Geophysical Research Abstracts
Vol. 20, EGU2018-10120, 2018
EGU General Assembly 2018

Misidentification of smoke plumes over Europe: joint use of ceilometer measurements with dispersion model increases their identifications

Quentin Laffineur, Andy Delcloo, Alexander Mangold, Veerle De Bock, and Hugo De Backer
Royal Meteorological Institute, Uccle, Belgium (lquentin@meteo.be)

On 16-17 October 2017, a reddish sun was observed across a part of Western Europe. Many Europeans were impressed by the beauty and the rarity of this optical event that hit the headlines in the media. Various scientific institutes and newspapers have come up with a statement that the reddish sun was due to the remnants of Hurricane Ophelia dragging dust from the Sahara. In reality, this optical phenomenon was caused by a smoke plume coming from wildfires located in Portugal and Spain. The misinterpretation given to this phenomenon clearly reveals its rarity at the European level where the last observation of this kind of event dates back to the end of September 1950 when a blue sun was observed caused by the smoke plume coming from the Chinchaga fire in North America.

The smoke plume coming from Portugal/Spain was observed by ceilometers that now offer the opportunity to monitor in real-time most aerosol plumes and especially their altitudes at high temporal and spatial scale. The use of ceilometer network measurements in Belgium together with the dispersion model FLEXPART made it possible to differentiate chronologically the passage of two aerosol plumes: the first one coming from the Sahara and the second one coming from Portugal/Spain, responsible of the reddish sun phenomenon.

Instrumental observation of smoke plumes in Europe is not uncommon. Over the last years, several smoke plumes not detectable to the naked eye have been observed by ceilometers in Europe. At the end of June 2013, an intercontinental smoke transport event was observed across Europe by satellite and ceilometer measurements. However, there were discussions on the region of origin of the smoke plume. Some scientists claimed that the observed plume originated from Colorado wildfires and others claimed that the smoke plume came from Quebec wildfires – sources separated by more than 2000km from each other! In this case, combining ceilometer measurements with the dispersion model FLEXPART made it again possible to discriminate the sources.

In this presentation, we will show how the joint use of ceilometer measurements in Belgium with the dispersion model FLEXPART, removes uncertainties about the region of origin of the aerosol plumes for these two major events covered by media. This method will ensure a better communication to authorities and the public, especially when the aerosol plume may generate a situation where quick decisions are required.