METEOROLOGICAL FIRE WEATHER FORECASTS
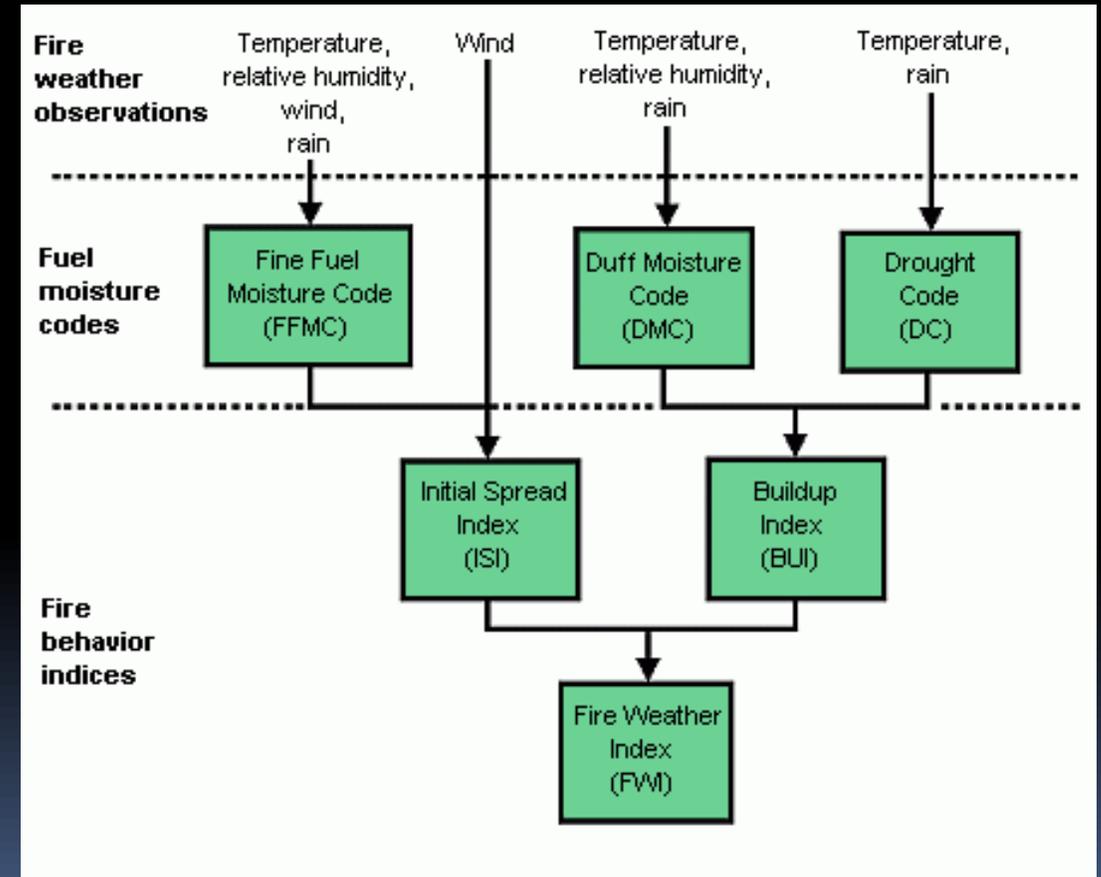
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Fire hazard assessment

- Fire weather index (FWI) – numerical rating of fire intensity
- Correlated with BUI → Fire danger classes

Fire danger classes

- High and very high classes → increased risk of fire occurrence and potential for spreading

