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ESA fire_cci product assessment

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Vegetation fires are a major disturbance in the Earth System. Fires change the biophysical properties and dynamics of ecosystems and alter terrestrial carbon pools. By altering the atmosphere's composition, fire emissions exert a significant climate forcing. To realistically model past and future changes of the Earth System, fire disturbances must be taken into account. Related modelling efforts require consistent global burned area observations covering at least 10 to 20 years.
Guided by the specific requirements of a wide range of end users, the ESA fire_cci project has computed a new global burned area dataset. It applies a newly developed spectral change detection algorithm upon the ENVISAT-MERIS archive. The algorithm relies on MODIS active fire information as "seed". It comprises a pixel burned area product (spatial resolution of 333 m) with date detection information and a biweekly grid product at 0.25 degree spatial resolution.
We compare fire_cci burned area with other global burned area products (MCD64 Collection 6, MCD45, GFED4, GFED4s and GEOLAND) and a set of active fires data (hotspots from MODIS, TRMM, AATSR and fire radiative power from GFAS).
The analysis of patterns of agreement and disagreement between fire_cci and other products provides a better understanding of product characteristics and uncertainties. The intercomparison of the 2005-2011 fire_cci time series shows a close agreement with GFED4 data in terms of global burned area and the general spatial and temporal patterns. Pronounced differences, however, emerge for specific regions or fire events. Burned area mapped by fire_cci tends to be notably higher in regions where small agricultural fires predominate. The improved detection of small agricultural fires by fire_cci can be related to the increased spatial resolution of the MERIS sensor (333 m compared to 500 in MODIS). This is illustrated in detail using the example of the extreme 2006 spring fires in Eastern Europe.