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Estimating 2017 Global Wildfire Emissions in Near-Real-Time and Their Impact on Air Quality

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As part of the Copernicus Atmosphere Monitoring Service (CAMS), the Global Fire Assimilation System (GFAS) is running operationally at ECMWF to estimate wildfire emissions daily as an input to Global and Regional (Europe) air quality forecasts. This system currently utilizes MODIS Fire Radiative Power (FRP) observations, but it is being expanded to include also FRP information from other satellite instruments, including geostationary platforms over Europe, America and Asia. We'll use the examples from a number of acute cases in 2017 (Chile in January, Portugal in June and October, Canada in July, Greenland in August, California in December. . .) to showcase how this system works in real situations, and how it will improve when hourly observations will be added. GFAS data is used as a surface boundary condition for atmospheric composition and air quality forecasts in CAMS with the distribution of aerosols and other key pyrogenic pollutants being further constrained by assimilating other satellite observations such as Aerosol Optical Depth and total columns or profiles. This enables ECMWF and the users of CAMS worldwide to overcome the previous shortcomings that air quality forecasts were entirely wrong when "exceptional" emissions happened in the case of large fires or volcanic eruptions. CAMS is able to provide the media and the general public in Near-Real-Time with estimates of the emissions of fire-related pollutants and inform on the potential air quality impacts. In addition, the database of fire emissions that we have built allows putting individual episodes in a climatological context and answering the questions about how far a given episode is exceptional. CAMS emissions and atmospheric composition forecasts data are unrestricted and freely available to users worldwide.