



Hotspot-assisted fire spread mapping and fuel consumption estimates



Natural Resources
Canada

Ressources naturelles
Canada



GOFC-GOLD Fire IT meeting,
Canadian Space Agency,
Montreal, Feb. 7-9, 2005

Canada



Goal

Estimates of carbon emissions from forest fires based on spatially and temporally explicit data

Fuel consumption depends on burning conditions

- Vegetation (fuel)
- Weather

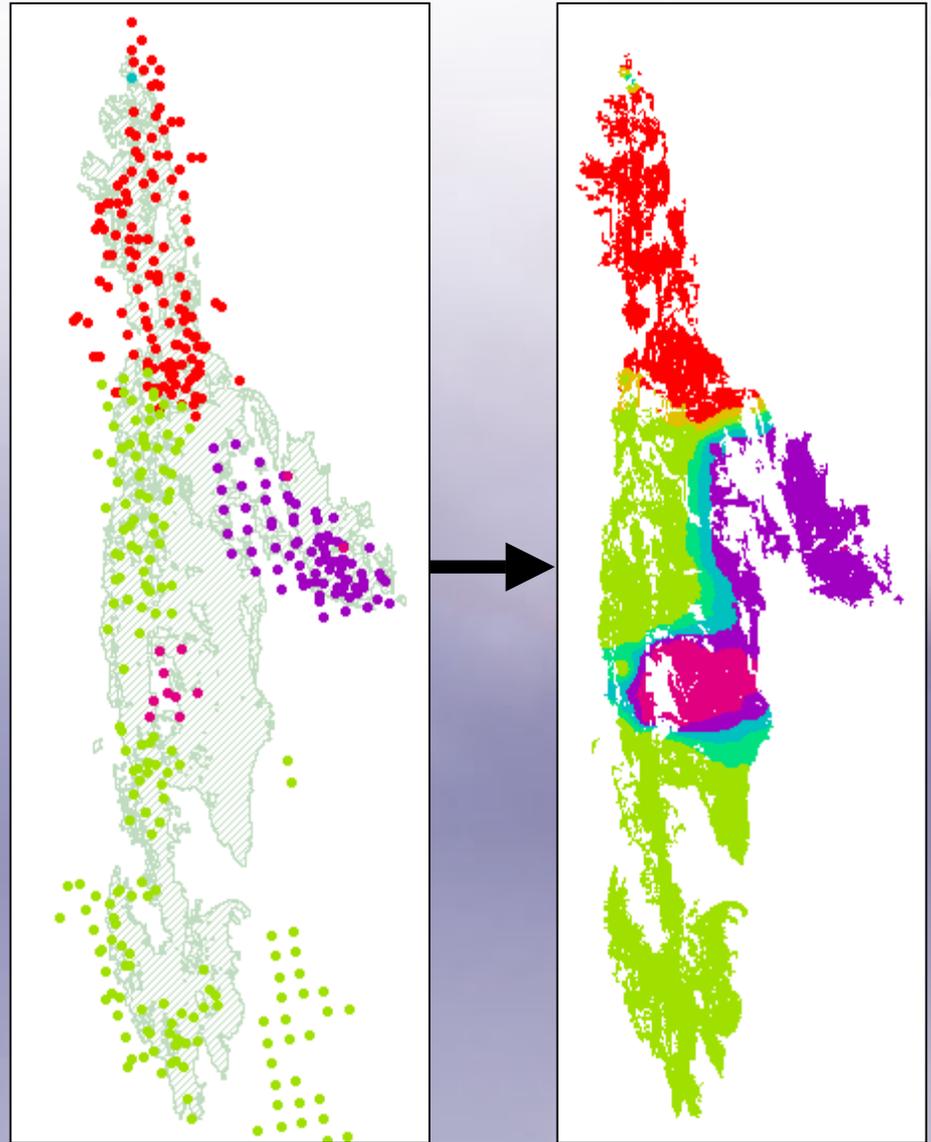




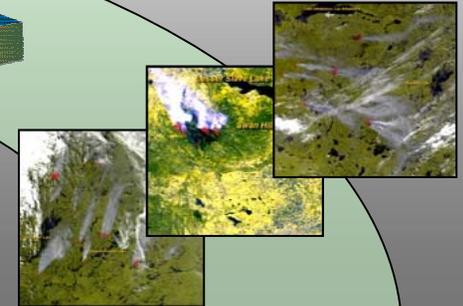
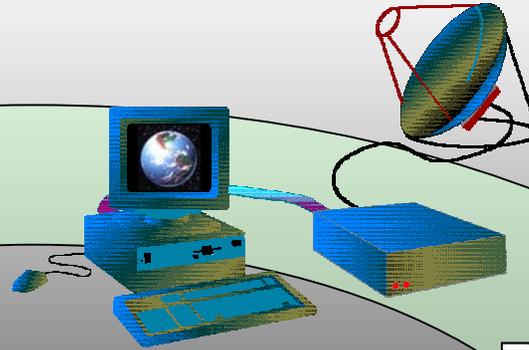
Method

Interpolate hotspot
dates to obtain
burn progression
map

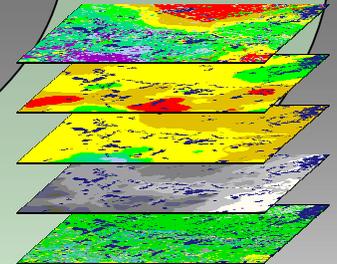
Fire perimeter map
based on Landsat



Hotspots



Daily monitoring of actively burning wildfires using data from NOAA AVHRR and MODIS.



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Canadian Wildland Fire Information System
Canadian Forest Services

The Canadian Wildland Fire Information System creates daily fire weather and fire behavior maps year-round and hot spot maps throughout the forest fire season, generally between May and September.

