High fire activity and associated atmospheric circulation patterns over the Mediterranean basin

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Encompassing the lands around the Mediterranean Sea, the Mediterranean Basin is associated to Mediterranean forests, woodlands, and scrub. This temperate biome is characterised by rainy and mild winters followed by warm and dry summers that make the region especially prone to the occurrence of a large number of fire events. Meteorological factors play therefore a crucial role in the setting and spreading of wildfires and are an important factor in the resulting fire severity.

In this context, the SEVIRI instrument on-board the MSG satellite series has been identified as having an especially good potential in the domain of fire detection and monitoring, especially because of its high temporal resolution (every 15 minutes) that allows having daily records of both fire location and duration.

Detection of active fires over Mediterranean Europe is performed by means of an operational procedure that has been developed within the framework of the Satellite Application Facility on Land Surface Analysis (LSA SAF). The procedure primarily relies on information from Meteosat-8 channels (namely the 0.6 μm, 0.8 μm, 3.9 μm, 10.8 μm and 12.0 μm) together with information on illumination and viewing angles. The method is based on contextual algorithms that have been successfully developed for different sensors, namely GOES, NOAA-AVHRR and MODIS. A potential fire pixel is compared with the neighbouring ones and the decision is made based on relative thresholds as derived from the pixels in the neighbourhood. The algorithm is self-adaptive and has shown consistency over large areas and throughout the seasons.

The spatial and temporal distribution of fire activity during the fire seasons (July and August) of 2007-2009 is analysed, paying special attention to large wildfire episodes. Finally, the relevance of associated meteorological conditions to the occurrence of extreme events is assessed by means of appropriate composites of meteorological fields (e.g. sea level pressure, 850 hPa temperature and relative humidity, 500 hPa geopotential) and respective anomalies.