

# Case studies of dangerous fires in Italian regions and Slovenia

## Case study of fire *Sela na Krasu*

Villa Manin di Passarino, Codroipo (Ud)

24th of May 2012

Anze Japelj, Slovenian Forestry Institute

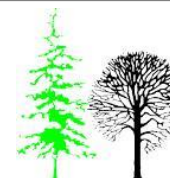
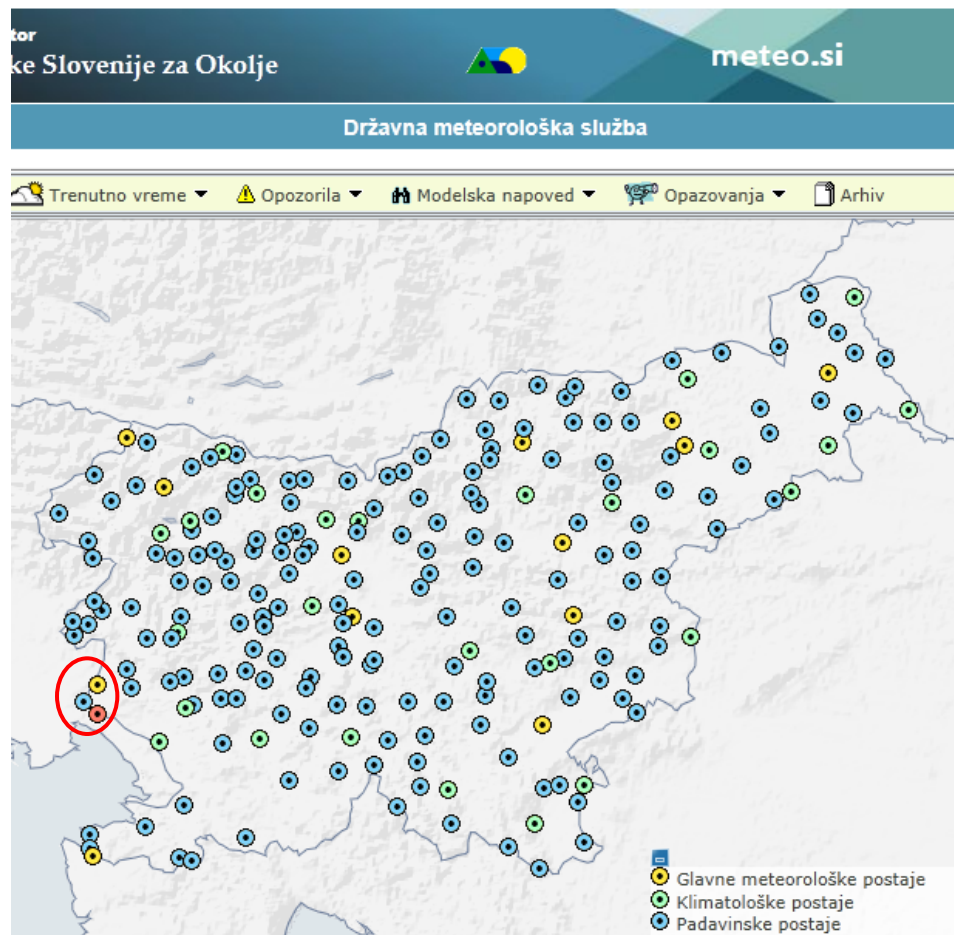


## Sela na Krasu – weather in 2003

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- hot summer of 2003 throughout Europe
- Slovenia: 6065 fires (>3000 ha)
- long-lasting drought (the driest March in 50 y.), which ended as late as in September
- above-average temp. in May, July and August

## Sela na Krasu – weather in 2003



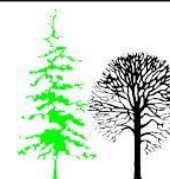
No  
significant  
precipitation  
from 18th of  
February

