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Forest fire prevention and suppression: an integrate risk index to improve management and planning actions

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Many DSS have been developed in order to help in fire fighting operative control centre to make decisions on how to manage a fire. These DSS usually contain various models for the evaluation of fire hazards. The Tuscany Region in Italy has decided to use a complex model for the evaluation of the risk of the territory. This model is called Final Risk Index (FRI). The FRI is the final result of the combination of different indices, which were initially developed separately. The main indices concerned are the Global Risk Index (GRI) developed by IBIMET – CNR and Operational Difficulty Index in Fire Fighting m(ODIF) developed by DISTAF University of Florence. Later these two indices were integrated to generate the FRI which became an efficient tool for the planning and management of all the forest fire activities. The FRI is now able to provide information on different scales of time and areas. In terms of time it can give information regarding seasonal risks. In terms of area, it can visualize pixels from 10X10m. to 400X400m., which can be averaged to provide map of risks of various types. The two indices contribute information in the following ways: the GRI gives an indication of the risk of a territory developing a Static Hazard and a Dynamic Hazard. The former is the evaluation of the vegetation, the morphology, the aspect and the road network, while the latter is the evaluation of the meteorological data. These values are then integrated with the evaluation of the social component, which is calculated by the historical statistic analysis of its ignition points. The mathematical elaboration

of these data gives an estimation of the probability of ignition of a forest fire in a given area. However, the GRI does not provide information regarding fire suppression: this information is provided by the ODIF. This second index analyses several factors affecting the extinction activities carried out by the fire squads and the aerial resources, the water points distribution, the types of fire engines and number and types of fire crews. The final result is an estimation of the efficiency and effectiveness of the fire fighting organization in a determined area. The FRI is still in a testing phase because not all the components have been sufficiently validated. The final development is due for the end of 2008