BUI	FWI				
	0-4	5-8	9-16	17-32	33+
0-48	1	2	2	3	3
49-85	2	2	3	3	4
86-118	2	3	3	4	4
119-158	2	3	4	4	5
159+	3	3	4	5	5

Razredi opasnosti od šumskih požara za 26.9.2018. 14:00
- prostorni regresijski kriging
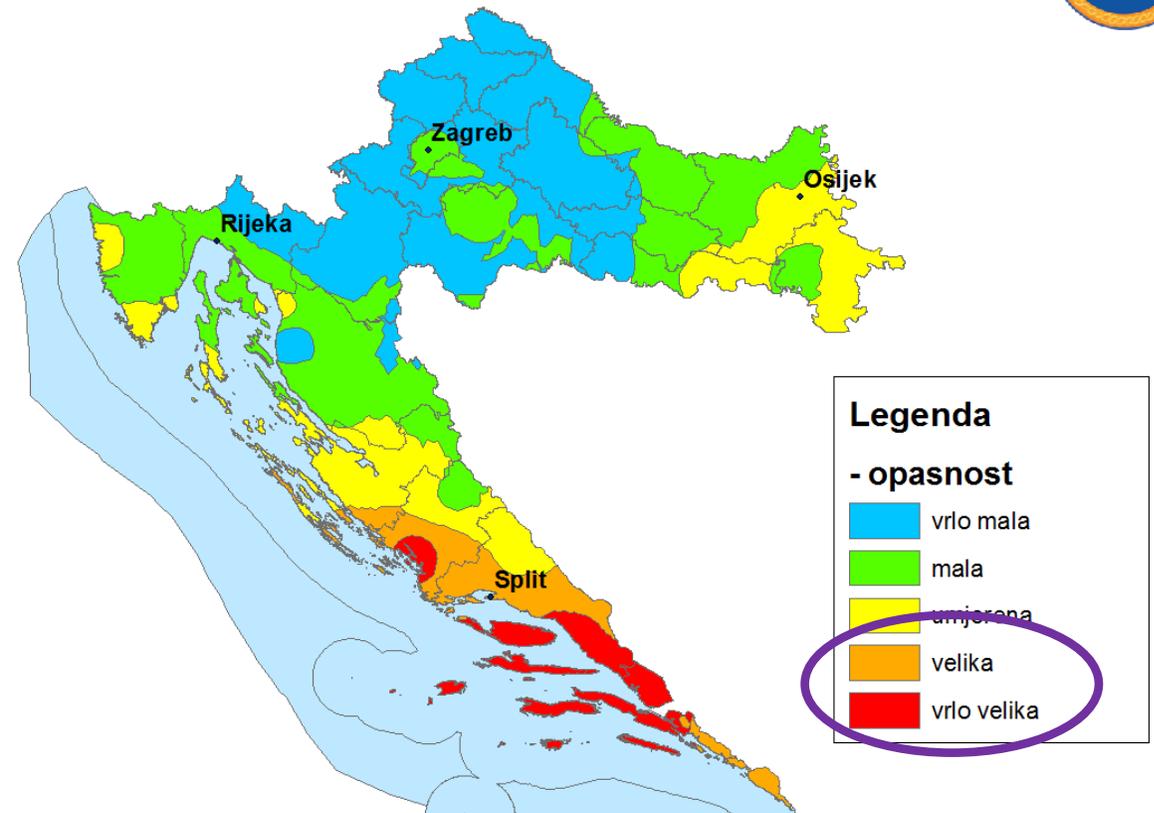
Legenda
- opasnost

- vrlo mala
- mala
- umjerena
- velika
- vrlo velika

Extreme fire behavior

- extreme fire behavior depends on meteorological parameters:

- Strong wind

- Wind shear

- Instability in dry air

- Monitored by meteorological products:
  - → prognostic wind speed field
  - → Turbulent kinetic energy
  - → Haines index

Special fire weather forecasts

- Indicate the weather conditions that can influence the fire behavior
- Textual form,
- valid for 36 hrs

DRŽAVNI HIDROMETEOROLOŠKI ZAVOD
REPUBLIKE HRVATSKE, Zagreb, Grič 3
Služba za vremenske analize i prognoze
U Zagrebu, nadnevka 16.07.2017.

POSEBNO UPOZORENJE ZA POŽARE RASLINJA DO KRAJA SUTRAŠNJEG DANA

Područje Republike Hrvatske na koje se odnosi upozorenje

Dalmacija i sjeverni Jadran

Opis sinoptičke situacije

Jačanje grebena u prizemlju, no duž Jadrana i dalje postoje izraženi gradijenti tlaka povezani s jakom na udare i olujnom burom.
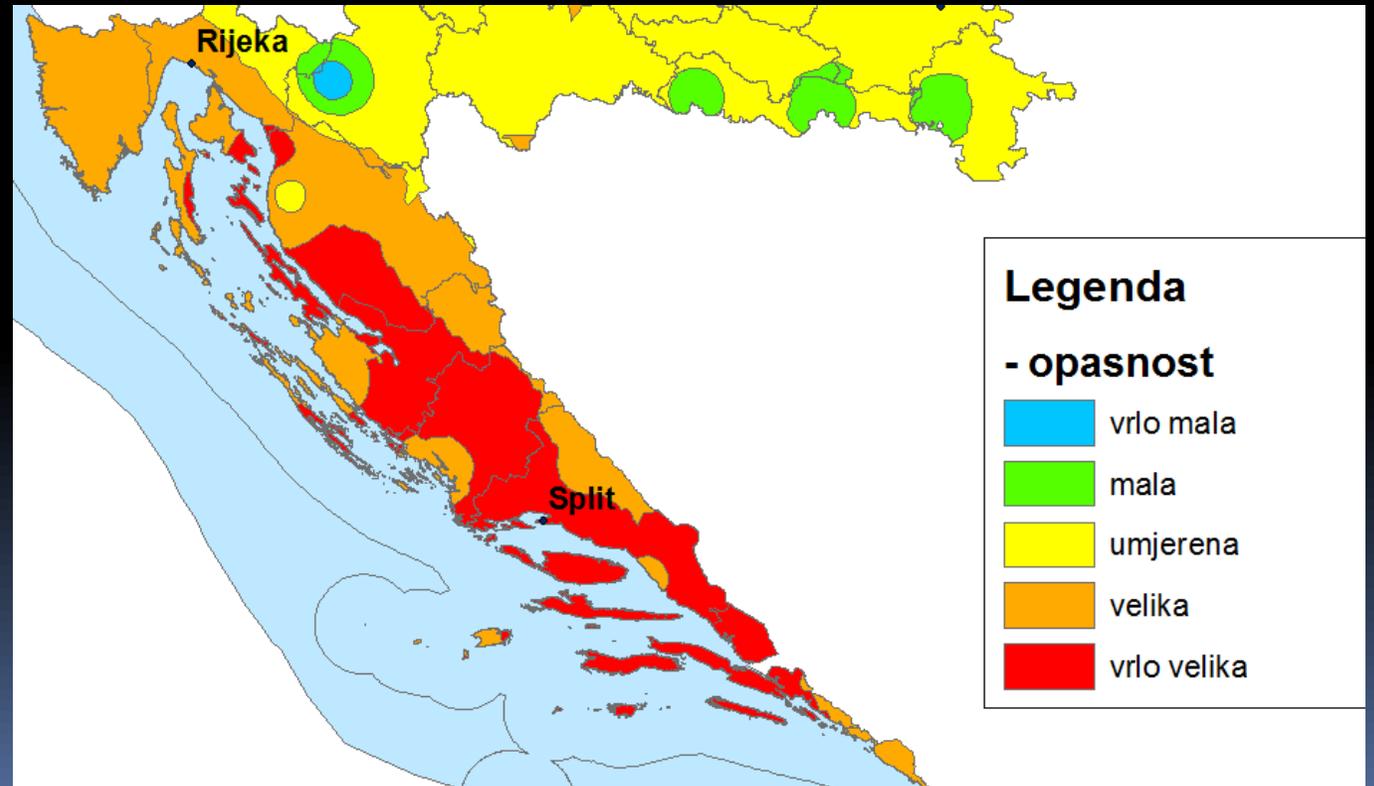
Vremenska prognoza