## Sela na Krasu – weather in 2003

Month	Avg. temp. (°C)	Avg. max. t. (°C)	Cum. precip. (mm)	Days with thundersto.	D. with rain (>1mm)
Jan.	2.6	8.1	70.3	2	8
Feb.	1.8	8.4	33.4	0	2
Mar.	8.0	15.7	1.2	0	1
Apr.	11.1	16.9	89.0	0	10
May	18.8	26	32.7	3	7
Jun.	24.5	31.9	35.5	13	13
Jul.	24.2	31.3	35.2	7	9
Aug.	25.7	33.7	91.4	10	8
Sep.	16.8	24.5	72.8	2	11
Oct.	11.0	15.8	161.1	4	12
Nov.	9.9	13.9	213.6	1	15
Dec.	4.9	9.7	150.1	0	8
Year	13.3	19.7	986.3	42	104

Month	Cum. precip. (mm)	Days with thundersto.	D. with rain (>1mm)
Jan.	83.8	0	7
Feb.	30.2	0	2
Mar.	0	0	0
Apr.	105.6	0	8
May	23.7	0	5
Jun.	17.7	3	6
Jul.	23.6	4	7
Aug.	70	6	7
Sep.	50.8	0	9
Oct.	131.6	1	12
Nov.	232.5	0	12
Dec.	150.5	0	7
Year	920	14	82

Month	Cum. precip. (mm)	Days with thundersto.	D. with rain (>1mm)
Jan.	76.1	0	9
Feb.	50.2	0	2
Mar.	0.7	0	2
Apr.	128.5	0	8
May	19.7	0	3
Jun.	35.8	0	6
Jul.	41.8	0	7
Aug.	45.7	0	7
Sep.	56.5	0	9
Oct.	134.1	0	13
Nov.	176.9	0	14
Dec.	148.9	0	7
Year	914.9	0	87



## Sela na Krasu – general description of the area

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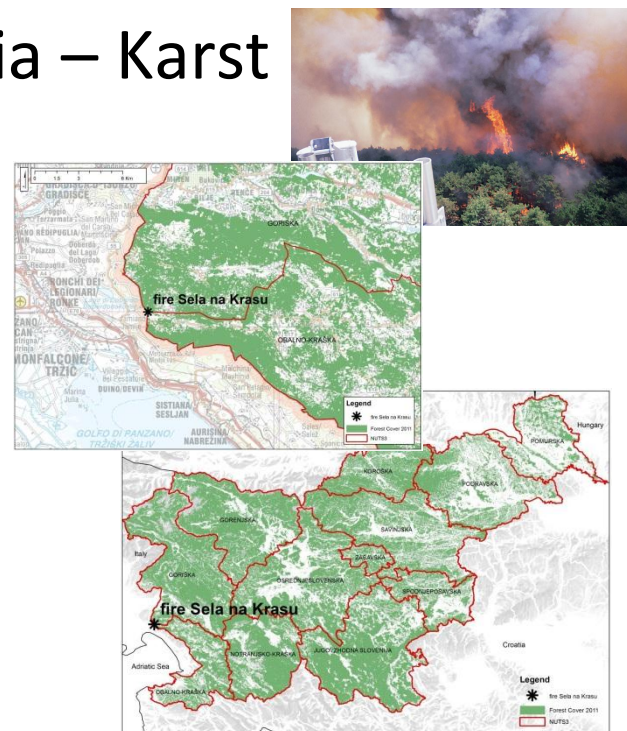
Forest fire danger mapping – static model  
elaborated by Slovenia Forest Service

- Karst forest management area
  - 470 km of fire pr. intersections
  - 450 km of forest roads
  - 45.9% of forests is classified as very highly end.
  - 20.9% as highly endangered and 33.2% as moderately endangered



