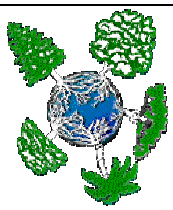
International Forest Fire News (IFFN) No. 28 (January – June 2003) p. 112-113

4th International Workshop on Remote Sensing and GIS Applications to Forest Fire Management

Innovative Concepts and Methods in Fire Danger Estimation, Ghent, Belgium, 5-7 June 2003



This technical workshop was co-organised by the EARSeL Special Interest Group (SIG) on Forest Fires and the Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) Fire Implementation Team. The SIG workshop followed three previous technical meetings held in Alcalá de Henares (1995), Luso (1998) and Paris (2001) and was focused on fire prevention, although other topics related to fire effects assessment were also covered.

More than 60 scientist from 15 different countries attended the meeting. Most of the attendees came from European Mediterranean states (Spain, Portugal, Italy, Greece and France), but there were also representatives of other European countries (U.K., Belgium, Germany, Ukraine, Switzerland). There were also attendees from Canada, Argentina, India and the USA.

The structure of the workshop was based on six invited lectures, four poster sessions and 3 round table discussion sessions. The lectures were organized around 3 topics: fuel characterization, fire risk mapping and burned land assessment. The techniques covered to improve fuel description were the application of radiative transfer models to moisture content estimation, developed by Stéphane Jacquemoud (University of Paris); the use of hyperspectral technologies for wildland fuel mapping, presented by Dar Roberts (University of California, Santa Barbara), and the derivation of canopy structure for fire modelling from lidar, illustrated by. Ralph Dubayah (University of Maryland). These lectures were followed by two poster sessions, one focussed on fuel moisture content estimation, and the other one on fuel type mapping, where 9 and 7 posters were presented, respectively. The lecture by S. Jacquemoud focused on the basis of radiative transfer models and the determination of plant water content, the importance of these physical models to better understand the contributions of different factors affecting plant reflectance and the potential to invert these models to estimate biochemical properties of plants. Ralph Dubayah offered a global view of the different available lidar systems, stressing the role of large-footprint full waveform digitising systems that his group are developing with NASA. Several study cases of tropical and temperate forests illustrated his lecture, showing the connection between lidar data and fire behaviour modelling. Dar Roberts presented research being conducted at his department using hyperspectral data from AVIRIS and Hyperion instruments to derive fuel moisture content and other biophysical properties of plants. The interest of developing spectral libraries was also emphasised.

The topics discussed on fire risk mapping issues covered: “Human fire causes: a challenge for modelling”, presented by Vittorio Leone (University of Basilicata, Italy), and “Fire risk mapping methods”, by Bryan Lee (Forestry Canada). V. Leone presented some thoughts on the different socio-economic motivations leading to fire ignition, from pure criminal attitudes to the advantage of economic interests. He made a strong case for considering fire as a natural factor in Mediterranean ecosystems. Bryan Lee presented different applications of the Canadian Fire Information System, which makes extensive use of remote sensing data and GIS analysis tools. In addition seven posters were exhibited on fire risk mapping.

The final lecture dealt with burned land mapping, focusing on “Fire regimes in protected areas of Sub-Saharan Africa, derived from the GBA2000 dataset”, presented by Jean-Marie Grégoire (Joint Research Center, European Union). J.-M. Gregoire presented a spatial analysis of patterns of fire occurrence in several nature reserves of Africa, stressing the interest of fire managers of these areas in having access to temporal and spatial

information on fire occurrence patterns. The general discussion on this lecture and the subsequent poster session (which included 20 contributions), emphasized the importance of providing well documented accuracy assessments for the burned land products, so they could be easily understandable by end-users. The average seasonal cycle and inter-annual variability deduced from the analysis of global burned surfaces and active fire long time series was identified as a key indicator contributing to the generation of global fire danger products.

The three round tables were focused on: Burned land mapping as an input to fire danger assessment, moderated by Bryan Lee (Forestry Canada), Operational problems for the estimation of fuel properties, chaired by Jan W van Wagtendonk (USGS Western Ecological Research Center, Yosemite Field Station), and operational integration of remotely sensed and socio-economic data for fire danger rating, coordinated by Vittorio Leone (University of Basilicata, Italy). In all cases, the importance of addressing the needs of information end-users was underlined. Different levels of end-users should also be distinguished, from fire managers (with different interests depending on their scale of planning), to scientist working in atmospheric or ecological modelling.

Additionally, a general discussion on future activities of the Forest Fires SIG, covering the potential participation in Global networks (VI Framework Program) was coordinated by Pilar Martin (National Council for Scientific Research, Spain).

As part of the meeting format, poster sessions were designed to allow detailed one-on-one discussions with poster authors and after each poster session a general summary discussion was held on the poster topics. These general discussions offered an excellent opportunity to share ideas about the application of remote sensing techniques to improve fire danger assessment and fire mapping.

One of the general recommendations of the workshop was to stress the importance of deriving global products for fire danger estimation, which could serve regional managers interested in strategic planning, as well as global scientist dealing with the impacts of fire upon atmosphere and vegetation. This global fire danger product may be designed in a hierarchical way, serving the various interests of end-users in different geographical regions: from more qualitative systems, where input data is scarce, to more quantitative-detailed frameworks, in those countries or regions where the required spatial information is more readily available. The global product should include a proper characterization of fuel properties (moisture content, fuel loads, fuel geometry, etc.), as well as meteorological patterns and the assessment of those human activities related to fire occurrence. This global fire danger product might be developed in the framework of the GOFC/GOLD-Fire program, bringing together the international pool of expertise in this research area. The workshop also underlined the importance of providing well documented products both in terms of the physical variables they include (considering temporal and spatial scales), and in terms of documenting the quality/reliability of the product.

Within European research programs, the development of a specific network addressing remote sensing and fire danger was also recommended. This network could be presented within the available instruments of the VI Research Framework Program of the European Union, and linked to the global components of European research, such as the GMES. Close connections to GOFC-GOLD and other international network development initiatives (UN International Strategy for Disaster Reduction; Global Fire Monitoring Center, FAO, etc.) would also help to reinforce the global perspective.

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