Fire Weather

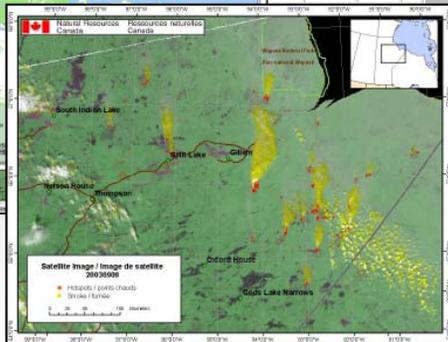
Fire

Regional Satellite

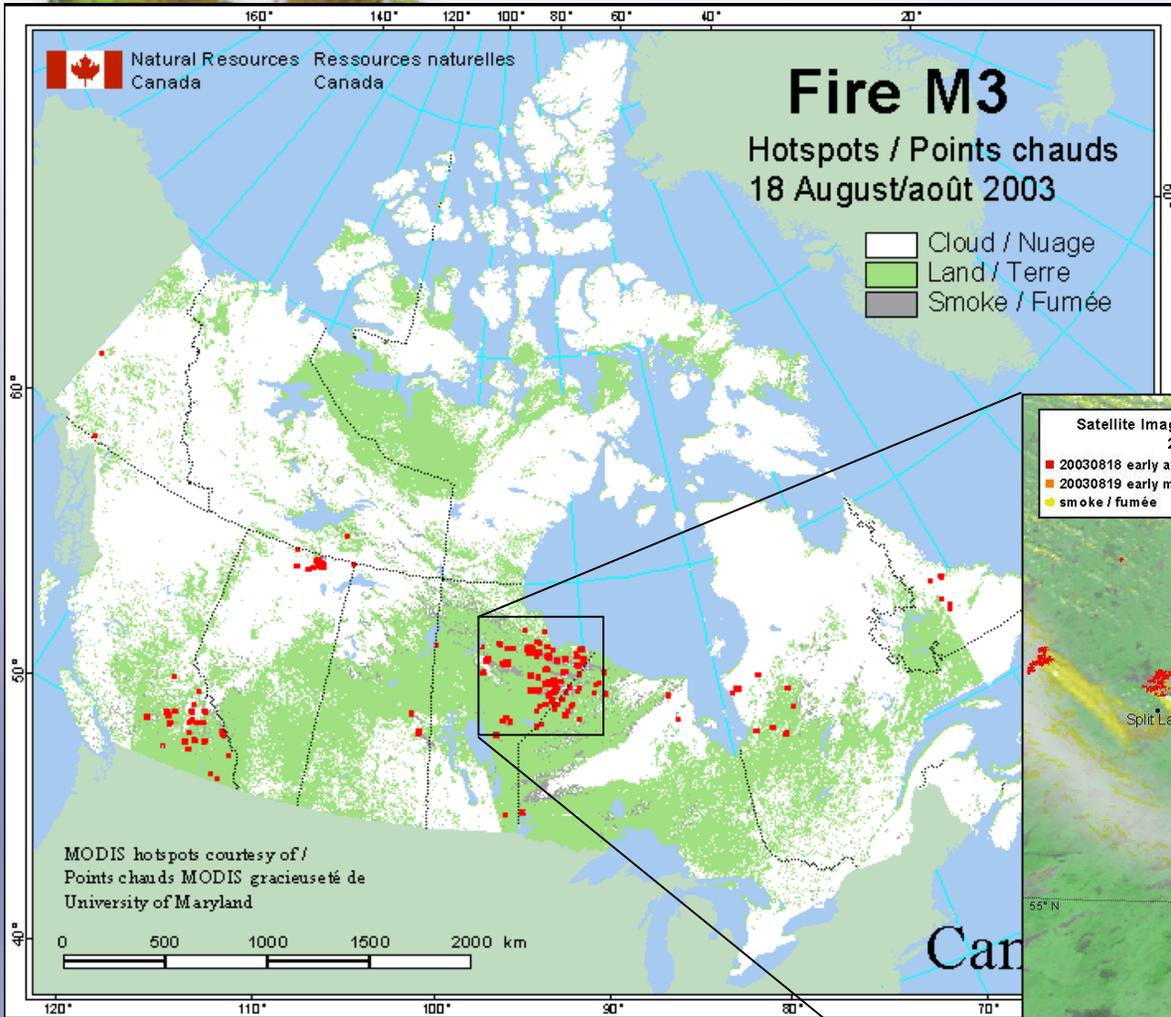
View the most recent **Hotspot** / **View more Hotspot**

View the most recent **Regional Satellite Images** / **View more Regional Satellite Images**