Prevladavat će sunčano vrijeme. Danas poslijepodne na krajnjem jugu, prolazno uz više oblaka moguć je i pokoji lokalni pljusak praćen grmljavinom koja potencijalno može izazvati požare raslinja. Puhat će jaka, na udare i olujna bura koja će otežavati gašenje požara. Lokalno može biti i promjene smjera vjetra što može utjecati na ekstremno ponašanje požara. Slabljenje bure očekuje se u ponedjeljak kroz jutro, a postupan prestanak prema večeri.
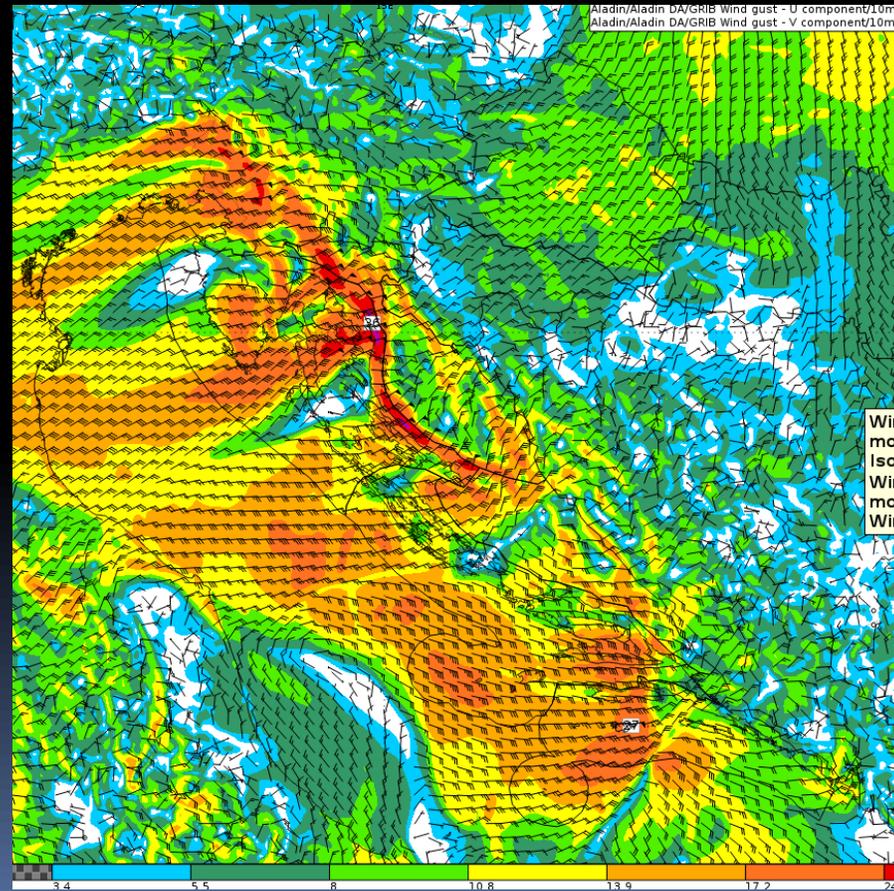
Criteria for issuing the forecast

BASIC CRITERION:

High/Very high fire danger classes on a larger area

Legenda

- opasnost

(blue)	vrlo mala
(green)	mala
(yellow)	umjerena
(orange)	velika
(red)	vrlo velika