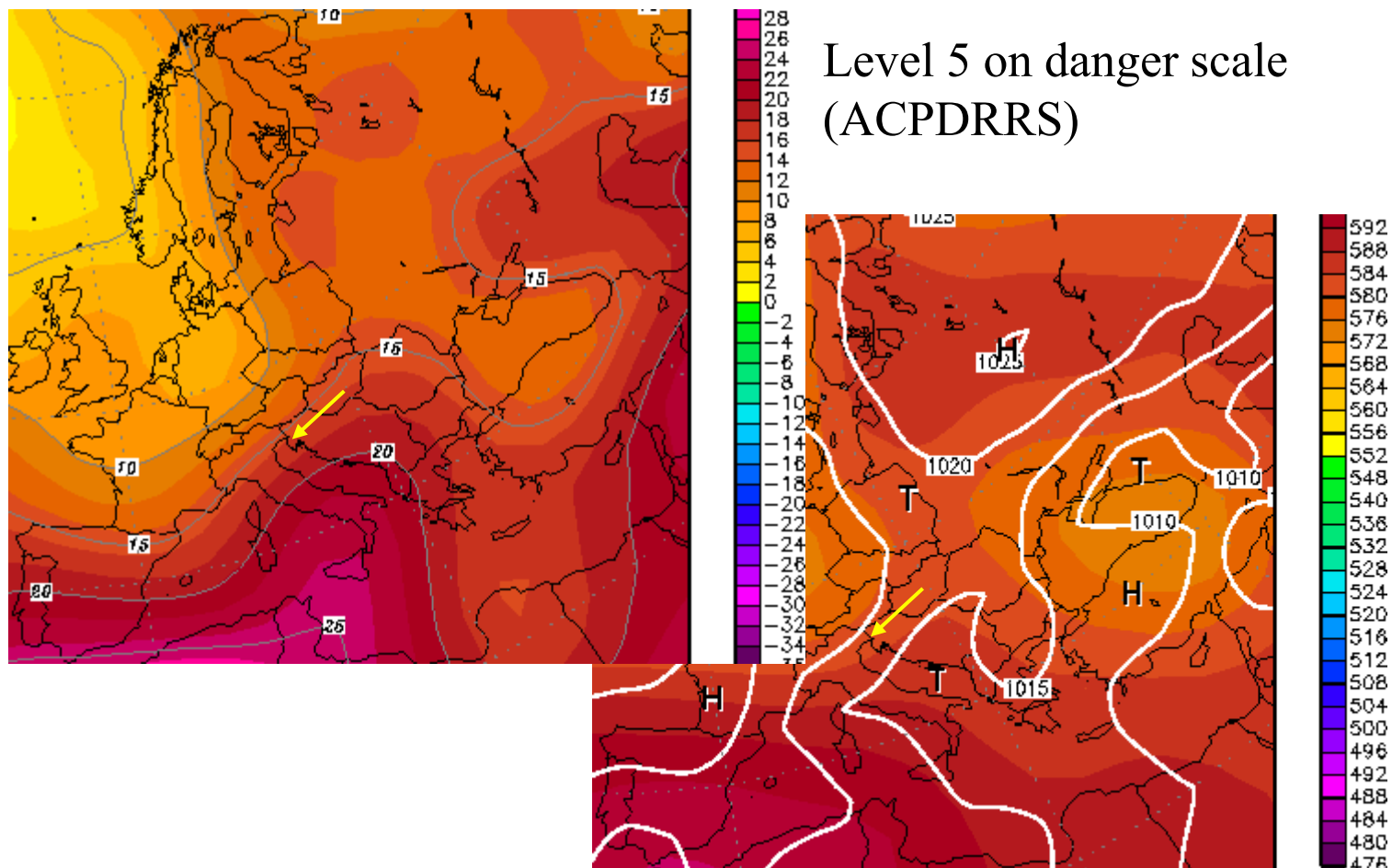
## Sela na Krasu – general description of the area

- south-west part of Slovenia – Karst
- area near ITA-SLO border
- mun. Komen and Miren-Kostanjevica (app. 8490 p.)
- cat. III volunt. FF squads:
  - PGD Komen
  - PGD Miren-Kostanjevica
- summer droughts, winter dry periods
- coppice broadleaved forests and *Pinus nigra*





