Introduction

During the past years, there has been a considerable number of occasions that a forest fire burns with such strong intensity that seems far out of proportion to apparent burning conditions. This proved to be the case for the Swedish fire “blow-up” that took place during 4 August 2014. On the afternoon of Thursday 31 July 2014 a wildfire broke out on the border between Sala and Surahammar municipalities in Sweden. This fire proved to be the Sweden’s largest fire in 40 years with a duration of 14 days (31 July to 13 August 2014). The fire broke out after an unusual spell of hot, dry summer weather in northern Europe. The fire was declared a national emergency, if finally encompassed an area of about 15,000 hectares.

From Figure 2 (f) it becomes clear that that more than 80% of the total number of large fires is falling in the two top extremity categories of CHI. It is also obvious from (h) that during the “blow-up” day (Day 5) both CHI and Fire Weather Index (FWI) [1] were getting extreme (“saturated”) values. A fire “blow-up” would lead to erratic / extreme fire behavior.

Data & Methodology

Details of estimated FIBA (Fire Burned Area) are given in Figure 1 (a) while details of the blow-up event are shown in (b). Inter-annual variability and frequency details of various FIBA categories for large fires (Megafires) from 2009 to 2014 taken from the European Fire Database (EFD) of the European Forest Fires Information System (EFFIS) [1] are given in (c) and (d) respectively. Both Haines Index (HI) and Continuous H (CHI) [2] give an indication about the potential for a fire “blow-up” due to low stability values of the atmosphere. A fire “blow-up” would lead to erratic / extreme fire behavior.

Most of the initial simulations utilizing ECMWF instantaneous wind speed values, as driving terms for EFFIS (European Forest Fires Information System) fire evolution models, namely FireSim [4] and FARSITE [5] were inaccurate due to errors in the intensity and gustiness of true prevailing winds. By introducing model gust factor values [6] instead of instantaneous speeds (WSs) significant improvement in accuracy was accomplished in all fire evolution simulations. Namely, FireSim [4] and FARSITE [5] were inaccurate due to errors in the intensity and gustiness of true prevailing winds.

Main Messages

By introducing model gust factor values [6] instead of instantaneous speeds (WSs) significant improvement in accuracy was accomplished in all fire evolution simulations. Namely, FireSim [4] and FARSITE [5] were inaccurate due to errors in the intensity and gustiness of true prevailing winds.

References