8.6 FIRE BEHAVIOUR MODELLING

Fire behaviour modelling may be approached with two different scales: Landscape scale (Schöning et al. 1997) and Fuel bed scale (burn table, Bartelt 1997). The basis for the fire behaviour modelling on the *landscape level* is the Rothermel model for the behaviour of surface fires. For any given point it calculates local intensity and spread parameters for the head of a surface fire. The fire spread model is implemented in SPARKS, a prototype fire behaviour modelling application. It is fully integrated in a commercial Geographical Information System (ARC/INFO), built on its raster modelling and applications development functionalities (Schöning et al. 1997). In order to provide input data for the fire behaviour modelling, fuel models were built for different forest types in Switzerland (Allgöwer et al. 1998).

The *small scale approach* proposes to investigate the thermodynamical properties of the forest fuel bed as well as the mechanics of forest fire spread by field observations, laboratory experiments and numerical modelling in combination. Fire intensity and fire spread velocity are studied in laboratory experiments (burn table) and numerical modelling (Bartelt 1997).

Fig.8.3 Night view of the burning slope above Mezzivico (Tessin) in April 1997.

8.7 FIRE MANAGEMENT

Although forest fires in the Alps seldom became a threat to life and property of local residents and tourists, some problems originate from forest fires in connection with the protection function of the forest, soil conservation or economical aspects of the timber industry. Therefore it is important to implement the acquired knowledge on forest fires in *decision support systems* and computer based management tools.

Different studies were already carried out on this topic: GIS-analysis for wildfire management planning in the Swiss National Park, Internet applications in the context of wildfire management, a GIS-based framework for wildfire risk assessment (Bachmann et al.

1997, Bärtsch et al. 1998) and a study on the integration of fire effects on vegetation in fire management strategies (Fürst and Conedera 1996).

Fig.8.4 Fire line of the 1998 organized fire experiment by the FNP Sottostazione Sud delle Alpi in St. Antonino (Ticino).

8.8 CONCLUSIONS

With these activities the Swiss research groups participated in European projects like MINERVE 2, INFLAME and PROMETHEUS s.v. since 1994 (Tab.8.1). The ongoing studies on prediction, modelling, ecology and effects of forest fires allow to obtain decisive instruments for supporting the responsible fire management authorities and fire brigades in order to aim at a more differentiated fire management strategy for Switzerland.

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