## Sela na krasu – weather when fire started



## Sela na Krasu – start of the fire

- start: 29.07. – extinguished in the same day
- second outbreak: 30.07. – crossing at Klariči (mun. Komen) (10:41) – ReCO Postojna (severe fire)



source: D. Muhič





## Sela na Krasu – development of the fire (30.07.)

- 10:44 – VFFA Komen and professional FF squad Sežana were activated
- 11:20 – VFFA Kostanjevica na Krasu asked for help from Goriška regional FF association and notified regional office of ACPDRRS

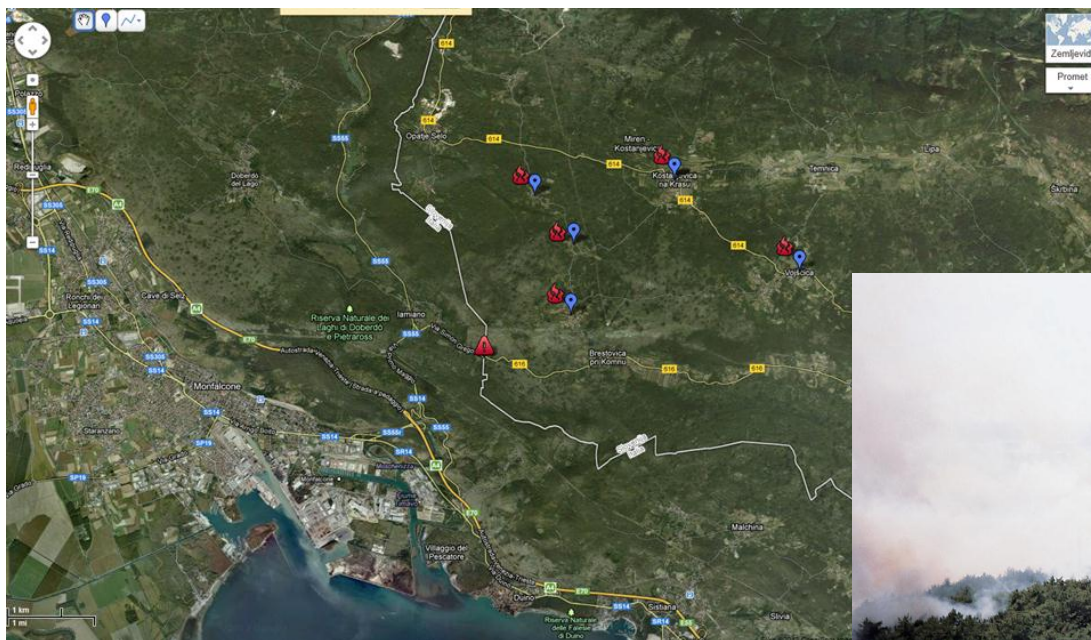
First troops succeeded in defending water supply facility and the border crossing.

source: D. Muhič



## Sela na Krasu – development of the fire (30.07.)

- 12:43 – fire came close to Klariči, Sela na Krasu (image), Vojščica, Kostanjevica na Krasu, Korita and Hudi Log – protecting buildings

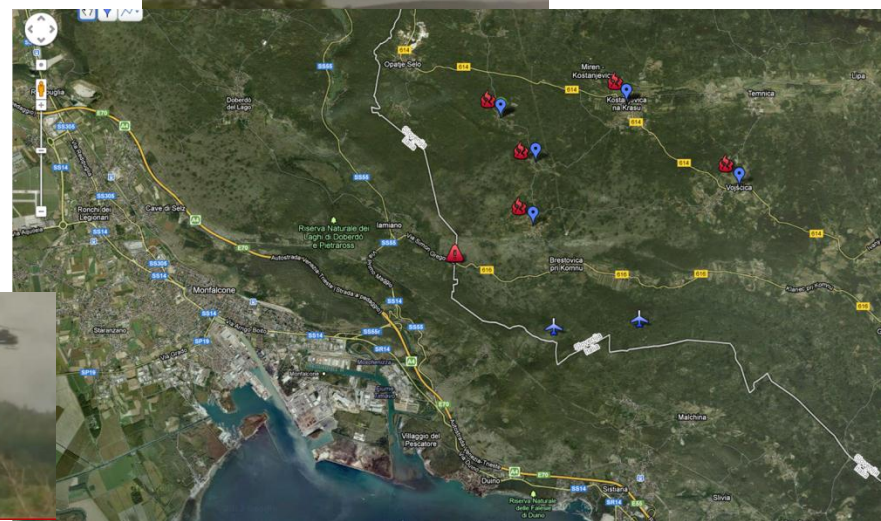
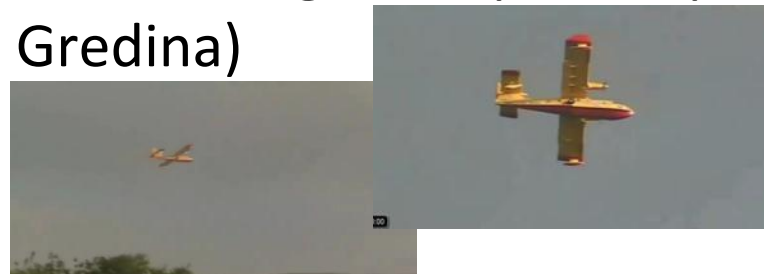


