measurements of soil spectra. We have prepared the peat moss (in Canada, Sri Lanka and Indonesia) of several soil water contents measured (Field pro, WD-3). We obtained the reflectance spectra with 400-1050nm (light source: halogen lamp, spectroscope: self-made) from the respective peat moss. There are the features for obtained spectra, the reflectance difference between wet and dry in ultraviolet (infrared) is smaller (larger). The results indicate that a new fire risk indicator for the soil covered with peat can be favorable to use the ultraviolet wavelength range, such as a new deep blue band on Landsat 8. It can be essential to know precisely the surface water content of soil through the spectral measurements on the ground. The resulting satellite images calculated by our original index appears to reflect the risk of fires rather than well-known indices such as Normalized Difference Water Index and Normalized Difference Soil Index. In conclusion, we have developed a new fire risk indicator that highly reflects to the degrees of soil water content for peat soil. We will show the results of spectral measurements for several water contents of soil sampling in Indonesia.

Keywords: Fire, Peat soil, Indonesia, Satellite remote sensing, Reflection spectrum