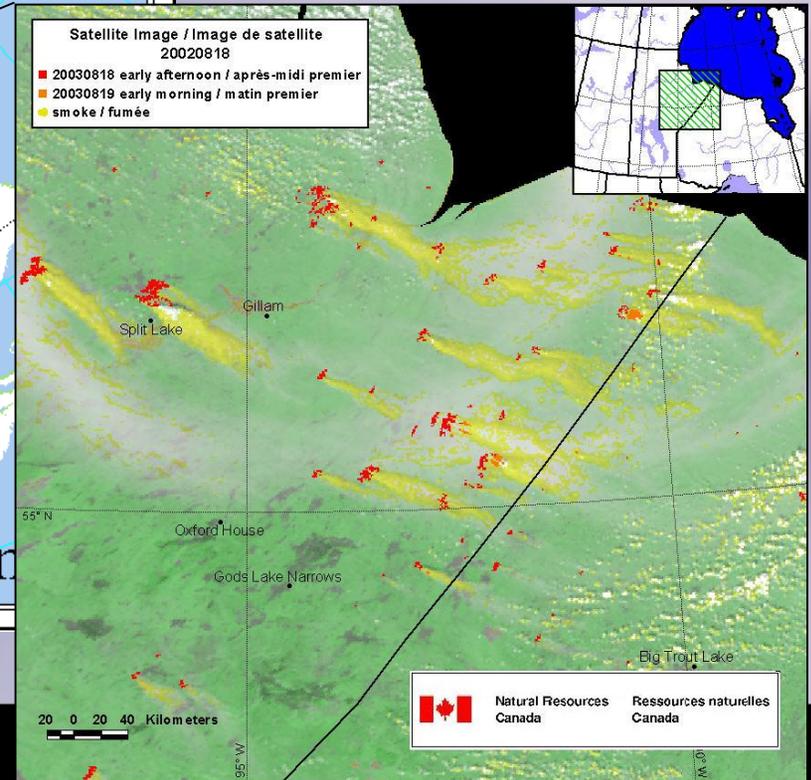
Ecoregion	Hotspots / Points chauds		Smoke / Fumée		Cloud / Nuage
	Daily / quotidiens	Year-to-date / cumulés pour l'année	km²	km³	%
1	0	0	40	237303	96
2	0	12	351	1155720	77
3	0	60	71	538921	67
4	25	2691	2685	83567	14
5	0	3043	4539	348781	59
6	0	1312	11	686110	93
7	0	11951	19464	434082	54
8	0	1070	235	1027560	97
9	0	32	0	211639	100
10	0	10	24	112207	93
11	0	2502	13526	238342	33
12	0	258	1856	160431	35
13	0	144	1058	109138	43
14	0	527	381	406404	91



Hotspots



Actively burning fires are identified and mapped using AVHRR and MODIS imagery.



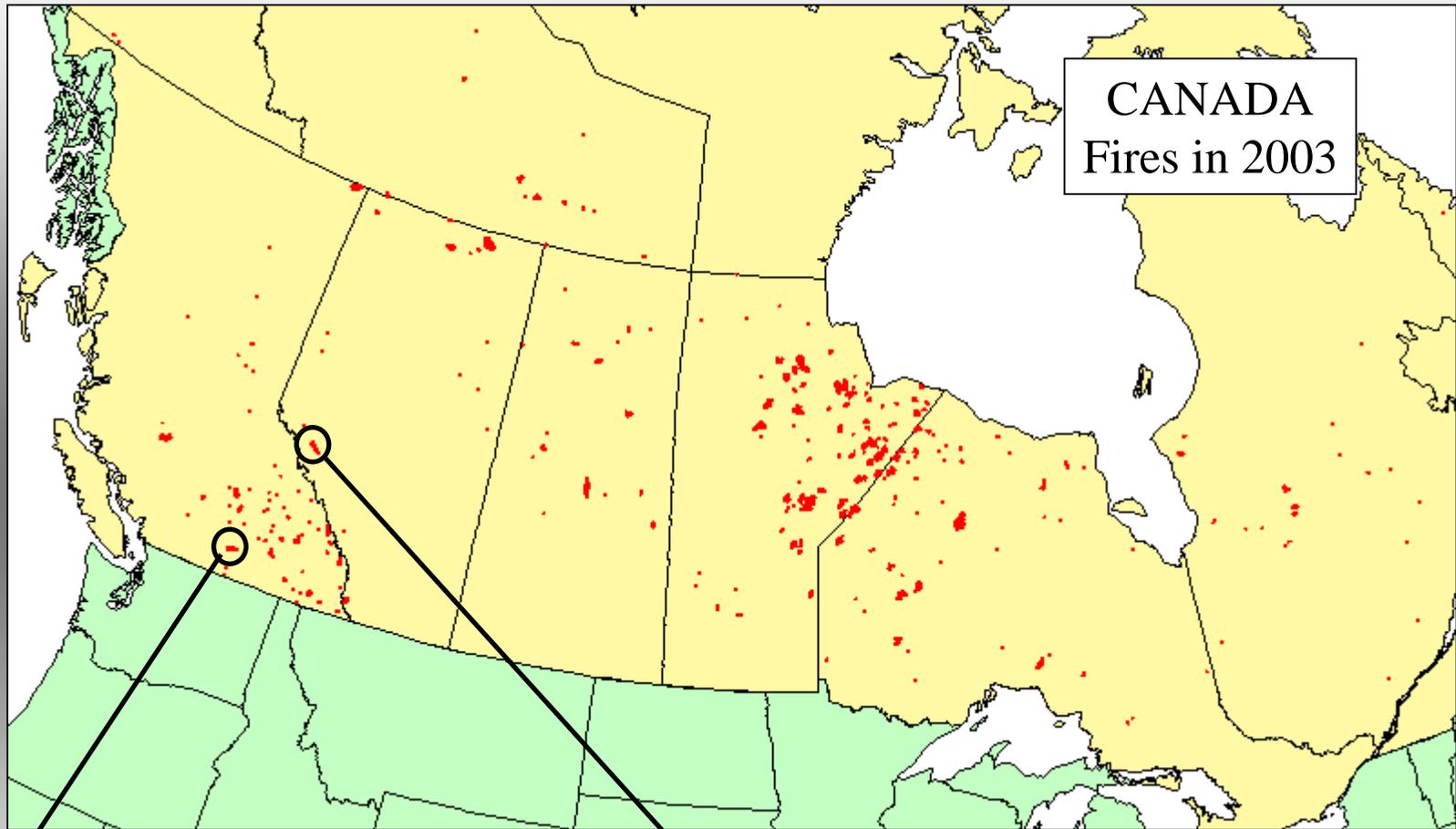
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Interpolation methods comparison test fires



