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Assessing burn severity using satellite time series

Sander Veraverbeke (1), Stefaan Lhermitte (2), Willem Verstraeten (3), and Rudi Goossens (1)

(1) Department of geography, Ghent University, Ghent, Belgium (sander.veraverbeke@ugent.be), (2) CEAZA, Universidad de La Serena, La Serena, Chile, (3) Geomatics Engineering, KU Leuven, Leuven, Belgium

In this study a multi-temporal differenced Normalized Burn Ratio (dNBR$_{MT}$) is presented to assess burn severity of the 2007 Peloponnese (Greece) wildfires. 8-day composites were created using the daily near infrared (NIR) and mid infrared (MIR) reflectance products of the Moderate Resolution Imaging Spectroradiometer (MODIS). Prior to the calculation of the dNBR$_{MT}$ a pixel-based control plot selection procedure was initiated for each burned pixel based on time series similarity of the pre-fire year 2006 to estimate the spatio-temporal NBR dynamics in the case that no fire event would have occurred. The dNBR$_{MT}$ is defined as the one-year post-fire integrated difference between the NBR values of the control and focal pixels. Results reveal the temporal dependency of the absolute values of bi-temporal dNBR maps as the mean temporal standard deviation of the one-year post-fire bi-temporal dNBR time series equaled 0.14 (standard deviation of 0.04). The dNBR$_{MT}$'s integration of temporal variability into one value potentially enhances the comparability of fires across space and time. In addition, the dNBR$_{MT}$ is robust to random noise thanks to the averaging effect. The dNBR$_{MT}$, based on coarse resolution imagery with high temporal frequency, has the potential to become either a valuable complement to fine resolution Landsat dNBR mapping or an imperative option for assessing burn severity at a continental to global scale.