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ADAPTING (V,W) BURNED INDEX FOR AVHRR/METOP DATA USING SWIR INFORMATION

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ABSTRACT

Accurate information about location and extent of burnt area is required and of particular interest for the scientific communities dealing with meteorological and climate models in what concerns reliable estimations of biomass burned. Currently, due to the very broad spatial extent and the limited accessibility of some of the largest areas affected by fire, the instruments on-board satellites are the only available operational systems capable to collect cost-effective burnt area data at spatial and temporal resolutions appropriate to most modeling applications. Accordingly, an effort has been made by the scientific community to develop thematic products of burnt areas. In such context, AVHRR/METOP is able to provide continuous, long term data sets (more than 14 years from 2006), which may contribute in a unique way to build a long time series of burnt area estimates in order to parameterize climate driven models for burnt area. Besides, AVHRR/METOP provides data continuity of MODIS/TERRA & AQUA and AVHRR/NOAA platforms and will allow the implementation of inter-validation exercises.

In this work we intend to apply the (V,W) burned index to the AVHHR/METOP characteristics in order to derive burnt area maps to Brazil and Europe. The (V,W) burned index was firstly designed for MODIS sensor characteristics of channels 2 (near infrared, (around 0.8 μm)) and 20 (middle-infrared – daytime, around 3.9 μm). The authors, however, have emphasized that although tested with the MODIS sensor, the proposed transformation may be straightforwardly adapted to other sensors and to other combination of bands, such as the AVHRR, working in the shortwave-infrared and near infrared bands. Since AVHRR/METOP middle-infrared channel is programmed to acquire only night-time data, it is then possible to use AVHRR/METOP shortwave-infrared (around 1.6 μm) as a surrogate of the middle-infrared daytime band, taking into account that the spectral response to fire scars in the shortwave-infrared domain is similar to that observed in the middle-infrared region. In addition, shortwave infrared domain, such as middle infrared, appears adequate for monitoring the land surface during fire episodes, because it is largely unaffected by the presence of most aerosols. Finally, advantages and drawbacks of the derived index are then discussed and operational applications are shown.