Fire Danger Rating in the European Forest Fire Information System (EFFIS) of the European Commission

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• What is JRC
• What is EFFIS
• Fire Danger Rating in Europe and in EFFIS
• Fire conditions and fire seasons in EU
• The adoption of FWI and on going work
• Weather data and forecasts
• Operational fire danger rating in the EFFIS system
• New products and further improvements
The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies.

As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union.

Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.
• EC initiative started in 1998
  – Legal framework
  – Support by Member States

• A network of EC services (DG ENV, DG JRC) and Member States fire agencies

• Scientific and technical infrastructure providing EU level information to support forest fire protection

• A web based platform with different modules (effis.jrc.it)
Fire danger information exchange during 1998
In EU there is a relative young tradition in FDR and many different approaches.

The fire danger rating module of EFFIS has been established as unified platform for implementing at the EU scale selected national indices.

The main motivation was having a common system to support preparedness and cooperation among EU countries.

Today the Canadian FWI has been adopted (research and development still on going).
Fire conditions and fire seasons in EU

About 65,000 wildfires per year in EU
Edmonton, Alberta, Canada - July 14 – 16, 2008

About 500,000 hectares burned per year in EU

Fire conditions and fire seasons in EU

**BURNED AREA**
Average burned area per year (Ha)
- 0
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 500
- 501 - 1,000
- 1,001 - 2,500
- 2,501 - 5,000
- 5,001 - 15,479

**WILDLAND FRACTION BURNED**
Total burned area / Year / Wildland area
- 0%
- 0.01% - 0.00%
- 0.01%
- 0.02% - 0.01%
- 0.02% - 0.03%
- 0.04% - 0.09%
- 0.10% - 0.19%
- 0.20% - 0.44%
- 0.45% - 1.06%
- 1.07% - 6.39%
NO FIRE DATA
Fire conditions and fire seasons in EU

FIRE FREQUENCY
- JAN
- FEB
- MAR
- APR
- MAY
- JUN
- JUL
- AUG
- SEP
- OCT
- NOV
- DEC
Fire conditions and fire seasons in EU
Fire conditions and fire seasons in EU

Regionalization of Europe Forest Ecosystems Regions
- Polar
- Boreal
- Moderate Temperate
- Warm Temperate
- Arid Moderate
- Mediterranean
- Orobiom
- Transition Boreal / Polar
- Transition Boreal / Moderate Temperate
- Transition Arid Moderate / Moderate Temperate
- Transition Moderate Temperate / Arid Moderate
- Transition Moderate Temperate / Boreal
- Transition Moderate Temperate / Mediterranean
- Transition Moderate Temperate / Warm Temperate
- Transition Warm Temperate / Boreal
- Transition Warm Temperate / Mediterranean
- Transition Warm Temperate / Moderate Temperate
- Transition Mediterranean / Moderate Temperate
- Transition Mediterranean / Warm Temperate
Fire conditions and fire seasons in EU

EUMed Countries (PT, ES, FR, IT, GR)
Fire frequency & Seasonal Severity Rating 1980 - 2005

Number of fires in EUMed per fire size classes (ha)

- >=500
- >=100 ; <500
- >=50 ; <100
- >=10 ; <50
- >=5 ; <10
- >=1 ; <5
- <1
Fire conditions and fire seasons in EU

EUMed Countries (PT, ES, FR, IT, GR)
Burned area & Seasonal Severity Rating 1980 - 2005

Burned area (ha)

- 200,000
- 400,000
- 600,000
- 800,000
- 1,000,000
- 1,200,000

SSR

[Graph showing burned area and seasonal severity rating from 1980 to 2005]

Number of large forest fires per year in EUMed

Number of fires

Fire size (ha)

>=50 ; <100
>=100 ; <500
>=500

[Graph showing number of large forest fires per year from 1985 to 2005]
Burned area vs Monthly Severity Rating in EUMed (June to October 1985-2005)

\[ y = 2199.1e^{0.4099x} \]
\[ R^2 = 0.7551 \]
Do we adapt DMC and DC for changing latitude?
Months of 2003 with maximum FWI difference

- APR
- MAY
- JUN
- JUL
- AUG
- SEP
- OCT
Looking for the extreme fire danger thresholds
Percentiles of long term (1958-2006) of FWI series

FWI calibration (on going)
ISI and BUI values in large fires (> 500 ha)
Weather Stations network (MARS)
Fire Danger Forecast

From MeteoFrance
- Spatial resolution 0.5° (~ 50 km)
- Forecast up to 3 days

From Deutscher Wetterdienst
- Medium resolution map
  - Spatial resolution 0.36° (~ 35 km)
  - Forecast up to 7 days
- High resolution map
  - Spatial resolution 0.0625° (~ 7 km)
  - Forecast up to 3 days

ECMWF ensemble forecast under consideration
Two new products introduced in 2008:

- FWI daily anomalies
- FWI absolute ranking

Both based on long term (50 years) computation of daily FWI values (ERA40 dataset)
Every day the FWI value in a given pixel is also assessed as the distance from the long term average FWI value for that pixel & time of the year.

The standardized distance (z score) is named anomaly.
FWI absolute ranking
Climate change impact on fire danger

- Average and extreme fire weather trend analysis with FWI computed for last 50 years in EU (from ECMWF ERA40 dataset)
- Outlook of future trends under given climate change scenarios