Criteria for issuing the forecasts

1. Synoptic situation with strong wind of longer duration – v> 6 m/s

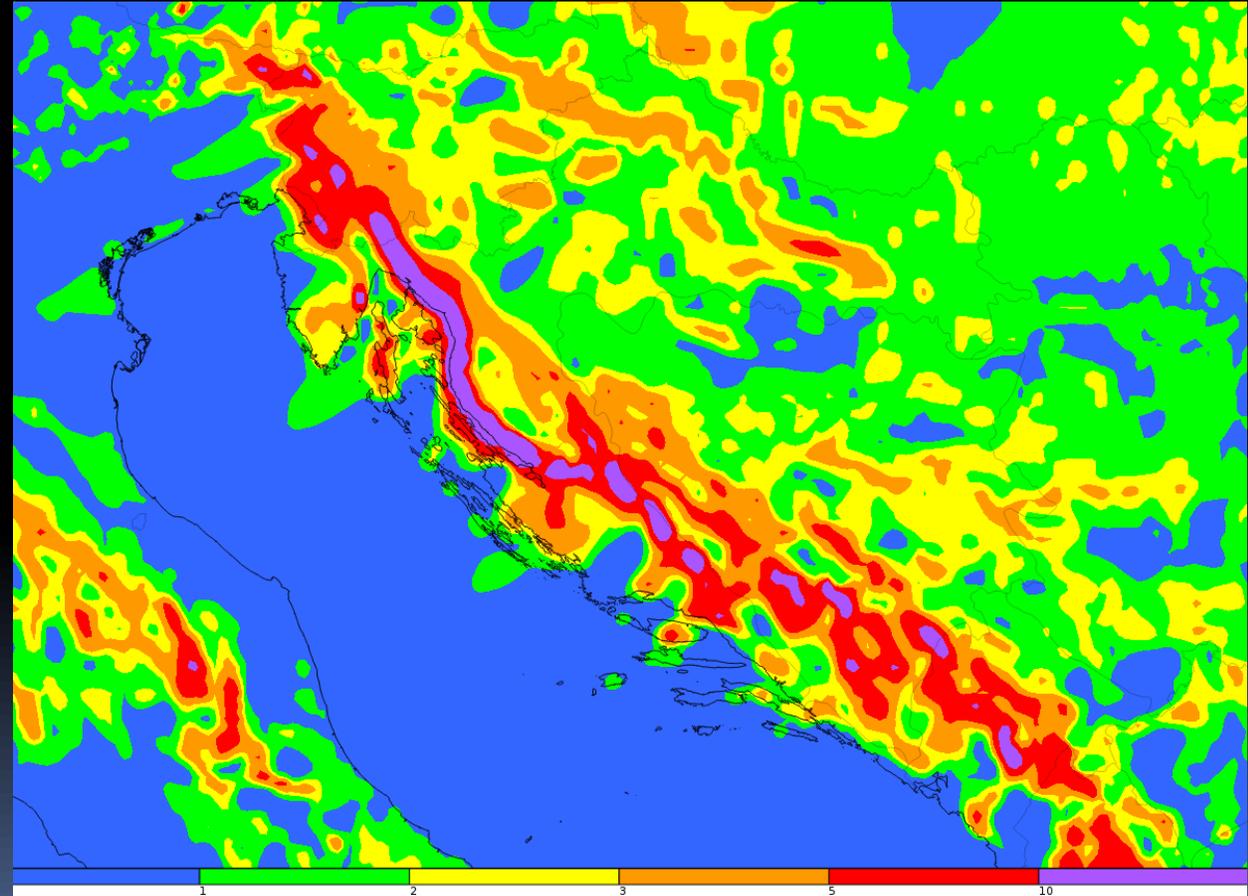# Criteria for issuing the forecast
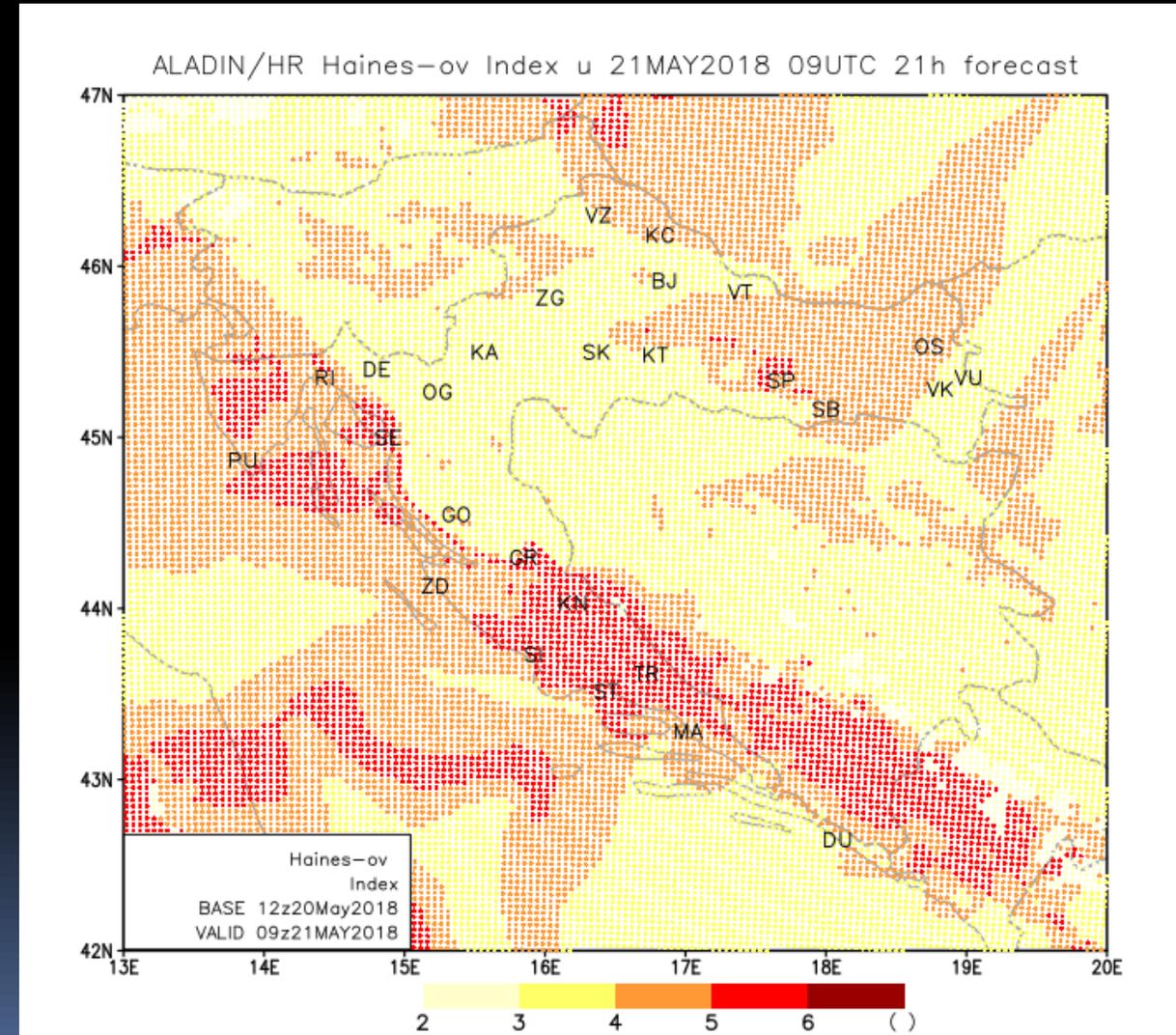
2. Turbulent kinetic energy:

$$TKE > 3 \ m^2/s^2$$

- indicates the energy contained in the turbulence
- (wind shear, thermally driven)

Criteria for issuing the forecast

3. Haines index :   HI=6

- Termic stability measure
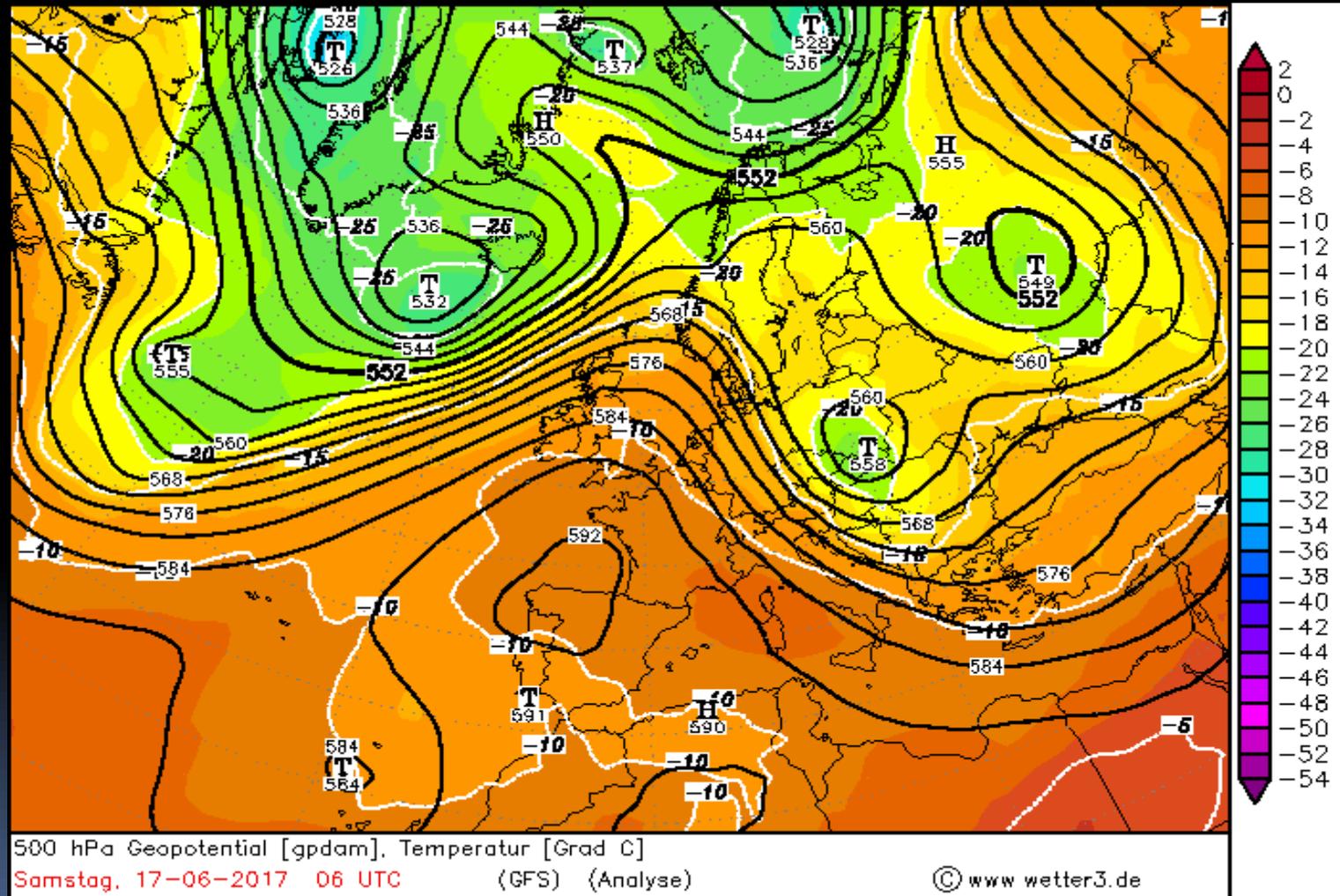
| Heines Index	Extreme behavior potential
2 or 3	Very small
4	Small
5	Moderate
6	High