CANADA
Fires in 2003

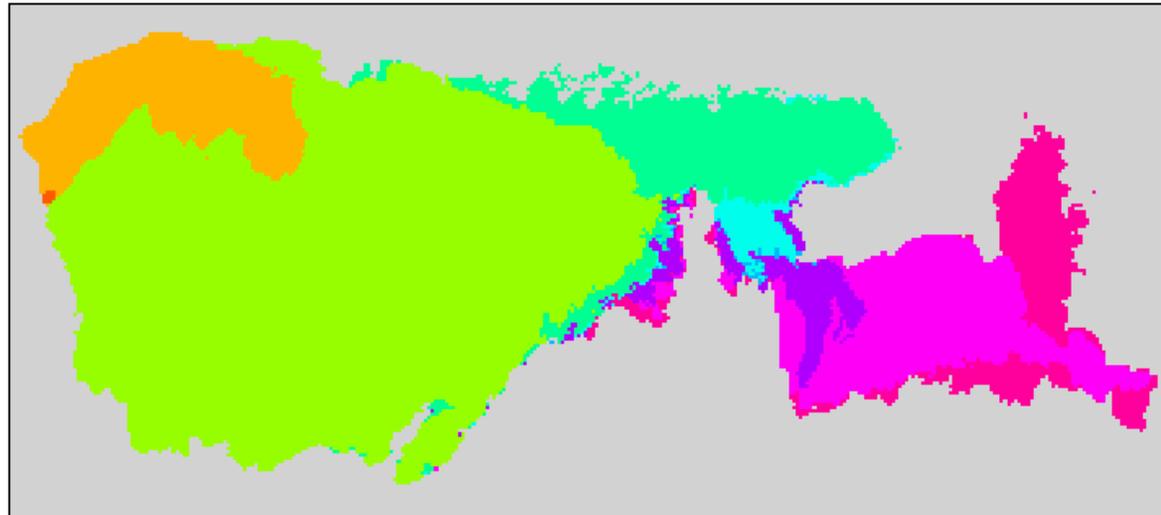
Okanagan Mountain Park
August 16 - Sept. 8, 2003
25,000 hectares

