FLIRE: an EO-based DSS for combined flood and fire risk assessment in peri-urban areas

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Fires and floods are among the natural hazards with the higher social impacts in the 21st century, with economic cost of the order of billions of euros. When these occur in urban and periurban areas, the loss of human lives, the destruction of private and public properties, the degradation of health and quality of life, as well as the disruption of economic activities are among the impacts that cause. Floods that occur after the manifestation of fires, are extremely catastrophic, especially in peri-urban areas. The study of both hazards is based on the same background data and Earth Observation (EO) is a crucial information source, as from the same satellite imagery up-to-date fuel map can be derived in case of fire modeling in urban and peri-urban areas, while the parameterization of flood modeling in different scales (hydrological modeling in catchment basin level and hydraulic model in the urban area) need dedicated land cover/use information, updatable when needed and suitable for the specifications of the models. The investigation of both fire and flood hazards traditionally has been conducted separately even if the same data are needed. This approach overlook the *"collect once – use for many purposes"* model which when is adopted, result in the increase of the accuracy and economies, as these phenomena are tightly interrelated; fires exacerbate the flood risk and the preceding flood dramatically reduce the fire risk. In the framework of the LIFE+ project FLIRE an integrated Decision Support System (DSS) was developed for both floods and fires risk assessment and management by adopting the model of "once collect – use for many", by using existence infrastructure and by incorporating extensively EO sources in different phases of the project. The FLIRE DSS is consists of three modules and seven applications unified under the FLIRE Server. The modules for fire management, flood management and weather forecasting have been implemented as web-services. The system has been designed as web-based solution which integrates the abovementioned tools. FLIRE adopt the distributed architecture of the components of the system while the DSS is accessible from the web (www.flire-dss.eu). The FLIRE server uses FTP and HTTP communication protocols and web service technologies. Visual basic, JavaScript, Google Maps API and Ajax have been used for the design and implementation of the FLIRE DSS. The user's interface has been designed and developed based on the user's requirements, goals and needs. ESA's Sentinels missions (1 & 2) is expected to have a crucial role for these steps due to the high temporal and spatial resolution, the high data quality, as well as the free data access policy.