Weather types and fire weather forecasts

- Period 2013 to 2018

- Surface pressure field and upper air charts (AT500 hPa i AT 850 hPa)

- The 5 most common weather types :
  a) Type 1: Cold front passage with the strengthening of the high pressure field
  b) Type 2: Cold front passage
  c) Type 3: Non-gradient pressure field with the instability in dry air
  d) Type 4: Front side of the cold front with dry jugo
  e) Type 5: High pressure ridge descending from northern Europe

Type 1: Cold front passage with the strengthening of the high pressure field
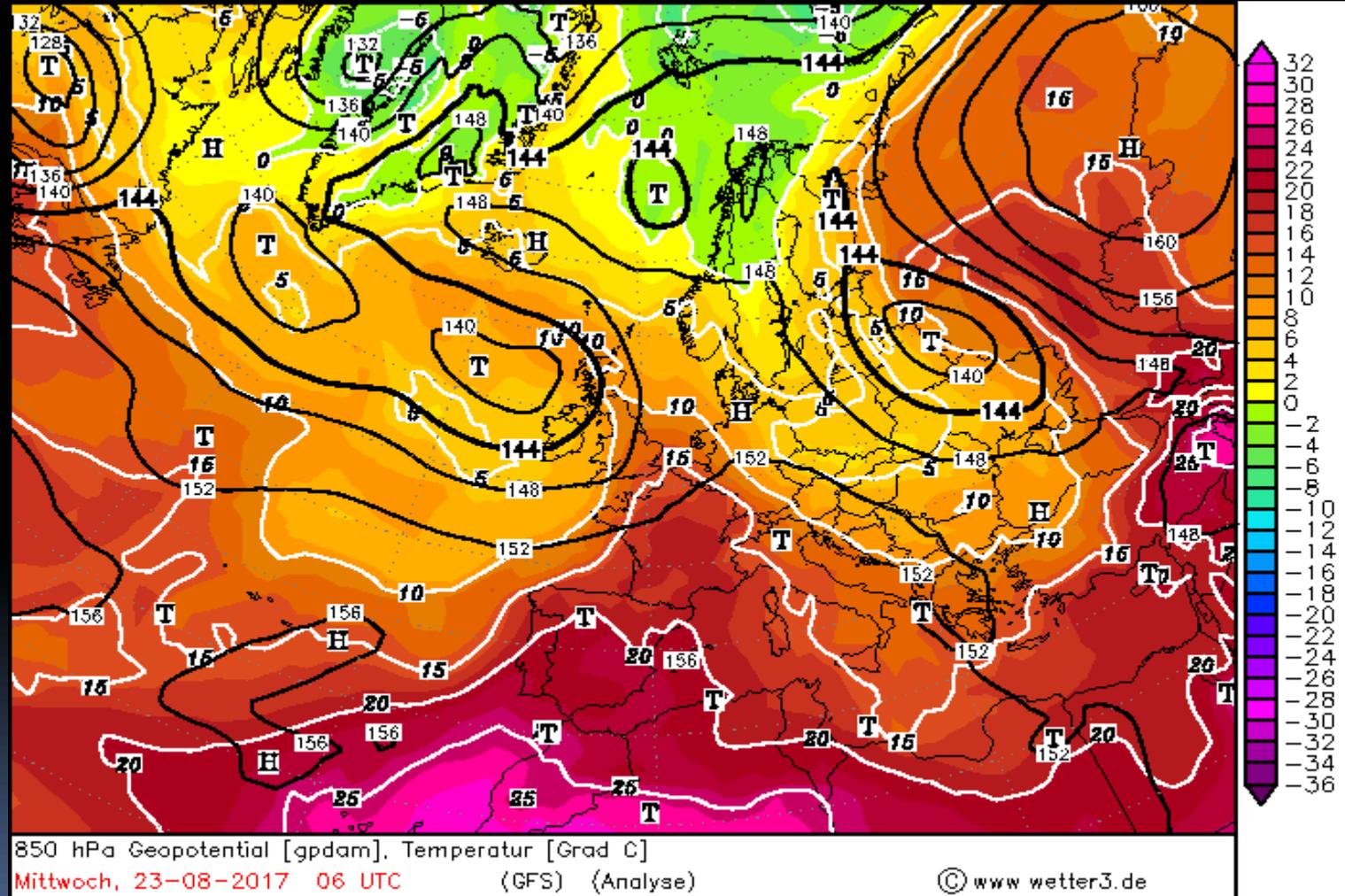