Syncline Ridge
July 25 - August 9, 2003
26,000 hectares

Okanagan Mountain Park

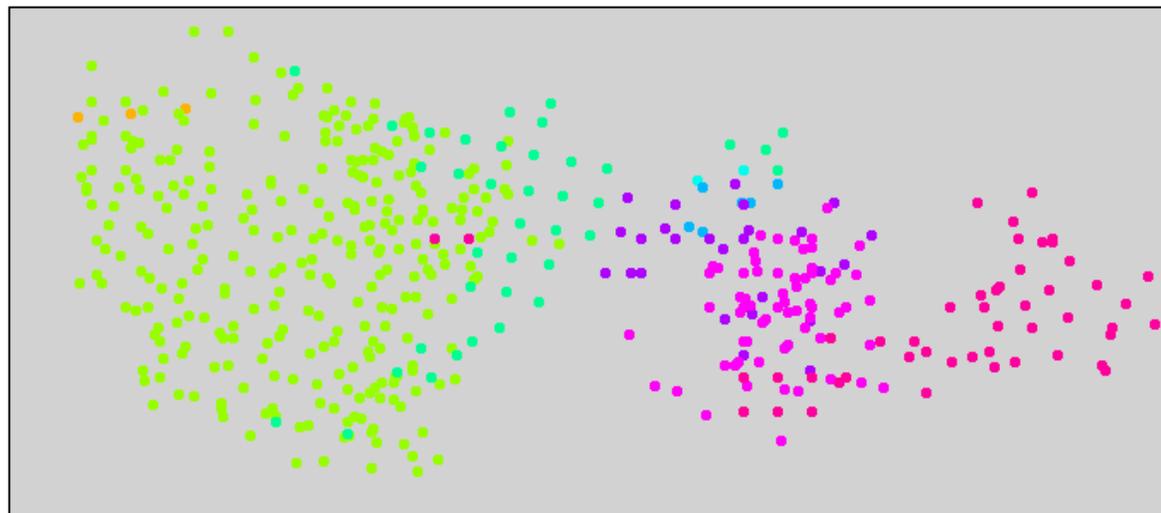
Interpolating burn days

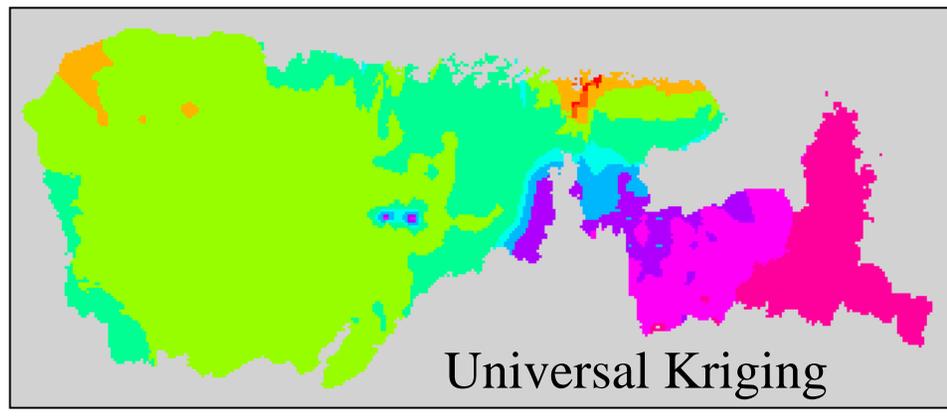
