ALPFFIRS WP4
Task 4.1.5 : Statistical description of the datasets : weather

Fire weather indices

On one hand we collected the data of fire weather indices from Meteo France corresponding to the pilot area (zone 63). On the other hand we computed the fire weather indices according to the software developed by WSL team based on Piera Cava weather station.

Fire history

We extracted the fire events from South East of France database (promethee) which were located in pilot area (800 events).

Winter season of fire is the most critical. The fire regime of study area is characterized by a winter maximum centred on February and March (over 161 fires) and a secondary maximum in august. The ratio of surface burnt by fire is higher in winter too with 10ha/fire when it is around 2h/fire in summer.

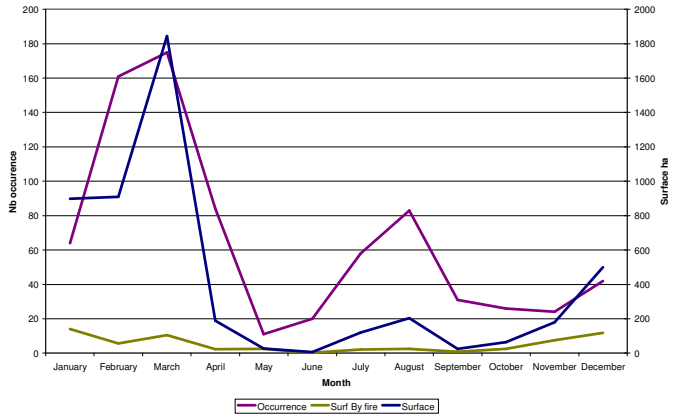

Figure 1 : Cumulated occurrence and surface of fires : 1991-2010

There is a high inter annual variability in fire occurrence or areas burnt by month. 1995, 1997, 1998 and 2002 were very severe with half of the area burnt in 1991-2010 period.

Fire index relevance

As mentioned above, the fire season is quite narrow focussed on three months during the year. In order to check the relevance of the daily indices we applied several statistical indices on a monthly criterium.

We assessed the relative relevance of the complete set of fire weather indices using:

- Contingency (fire/not fire)
- Piemonte and WSL test of percentile skills and auc.
- Kendall and Spearman test

We also studied if teleconnections forerunner parameters of severity for fire seasons (1955, 1997, 1998 and 2002) could be found.

We studied these relations between the fires parameters (occurrences, surfaces and ratio of surface by fire) and teleconnections indices (NAO, PNA and Enso) for the months of February, March April and August where the numbers of fires are the largest (Table 1). We assessed correlations for these parameters with paired values and timelags in indices in order to assess if forerunners conditions of severe fire seasons could be determined.

The correlations with Enso are not significant. NAO is relevant with one month anticipation in March (maximum of number of fires) for both occurrences and surfaces burnt and two months for August surface by fire. Pna is strongly correlated with surface by fire in four months anticipation (February and April).

			Tlag5	Tlag4	Tlag3	Tlag2	Tlag1	Tlag0
Surf/Fires	Feb	NAO	0.31	0.24	0.22	0.11	-0.28	**0.52**
		PNA	0.15	**-0.73**	0.06	-0.13	0.36	0.19
	March	NAO	0.20	-0.07	0.04	0.14	0.41	0.14
		PNA	-0.31	-0.35	0.02	0.25	0.19	-0.29
	April	NAO	0.43	0.10	0.25	0.25	0.37	0.06
		PNA	0.17	**-0.78**	-0.22	-0.22	-0.16	0.30
	August	NAO	**0.58**	0.09	0.02	**0.45**	0.31	-0.13
		PNA	0.14	-0.07	-0.16	-0.42	0.25	**-0.47**
Surf	Feb	NAO	0.24	0.23	0.15	0.05	-0.15	**0.69**
		PNA	0.11	0.23	0.37	-0.17	-0.26	0.36
	March	NAO	0.15	0.01	-0.26	-0.08	**0.53**	0.15
		PNA	-0.08	-0.16	-0.11	0.03	0.14	**-0.46**
	April	NAO	0.18	-0.30	-0.24	0.42	0.24	-0.27
		PNA	0.06	-0.44	-0.01	-0.09	-0.38	0.18
	August	NAO	**0.48**	-0.03	0.08	0.43	0.30	-0.30
		PNA	0.07	-0.14	-0.22	-0.38	0.23	-0.39
Occurrence	Feb	NAO	-0.05	-0.05	0.17	0.11	0.08	0.30
		PNA	0.14	0.43	**0.48**	-0.06	-0.26	0.23
	March	NAO	-0.03	0.07	-0.42	-0.25	**0.46**	0.11
		PNA	0.11	0.14	-0.21	-0.21	0.03	-0.34
	April	NAO	0.06	-0.41	-0.27	0.34	0.18	-0.45
		PNA	0.09	-0.08	0.06	-0.10	-0.37	0.13
	August	NAO	0.14	-0.09	-0.07	0.09	0.04	-0.33
		PNA	0.25	0.08	-0.13	-0.19	0.15	-0.21

Table 1 : Relation of fire parameters to teleconnections indices