

EFAISTOS: EXPERIMENTS AND SIMULATIONS FOR IMPROVEMENT OF BEHAVIOUR MODELS OF FOREST FIRES

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ABSTRACT

EFAISTOS is an European project funded by the European Union in the frame of the << Environment and Climate >> Programme of the General Directorate for Science, Research and Development. It began on September 1st 1996 for two years.

This project participates to the development of an European behaviour model for forest fire. It is focused on the fire behaviour in forest litter during laboratory experiments and in the litter, the herbaceous and the low shrub layer during experimental fires.

In order to work out this typically multi-disciplinary project, foresters enter in a partnership with physicists, fluids dynamicists, applied mathematicians and computer scientists of six European countries (France, Denmark, Holland, Greece, Portugal and Spain) and Australia. This project had two main objectives: (i) to design, to develop and to validate improved physical models, (ii) to design, to develop and to implement the Problems Solving Environment which integrates the modelling tools.

Two models have been designed, developed and validated. Quasi-2D model and P1F97 model are both based on the multiphase approach (on gaseous phase and several solid phases) and on the basic equations on energy conservation. They include the properties of heat sources (flame, combustion interface) and the heat transfers by radiation and convection through porous medium.

The predictions of these two models have been compared against experimental results obtained in controlled conditions at different space scales on litter of pure dead pine needles. Slope and wind effects were included.

They have been also compared against experimental burnings carried out in forest areas.

To simplify this validation and to manage the models and the experimental data, they have been introduced in the model base and the databases of the Problem Solving Environment. Three levels of users have been defined Novice, Experimenters, and Modellers. They can simulate the fire behaviour under fixed (novice) or defined (experimenters and modellers) burning conditions.

The communication will presented the different works done in the frame of EFAISTOS by all the partners and the state of the art at the end of this project.

It will indicate the working directions for the next future.