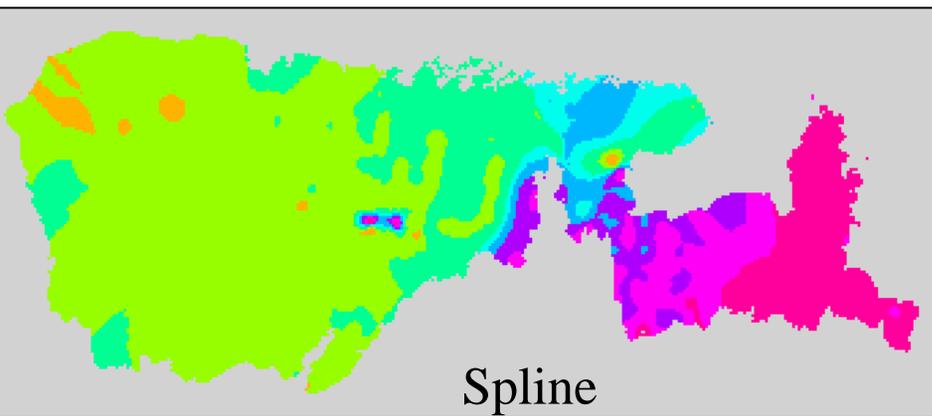
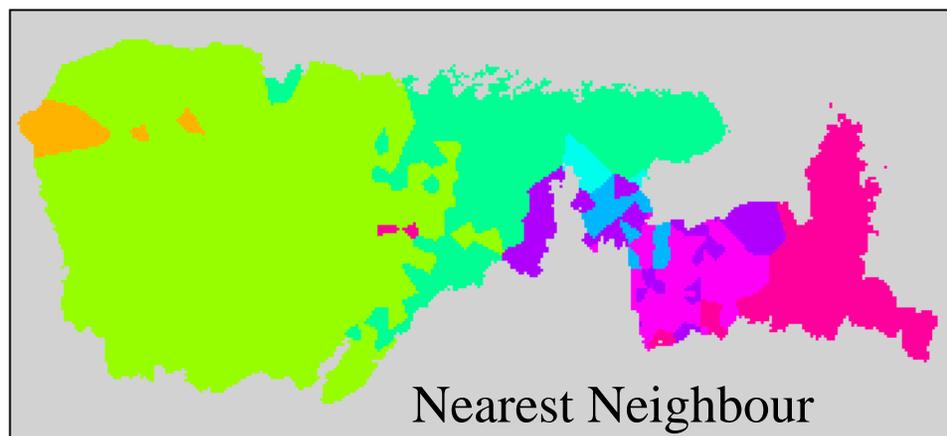
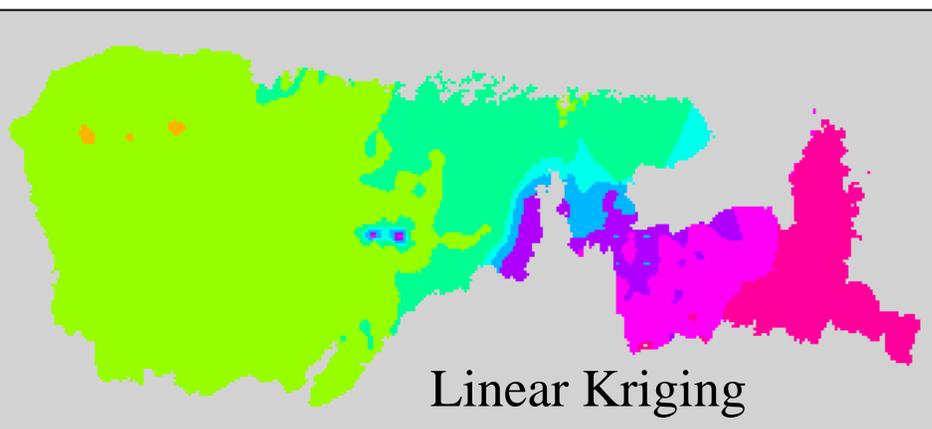
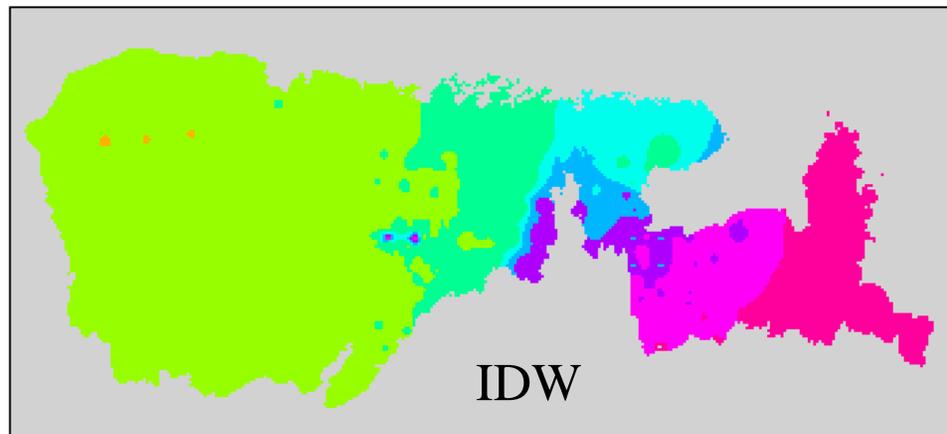
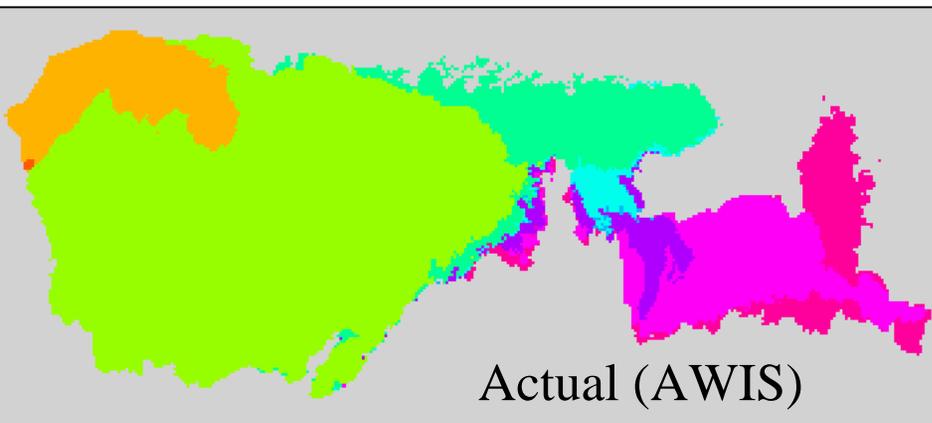
Julian date



