Day 1, Session 3: Fire Behaviour Modelling

Rapporteur: Vasileios Tsitsopoulos (University of Manchester)

Chair: John Dold (University of Manchester)
Keynote: Professor Carlos Fernandez-Pello (University of California at Berkeley)
Professor Domingos Xavier Viegas (University of Coimbra)

The first day of the FIRES3 seminar closed with highly awaited public lectures from two pioneer scientists in the field, namely Professor Carlos Fernandez-Pello and Professor Domingos Xavier Viegas. This session was dedicated to the mathematical modelling of wildland fire propagation and focused on two main mechanisms of fire spread: Spot Fires and Eruptive Fires (also known as “Blow up” fires).

Professor Pello kick-started his lecture on Spot Fires by describing the lofting and trajectory of hot embers/particles. Different shapes and sizes of embers were used, and their behavior was uncovered. A 2D numerical simulation followed, exploring the mechanism of ignition activated when the embers hit the ground. Following the description of two models of wildfire propagation, the lecture closed with suggestions on which research direction to follow next and an outline of difficulties that still need to be overcome.

Professor Viegas took the podium next and started his lecture by giving a brief description of the Forest Fire Research Laboratory of ADAI in Coimbra, Portugal, and the research that takes place there. He then moved into his main subject, Eruptive Fires. Until recently, fatal losses of firefighters which took place under similar topographical circumstances, but in different countries such as USA, Portugal, Spain and Croatia were not clearly understood. Today they are associated with the phenomenon of Fire Eruption. What really moved the audience was a video of a laboratory simulation of a fire front turning into an Eruptive Fire, uncovering the extreme behavior and the continuity that it carries as a process. Professor Viegas concluded that the knowledge and experience obtained so far is a powerful weapon, which should be used to avoid loss of lives in the future.

The session ended with a discussion on how the scientific knowledge explored during the day should be applied into practice, and with a strong feeling that it would be useful to have a wildfire research laboratory similar to the lab of Professor Viegas’ in the UK.