



MATISSE: an ArcGIS tool monitoring and nowcasting meteorological hazards

Valeria Rillo (1), Alessandra Lucia Zollo (1,2), Paola Mercogliano (1,2)

(1) EuroMediterranean Centre on Climate Change, Impact on Soil and Coast Division, Capua, Italy, (2) Italian Aerospace Research Center (CIRA), Meteo System & Instrumentation Laboratory, Capua

Adverse meteorological conditions are among the most important causes of accidents in aviation, causing human and economic losses. For this reason it is crucial to monitor and early forecast high impact weather events. In such framework, CIRA (Italian Aerospace Research Center) implemented MATISSE (Meteorological AviaTion Supporting SystEm), an ArcGIS Desktop Plug-in able to detect and forecast meteorological aviation hazards over European airports, using different sources of meteorological data (synoptic information, satellite data, numerical weather prediction models outputs). The system processes raw data (in BUFR, NetCDF, HDF and GRIB2 formats), retrieving information useful for the detection and the forecast of hazards, and stores them in a database used by ArcGIS. After that, data are further elaborated providing user-friendly maps, graphs and statistics. MATISSE presents a graphical interface allowing the user to select and visualize such meteorological conditions (e.g. visibility, cumulonimbi, wind speeds and directions, cloud cover, cloud type, precipitations, turbulence, lightning and other variables) over an area or an airport of interest. The system is able to handle outputs of COSMO model (providing forecasts of turbulence, temperature and relative humidity up to the following day), and outputs of satellite tools. In particular, two nowcasting tools, based on MSG-2 data, have been developed and implemented in MATISSE. The first one forecasts the evolution of cumulonimbi, responsible of thunderstorms, icing and turbulence phenomena, comparing the brightness temperatures of two consecutive satellite images in different channels. The second one is based on the EUMETSAT Multisensor Precipitation Estimate product, providing forecasts up to an hour of convective precipitations using the uniform advection temporal technique. Both tools report the corresponding hazard in a format usable by a GIS platform. MATISSE includes also tools for the statistical characterization of the typical weather bad conditions on the airport of interest, for example percentage of fog events.