source: D. Muhič



## Sela na Krasu – development of the fire (30.07.)

- 14:45 – regional office of ACPDRRS for Notranjska region contacted Italian forces and agreed upon help in areal forces (Vršec and Gredina)
  - 150 fire fighters
  - 3 helicopters (SLO)
  - 2 airplanes (ITA)
- passed Brestovica
- calmed down in ITA



source: D. Muhič





## Sela na Krasu – development of the fire (30.07.)

- late afternoon – rate of fire spread decreased
- forces moved on the road above Reber and below fire site (road Brestovica-Zgornja Brestovica) to stop potential new spreads



source: D. Muhič



## Sela na Krasu – development of the fire (30.07.)

- 17:10 – leadership of the intervention agreed upon:
  - 4 sectors: Miren-Kostanjevica, 1 sector: Komen
  - ways of radio communication
  - goal to: localize fire and setup a night fire watch (app. 170)
  - activation of fire troops from the central Slovenia (app. 300)
- 20:00 – fire was localized (actual fire watch-app. 250)

source: D. Muhič





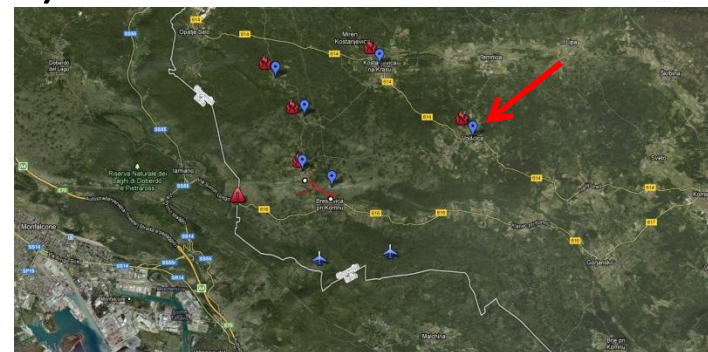
## Sela na Krasu – development of the fire (31.07.)

- fire had spread into black pine plantation near Zg. Brestovica – heavy load of pine needles with no undergrowth – underground fire
- some individual ignitions
- 08:00 – replacement of troops
- 12:30 – press conference
- 16:10 – gentle (not sufficient) rain



source: POT TV

Areal survey with MO's helicopters.  
Fire extinguished with only one  
smokestack near Vojščica.



