A TOOL FOR EARLY WARNING AND MONITORING OF FIRE

MSG ACTIVE FIRE MONITORING PRODUCT

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Abstract

Although forest fires are a major concern for Türkiye, there is not an established standard methodology of tracking the active fire and/or burnt area yet (Figure 1,2). Even though there are some governmental organizations, the rapid developing fires overcome the precautions taken and necessitate faster responses.

Remote sensing, especially satellite imagery may help to keep up with this rapid occurring event. Satellite imagery may even help to find out the missed fires in the ground data. Moreover it may help to augment the inadequacy of fire location determination based solely on the city name information.

In this poster, we will show the ability of MSG satellite to detect active fires occurring in Türkiye region. The prototype processing chain in Turkish State Meteorological Services is also summarized (Figure 3). The initial observations are provided. A few satellite derived active and probable fire areas are compared to ground based observations. The way forward is mentioned.

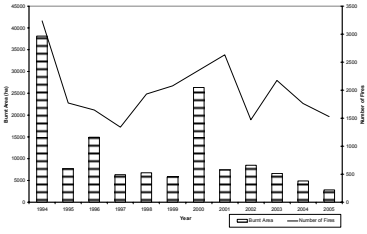


Figure 1 Number of forest fires and burnt area between 1994 and 2005

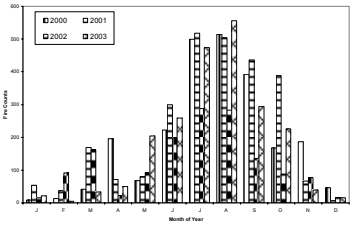


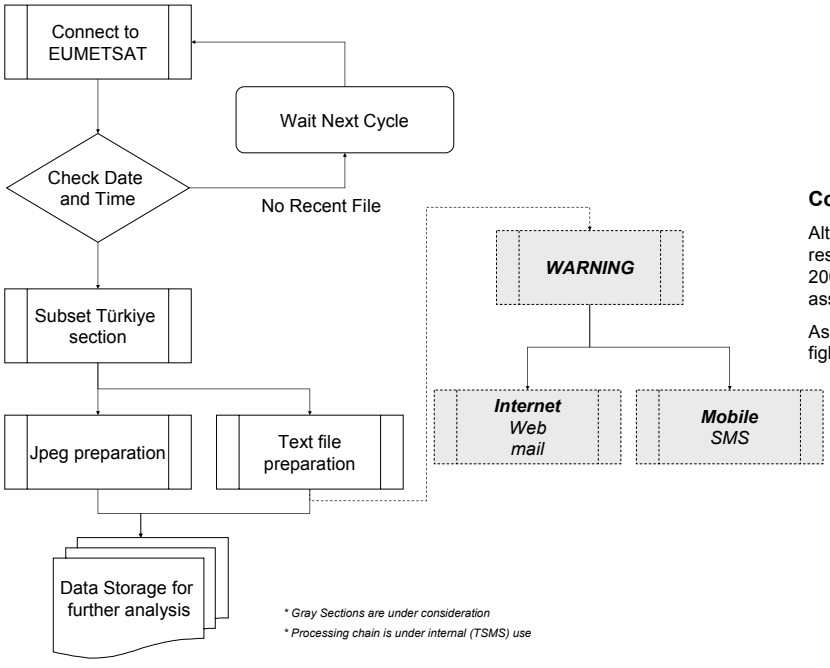
Figure 2 Monthly observed total fire counts

Methodology

Fire product, FIR, derived from a stationary satellite namely, Meteosat Second Generation (MSG-1), is used in the present study. FIR is downloaded from EUMETSAT's ftp site, by an operational code. After every MSG cycle (i.e. every 15 minutes), the code connects to the EUMETSAT's ftp site and downloads the latest fire files. Date and time checks of the downloaded files are performed initially. If the date and time are not recent, the files are not processed any further.

From the recent files, an area covering the Türkiye region is deducted. A jpeg file of the area is prepared with the fire locations indicated on (Figure 4). A text file of the determined fire locations and types are also prepared (Figure 5).

Figure 3 Prototype processing chain in TSMS*



** Gray Sections are under consideration*

** Processing chain is under internal (TSMS) use*

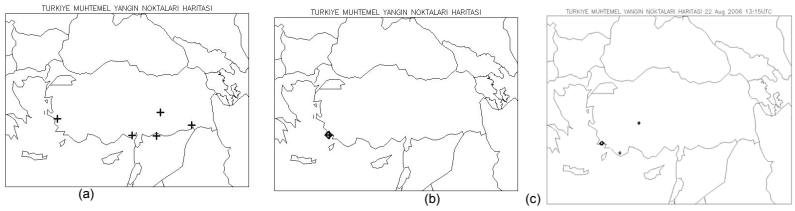


Figure 4 MSG-1 observed fires for 20(a)/21(b)/22(c) August 2006

Satellite	Date	Time
MET08	2006/08/30	12:00Z
LAT	**LON**	**TYPE**
37.270	35.650	1 Possible
39.540	35.140	1 Possible
39.580	35.170	1 Possible
40.110	35.730	1 Possible

Figure 5 Text file prepared for fire warnings

Validation

Validation of FIR was designed to be performed in two major parts. In the first, the total daily observed fire events are compared with the previous fire statistics. Patterns of the ground based and FIR based fire events match rather well. Both patterns are presented in Figure 6. In the second, areas determined as fire by the FIR should be compared with the ground truth, if the ground data is assumed as accurate. Unfortunately, the assessment could not be finished on time. Nevertheless, as shown in Figure 6, the results seem promising.

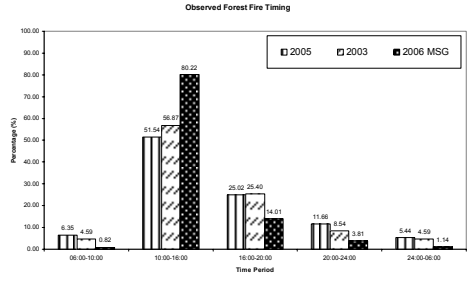


Figure 6 Daily time distribution of observed fires

Conclusion and the Way Forward

Although, the comparison with ground truth, could not be performed yet, the preliminary results are very promising. The fires occurred on 20 August 2006 in İzmir and 21 August 2006 in Muğla are caught by FIR as seen in Figure 4. However, for a quantitative assessment, the verification should be provided as soon as possible.

As a further issue, the warning system should be activated and early messages to fire fighters should be provided.