500 hPa Geopotential [gpdam], Temperatur [Grad C]
Samstag, 17-06-2017 06 UTC   (GFS)   (Analyse)   © www.wetter3.de

Surface and upper air (AT 500hPa) analysis for 17 June 2017, 00 UTC. Deutcher Wetterdienst.

Type 2: Cold front passage
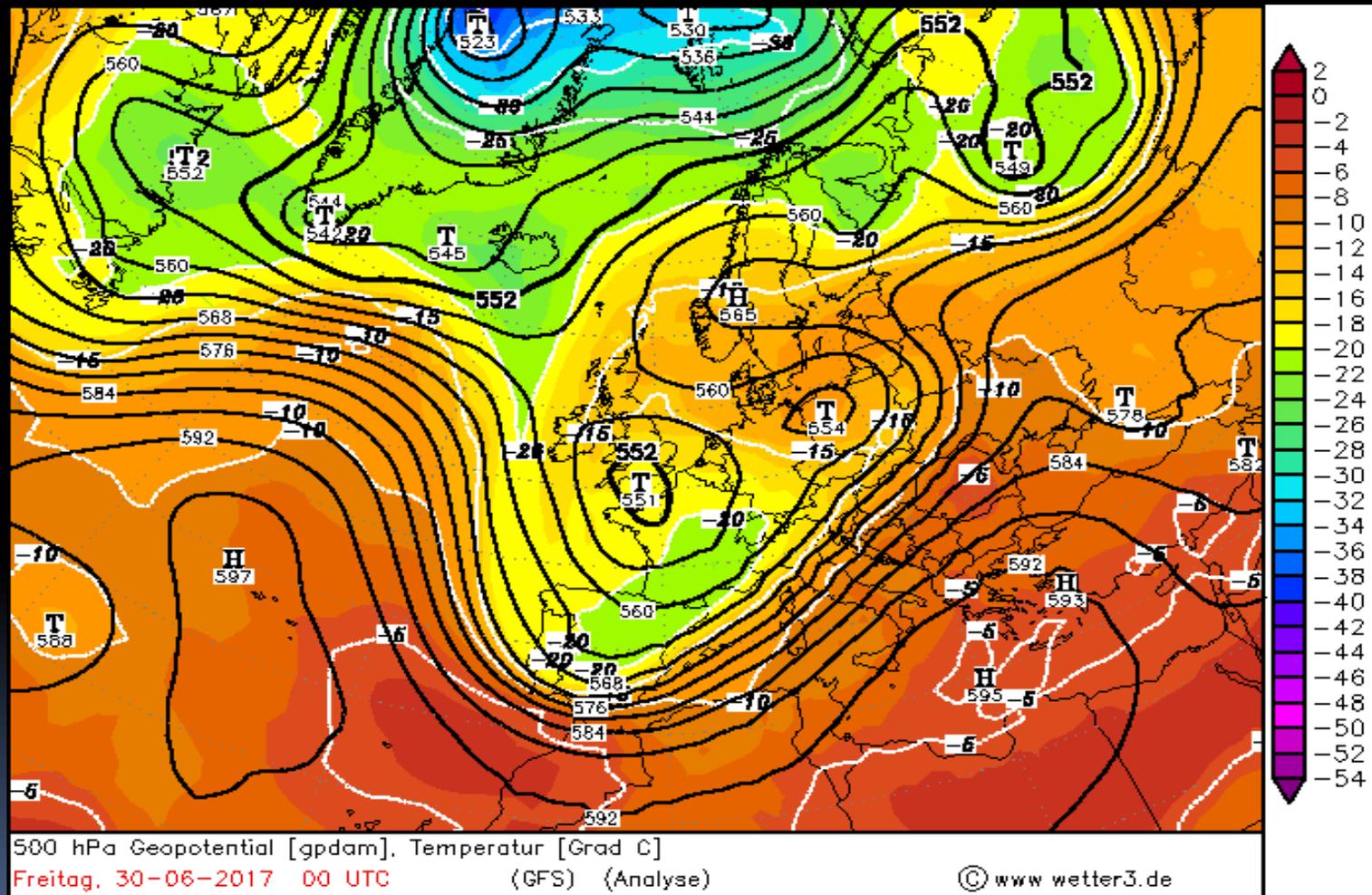
Surface and upper air (AT 500hPa) analysis for 30 June 2017, 00 UTC. Deutcher Wetterdienst.

# Type 3: Non-gradient pressure field with the instability in dry air

Surface and upper air (AT 500hPa) analysis for 23 August 2017, 00 UTC. Deutcher Wetterdienst.

