Early detection of fires is important to prevent possible catastrophes. Satellite based systems enable monitoring and early detection of fires. EUMETCast provides timely and continuous satellite data flow with its flexible design. On the other hand, Google Earth is a free tool enabling visualization of any observed parameter on the 3D topography. This poster introduces the activities taken in Turkish State Meteorological Service to support related governmental bodies against fire fighting where, MSG satellite based fire detection products are received from EUMETCast and then Google Earth is used to represent the fire locations on 3D topography. By the prototype processing chain in Turkish State Meteorological Service, products are operationally sent to Forest Fires and Preventing and Combating (FFPC) section of General Directory of Forestry.

INTRODUCTION

Wild fires are one of the most devastating problems that Mediterranean countries face during the summer period. They not only threat the lives of the inhabitants but also destroy the property and settlements. Due to their impact on climate change with direct or indirect aerosol emission, the scope of coping with wild fire is greater than regional basis and is regarded as a global issue.

Turkey, being a Mediterranean country, suffers much from the wildfires taking place during the long duration hot summer months with dry weather. Burned 2027-hectare forest area in 245 different events from 20 to 27 August 2006 (Ministry of Environment and Forestry, 2006) is a clear evidence of the severity of this problem. Figure 1 shows burned 143 972 hectares during the period from 1994 to 2006 while Figure 2 represents the annual fire cycle.

Figure 1: Number of forest fires and burnt area between 1994 and 2005 (Modified from Tekeli et al. (2007))
FIR PRODUCT:

The EUMETSAT’s Meteorological Operations Division (MOD) provides Fire (FIR) product. FIR is presently implemented in operational processing chain under Meteorological Products Extraction Facility (MPEF). FIR algorithm uses the combination of brightness temperature measurements in SEVIRI channels of IR3.9 and IR10.8 with their differences and standard deviations over 3x3 pixel. These values are compared with four threshold criteria tests (Table 1) for classifying the pixels as "probable fire", "possible fire" or "non-fire".

<table>
<thead>
<tr>
<th>Potential Fire</th>
<th>Fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>Day (°K)</td>
</tr>
<tr>
<td>Test a (IR 3.9)</td>
<td>310</td>
</tr>
<tr>
<td>Test b (σ₃.₉)</td>
<td>2.5</td>
</tr>
<tr>
<td>Test c (σ₁₀.₈)</td>
<td>2</td>
</tr>
<tr>
<td>Test d (IR3.9-IR10.8)</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 1: Thresholds used for day and night time in FIR algorithm

FIR PRODUCT PROCESSING CHAIN AT TURKISH STATE METEOROLOGICAL SERVICE

FIR, derived from a Meteosat Second Generation (MSG) Satellite, is received via EUMETCast. Any possible or probable fire information is processed and visualized in Google-Earth and corresponding files are archived and sent to FFPC section of General Directory of Forestry. The prototype processing chain in Turkish State Meteorological Service is provided in Figure 3.
Figure 3: Prototype processing chain in TSMS*

* Gray Sections are under consideration
* Processing chain is under internal (TSMS) use

**GOOGLE-EARTH**

Google Earth by Google and Virtual Earth by Microsoft have been the frontiers in web based Geographic Information Systems (GIS). Google Earth is a free application that enables viewing 3D Earth and 2D maps. Application Programming Interface (API) provided within Google Earth, enables the users to add, represent, share and distribute their own data. Figure 4 represents the initial page of Google Earth. Figure 5 shows global fir product representation.
CASE STUDY

Separate fires were reported on 15th August 2007 near to the main road connecting Manisa to Izmir provinces. Figure 6 is a section from the web based newspaper. The fires was observed around the two towns namely, Karakoca and Turgutalp.

FIR product detected the fire by the MSG cycle at 10:30 in the mentioned provinces. Figure 7 represents the detected fires both on plane and on topography in 3D.
CONCLUSIONS

Conclusions derive at the end of the study can be bulleted as below.

- High temporal resolution of the MSG SEVIRI based FIR product enables the early detection and monitoring of forest fires.
- FIR products are pre-operationally processed at Turkish State Meteorological Service after every MSG cycle (i.e. every 15 minutes)
- Any ‘possible’ or ‘probable’ FIR product is archived in text and kml format of the Google-Earth multimedia.
- The archived product is also sent to Forest Fires and Preventing and Combating (FFPC) section of General Directory of Forestry as part of the warning system.
- Fires indicated with ‘probable type’ enable the fire fighters to be alert; where as ‘possible type’ helps them to move to the event location earlier.
- The 3D Google-Earth visualization of the terrain enables fire fighters to know the area before hand and quickly develop strategies for extinguishing the fire.

REFERENCES:


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