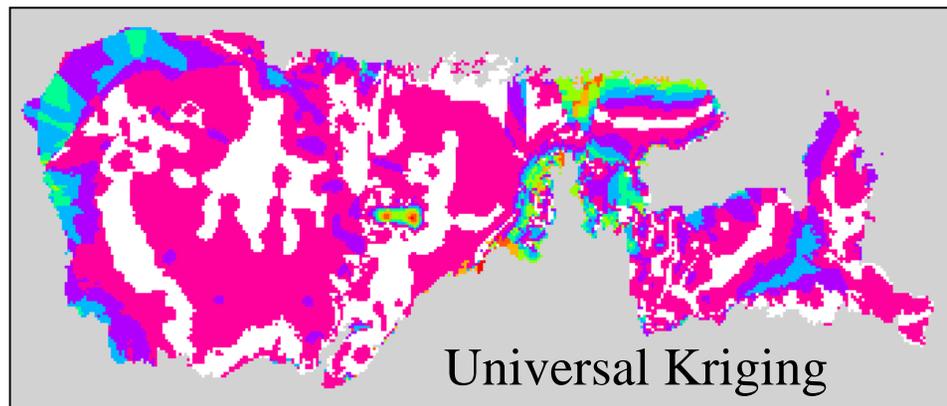
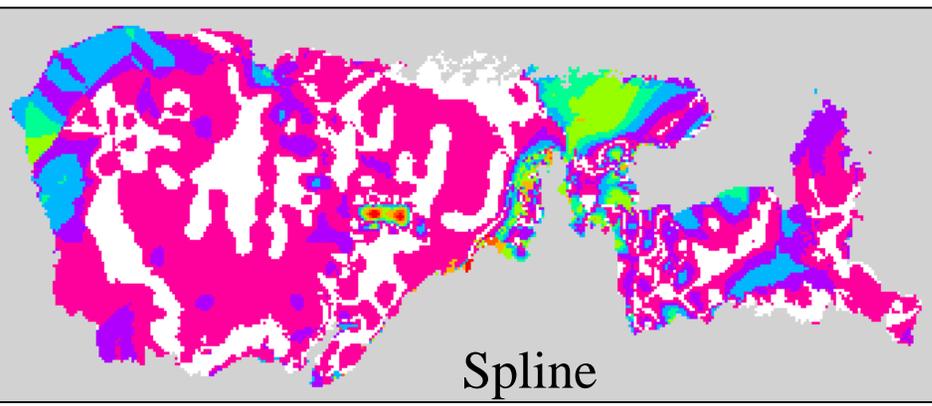
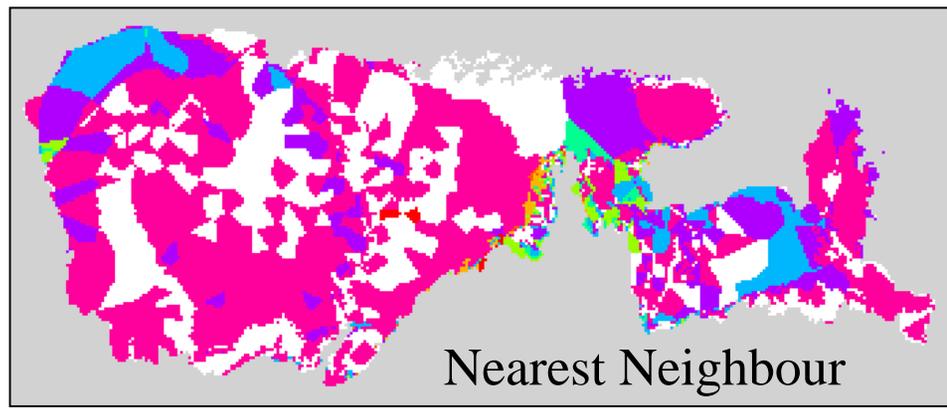
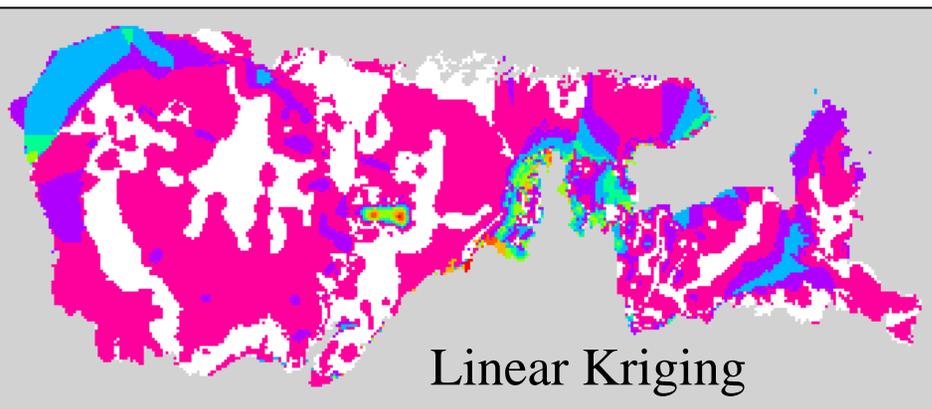
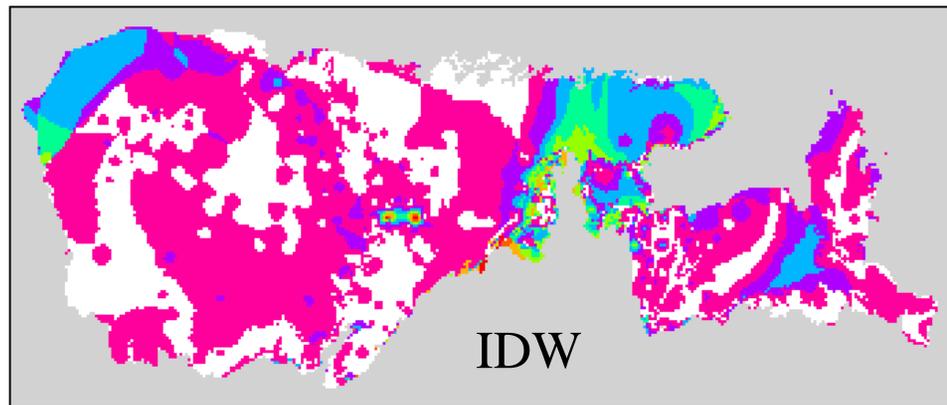
500 hotspots

