Geophysical Research Abstracts
Vol. 21, EGU2019-15800-1, 2019
EGU General Assembly 2019

Early warning system of extreme clouds providing tailored alert products dedicated to ATM, transport modelling and observatory monitoring

Hugues Brenot (1), Nicolas Theys (1), Jeroen Van Gent (1), Sophie Vandenbussche (1), Lieven Clarisse (2), Nikolaos Papagiannopoulos (3), Lucia Mona (3), Luca Bugliaro (4), Pascal Hedelt (4), Tuomas Peltonen (5), Juhani Lahtinen (5), Delia Arnold-Arias (6), Michelle Maree Parks (7), Sara Barsotti (7), Mauro Coltelli (8), William Moreland (8), Timo Virtanen (9), Klaus Sievers (10), Saskia Wagenaar (11), Wim Som de Cerff (11), and the WP5 EUNADICS-AV team

(1) Royal Belgian Institute for Space Aeronomy (BIRA-IASB), Belgium, (2) Université Libre de Bruxelles (ULB), Belgium, (3) Deutsches Zentrum für Luft-und Raumfahrt (DLR), Germany, (4) Consiglio Nazionale delle Ricerche (CNR), Italy, (5) Radiation and Nuclear Safety Authority (STUK), Finland, (6) Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Austria, (7) Icelandic Meteorological Office (IMO), Iceland, (8) Instituto Nazionale di Geofisica e Vulcanologia (INGV), Italy, (9) Finnish Meteorological Institute (FMI), Finland, (10) Klaus Sievers Aviation Weather, Germany, (11) Royal Netherlands Meteorological Institute, Netherlands

Extreme clouds can very often conduct to a considerable threat to human society, especially for the life, health and properties of population, the air traffic management (ATM), the air traffic control (ATC), the safety of passengers, the consequence and costs for stakeholders. This presentation will give you an overview of our global early warning system that provides near real-time notification and alert products. The stakeholders are the observatories (warranting the risk to population), meteorological services (acting transport modelling of extreme clouds) and the international institutions (sharing the responsibility, taking the decision or providing official information; e.g. national authorities, EUROCONTROL, VAAC). Other public and private users also receive our notifications (e.g. national forest agencies, nature reserves, airports, airlines and pilots). The extreme clouds detected by our system are the volcanic clouds, the convective pyro-cumulonimbus, the sandstorms and the radionuclide clouds.
The accessibility to alert products (in a standard netCDF format, compatible with SWIM SESAR; http://www.eunadics.eu) and the near-real time visualisation (with a user-friendly web interface; http://sacs.aeronomie.be) of satellite and ground-based observations (maximum delay of a few hours), is essential for dealing with the threat of extreme clouds. Satellite products from UV and IR sensors (e.g. TROPOMI, IASI and SEVIRI) and retrievals from ground-based networks (e.g. EARLINET, E-PROFILE and OPERA), are combined with existing service (e.g. SACS, NASA/FIRMS, EFFIS, CAMS, SDS-WAS, EURDEP, ESA CCI Land Cover), to create alert products. These tailored products (e.g. ash, smoke and dust, SO_2 column, plume height, airborne hazard for different flight levels) provide substantial information to users, with identification and traceability of extreme events. An illustration of a sandstorm in October 2017, which took place simultaneously with storm Ophelia, will be presented. Sand and dust had been carried over from southern Europe and Africa, travelling over France, UK and Belgium among others. In the same time, a wildfire was taking place in the North of Portugal. Studying this event to develop alert products, our system shows ability to discriminate smoke and sand clouds, providing selective detection for both of them. The examples of the last substantial clouds from wildfires and volcanic eruptions, will be shown.
Our free early warning system takes place in the frame of the EUNADICS-AV project (European Natural Airborne Disaster Information and Coordination System for Aviation); the consortium consists of 21 participating organizations from 12 different countries; the project is funded under H2020 grant no. 72398.