## Sela na Krasu – end of the fire event (31.07. and after)

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- areal survey with thermal cameras by helicopter (areal club Nova Gorica and VFFA Kostanjevica)
- fire watch in the night of 31.07-01.08. by VFFAs: Kostanjevica na Krasu, Komen, Col, Kanal, Dole, Avče, Cerčno, Srpenica, Grahovo, Rut, Ponikve, Godovič, Dol, Logatec, Kobarid, Medvedje Brdo, Rovte in Nova vas
- fire watch 01.08.-09.08. by VFFAs: Kostanjevica na Krasu, Komen, Kanal, Log, Kobarid, Verd, Šempeter pri Novi Gorici, Dornberk, Nova Gorica, Borovnica, Bevke, Stari trg and firefighting association of the Republic of Slovenia – Sežana
- termination of fire fighting activities on the 08.08.2003



## Sela na Krasu – fire characteristics in short

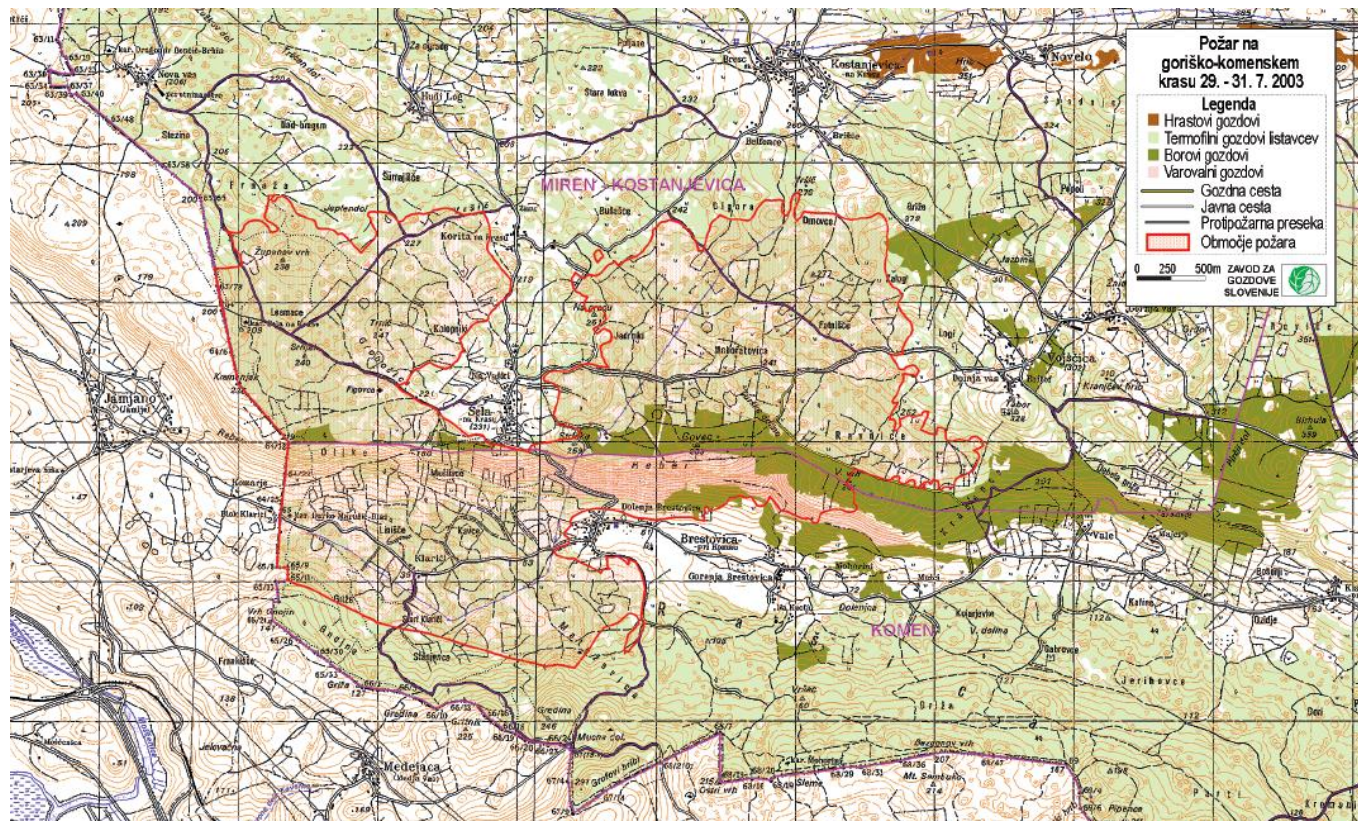
- total burnt area: 1048.57 ha (957.93 ha of forests)
- cause: unknown
- type of fire: ground fire, that progressed in to crown fire
- start fire time: 29.07.2003 at 12:55 (first time it crossed the ITA-SLO border, near the settlement Jamlje on the Kremenjak hill)
- final propagation time: 09.08.2003
- ignition point Coordinates (WGS84), aspect, altitude:
  - position: N 45.820°, E 13.597°
  - aspect: 223° (SW)
  - altitude: 200 m a.s.l.

