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Integrated visualization of remote sensing data using Google Earth

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The need for advanced visualization tools for meteorological data has lead in the last years to the development of sophisticated software packages either by observing systems manufacturers or by third-party solution providers. For example, manufacturers of remote sensing systems such as weather radars or lightning detection systems include zoom, product selection, archive access capabilities, as well as quantitative tools for data analysis, as standard features which are highly appreciated in weather surveillance or post-event case study analysis. However, the fact that each manufacturer has its own visualization system and data formats hampers the usability and integration of different data sources. In this context, Google Earth (GE) offers the possibility of combining several graphical information types in a unique visualization system which can be easily accessed by users.

The Meteorological Service of Catalonia (SMC) has been evaluating the use of GE as a visualization platform for surveillance tasks in adverse weather events. First experiences are related to the integration in real-time of remote sensing data: radar, lightning, and satellite. The tool shows the animation of the combined products in the last hour, giving a good picture of the meteorological situation. One of the main advantages of this product is that is easy to be installed in many computers and does not need high computational requirements. Besides this, the capability of GE provides information about the most affected areas by heavy rain or other weather phenomena. On the opposite, the main disadvantage is that the product offers only qualitative information, and quantitative data is only available though the graphical display (i.e. trough color scales but not associated to physical values that can be accessed by users easily).

The procedure developed to run in real time is divided in three parts. First of all, a crontab file launches different applications, depending on the data type (satellite, radar, or lightning) to be treated. For each type of data, the time of launching is different, and goes from 5 (satellite and lightning) to 6 minutes (radar). The second part is the use of IDL and ENVI programs, which search in each archive file the last images in one hour. In the case of lightning data, the files are generated for the procedure, while for the others the procedure searches for existing imagery. Finally, the procedure generates metadata information required by GE, kml files, and sends them to the internal server. At the same time, in the local computer where GE is running, there exists kml files which update the information referring to the server ones. Another application that has been evaluated is the analysis of past events. In this sense, further work is devoted to develop access procedures to archived data via cgi scripts in order to retrieve and convert the information in a format suitable for GE.

The presentation includes examples of the evaluation of the use of GE, and a brief comparison with other existing visualization systems available within the SMC.