Weather type analysis for period from 2013 to 2018

	Forecast number	Total duration (days)	Average duration(days)	Relative frequency (%)
type 1	20	43	2	34
type 2	13	18	1-2	22
type 3	16	35	2	27
type 4	5	6	1	9
type 5	9	18	1-2	16

Analysis by year

Broj vremenskih tipova po godini
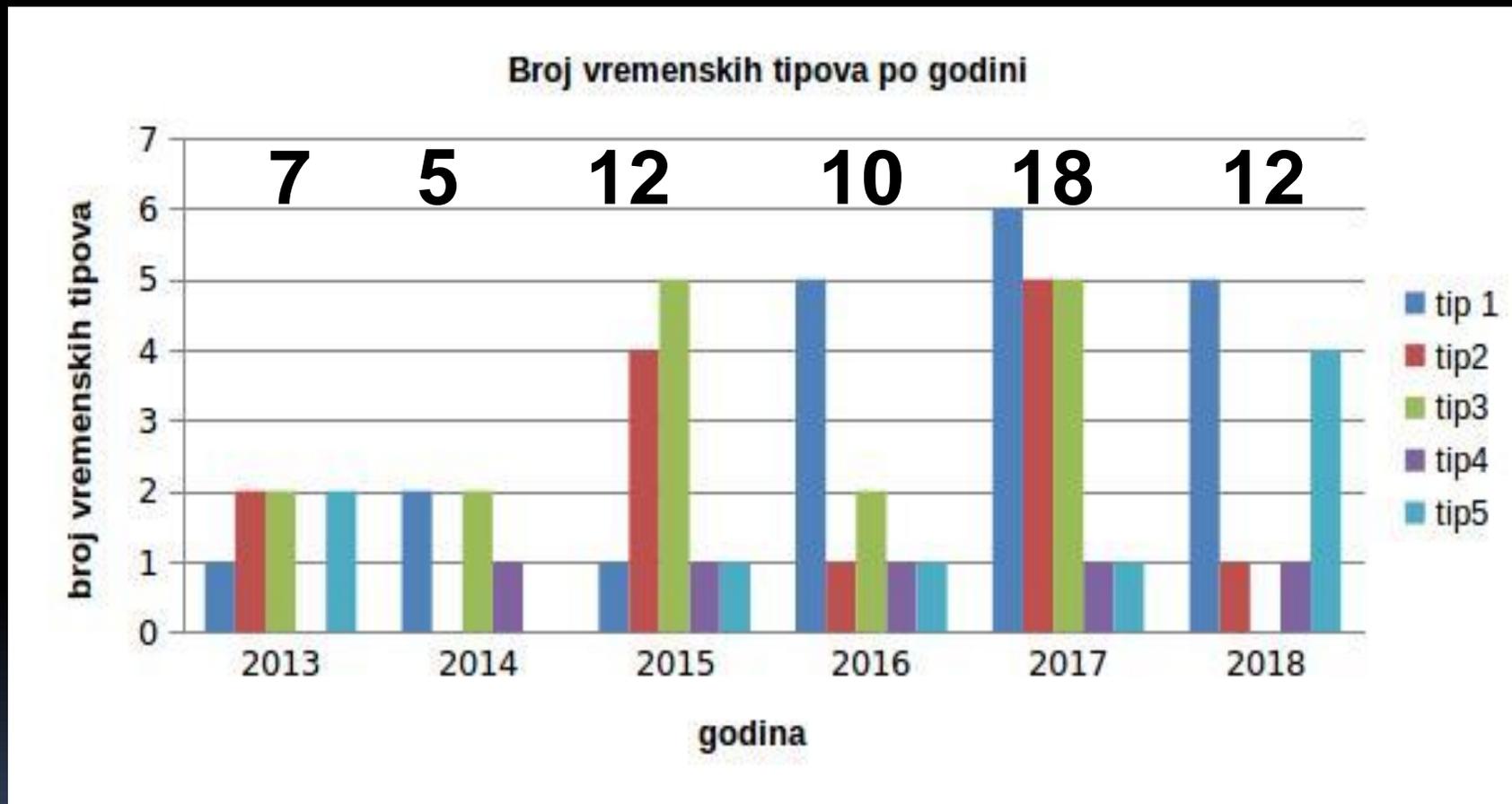
Comparison of forecasts with fire data for 2017

- 41 major fires ➔ source DUZS (National Protection and Rescue Directorate)
- 50 551 ha of burned area
- Comparison with issued forecasts:
  a) 34 fires (83%) - accompanied by forecasts; – 2 fire incidents happened outside of the area designated by the forecast (neighboring county) , and one issued for the wrong area (Dalmatian inlands instead of Kvarner region).
  b) For 2 situations no major fires happened
  c) 4 fires (1%) not accompanied with the forecast -September and October

Conclusion

- Purpose – verification of the forecasts ;
  - identification of the synoptic situations when the forecasts are issued
- 3 most common weather types with conditions favorable for extreme fire behaviour were identified
- Comparison with recorded fire showed the good coverage of the fires with the fire weather forecasts
- Goal:
  - improvement of the criteria for the issuing of forecasts
  - determination of the criteria for the differentiated meteorological warnings

Thank you for the atention !!!