source: J. Zafran

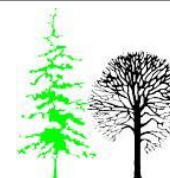




## Sela na Krasu – fire characteristics in short



source: Slovenia Forest Service



## Sela na Krasu – damage and costs

<b>1. Damage in natural environment and infrastructure</b>	<b>Cost in EUR<sup>1</sup></b>
Damage on forests (according to Slovenia Forest Service's estimation)	417 292.61
Damage on electrical power supply grid	283 758.97
Damage on telecommunication grid	47 988.65
<b>Total</b>	<b>749 040.23</b>
<b>2. Other damage costs</b>	
Costs of water and other means of extinguishment	2 921.05
Costs of water (water supply service "Kraski vodovod" – 1500 m <sup>3</sup> )	1 251.88
Costs of salary reimbursement for fire-fighters <sup>2</sup> , costs of transportation, equipment repairs and running costs of fire-fighting vehicles	271 240.19
Costs of food for fire-fighters	10 432.32
Fuel costs for fire-fighting vehicles	2 086.46
Costs of helicopters (29 hours of running)	38 724.75
Costs of collaboration/involvement with other services that was not predicted/planned	11 892.84
<b>Total</b>	<b>338 549.49</b>
<b>Total 1. + 2.</b>	<b><u>1 087 589.72</u></b>

### Remarks

<sup>1</sup> Calculated with the exchange rate of 1EUR=239.640SIT (Slovenian tolar) Original estimation of costs was given in Slovenian tolar, as this was an official currency in Slovenia at that time

<sup>2</sup> Employers of fire-fighters are compensated when their employees, that are also voluntary fire-fighters, are called on duty

There were no casualties or injured during the fire.



## Sela na Krasu – post-fire forestry measures

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Planned post-fire forest management comprised of

- preparation of forest stands for regeneration (438.90 ha, 1.92 of which was planned to be financed from the government budget)
- preparation of the soils (334.02 ha, 112.20 of financed ...)
- planting (39.15 ha, 4.80 of financed ...)
- seeding (294.87 ha, 99.48 of financed ...)

## Economical management of the post-event situation

Restoration costs for forest lands for the government budget were estimated at EUR 83 458. The figure comprises of work costs and costs for planting and seeding materials.



## Sela na Krasu – Ecosystem services of forests

### Ecosystem services affected by fire event

- water retention (catchment area near Brestovica pumping facility) capacity was severely affected
- mineralization of organic component of the soil
- loss of habitats
- decrease in wind protection
- source of additional CO<sub>2</sub> emissions
- loss of wood production



## Sela na Krasu – Conclusions

### Lessons learnt

- formal protocol on collaboration between fire fighters and foresters should be set up
- protocol of collaboration with Italian side should be signed
- lack of cartographic materials

Part of the solution: *Atlas of fire protection objects (2009)*

*Protocol on mutual collaboration ITA-SLO in case of natural and other disasters (2006)*

- prevention measures as removal of excessive plant material can be done in the dormant phase – winter – trimming/felling trees at intersections
- worn-out equipment



## Sela na Krasu – Literature and sources used

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- ARSO. Archive of meteorological observations in Slovenia
- Fire Service Act (Official Gazette of the RS, No. 113-5006/05)
- Košiček B. 2005. Fire at Sela na Krasu – a Forester's view. UJMA, 19: 108-113
- Muhič D. 2005. Fire at Sela na Krasu. UJMA, 19: 99-107
- <http://www.wetterzentrale.de/>

