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Calculating the radiant power of fires and volcanoes

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ABSTRACT:

Fires and volcanoes are global hazards that are both characterized by the emission of heat. Radiant power [W], sometimes also referred to as Fire Radiative Power (FRP), can be measured from space and is related to key physical parameters such as the combustion rate of fires and runout length of lava flows. There are three methods for calculating radiant power of fires and volcanoes from space: bispectral, Kaufman-Wooster and spectral library. The comparison of the performance of these three methods, using millions of individual test spectra, is presented here for the first time. Two different sensor types were simulated i) a Sentinel 2 -type sensor and ii) a BIROS-type sensor. The spectral library method was found to consistently be the most accurate and reliable. This suggests that current and future fire and/or volcano monitoring efforts should use the spectral library method for calculating radiant power from space.