- 66 AVHRR
- 434 MODIS

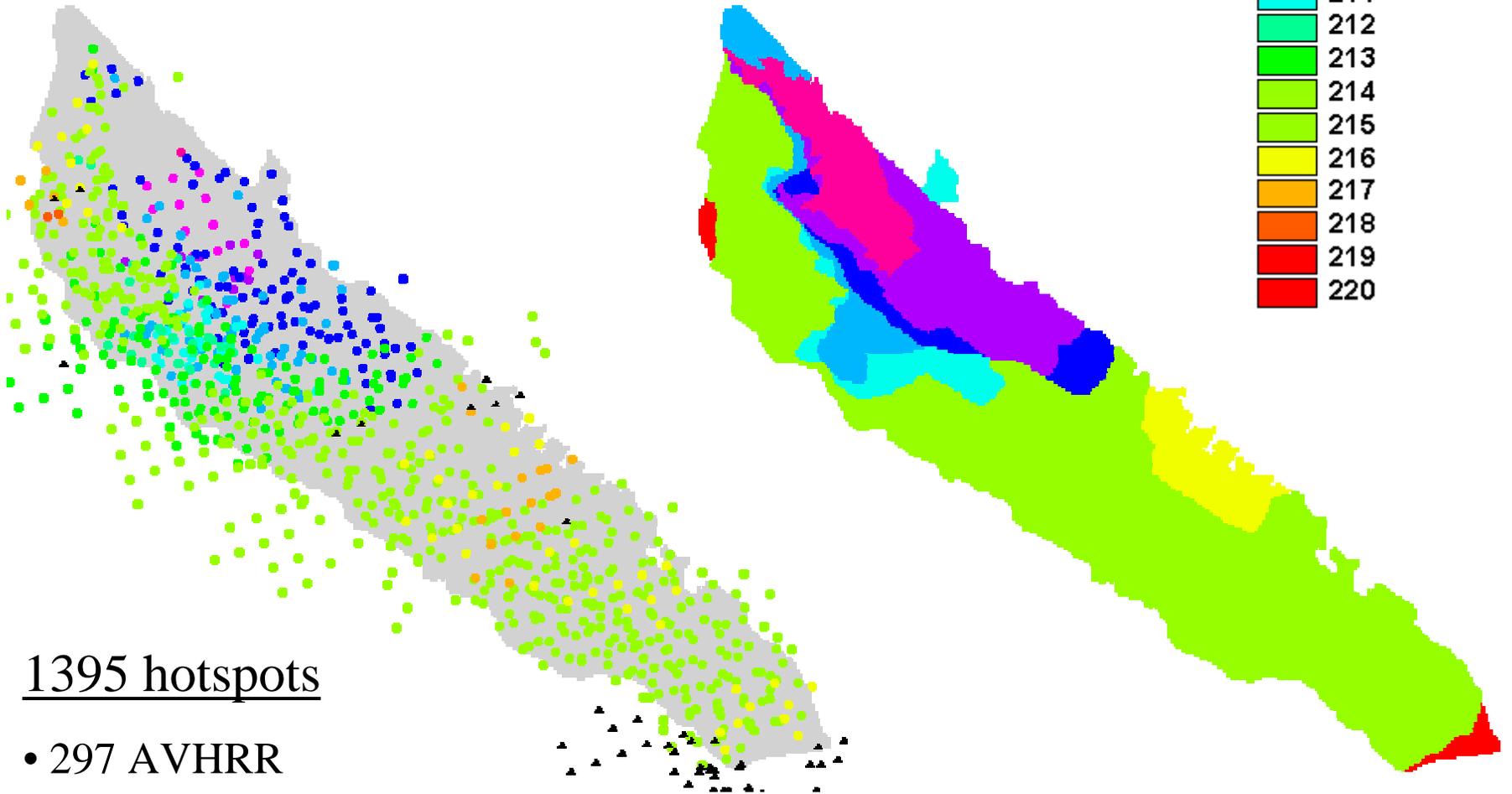




Burn day anomalies



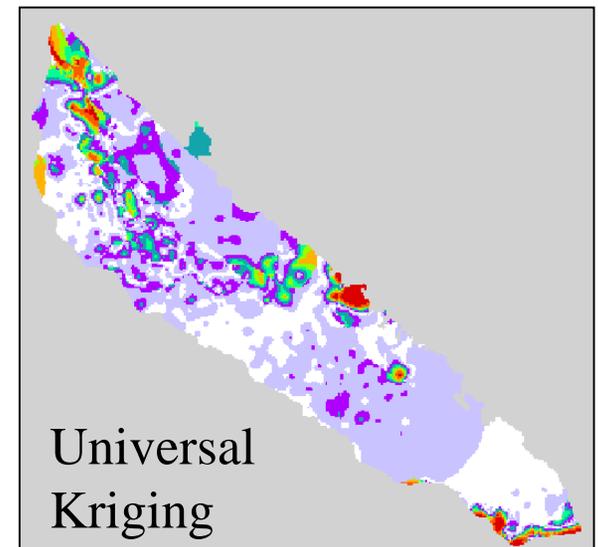
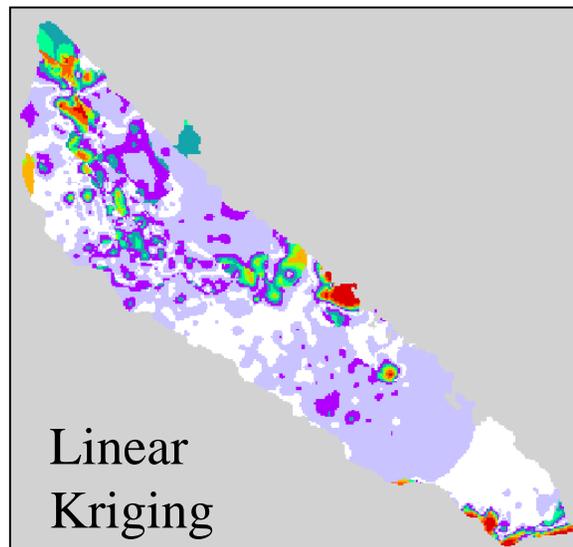
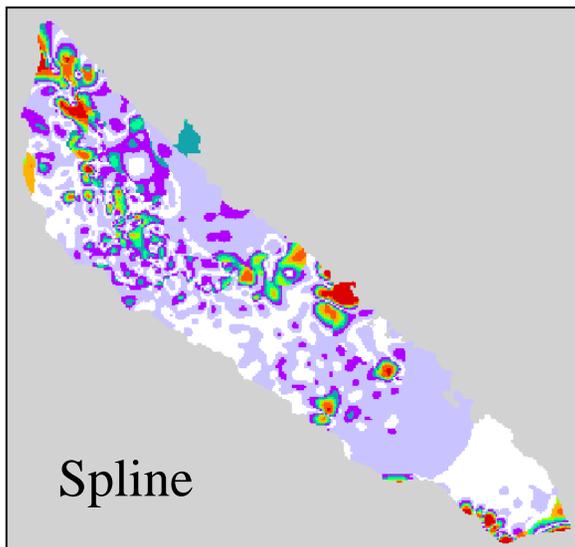
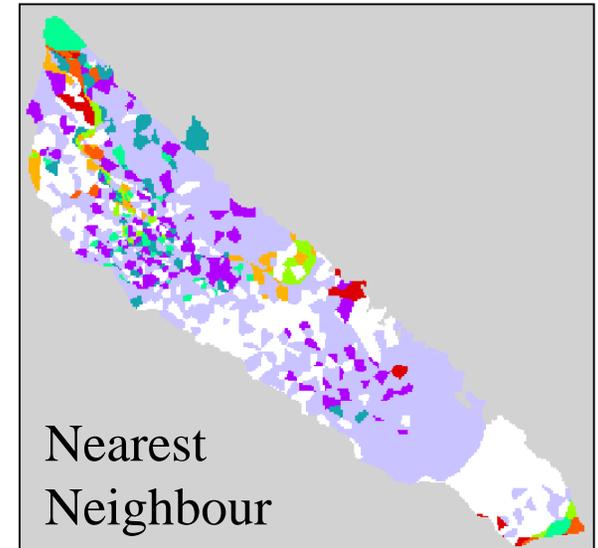
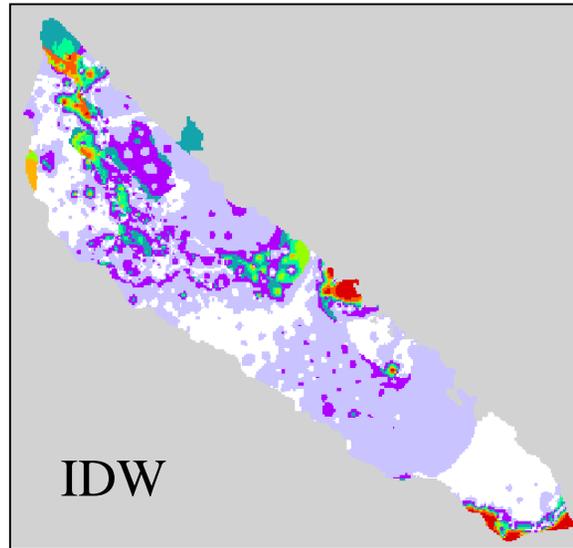
Syncline Ridge



1395 hotspots

- 297 AVHRR
- 1098 MODIS

Burn day anomalies





Total Fuel Consumed

<i>Interpolation method</i>	<i>Okanagan Mountain</i>	<i>Syncline Ridge</i>
Actual	1195.2 kt	750.2 kt
Nearest neighbour	1196.4	759.5
IDW	1190.8	749.1
Spline	1195.0	745.3
Linear Kriging	1194.0	748.5
Universal Kriging	1195.7	748.3

