Hotspot-assisted fire spread mapping and fuel consumption estimates

Natural Resources Canada

Ressources naturelles Canada

CSA ASC

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
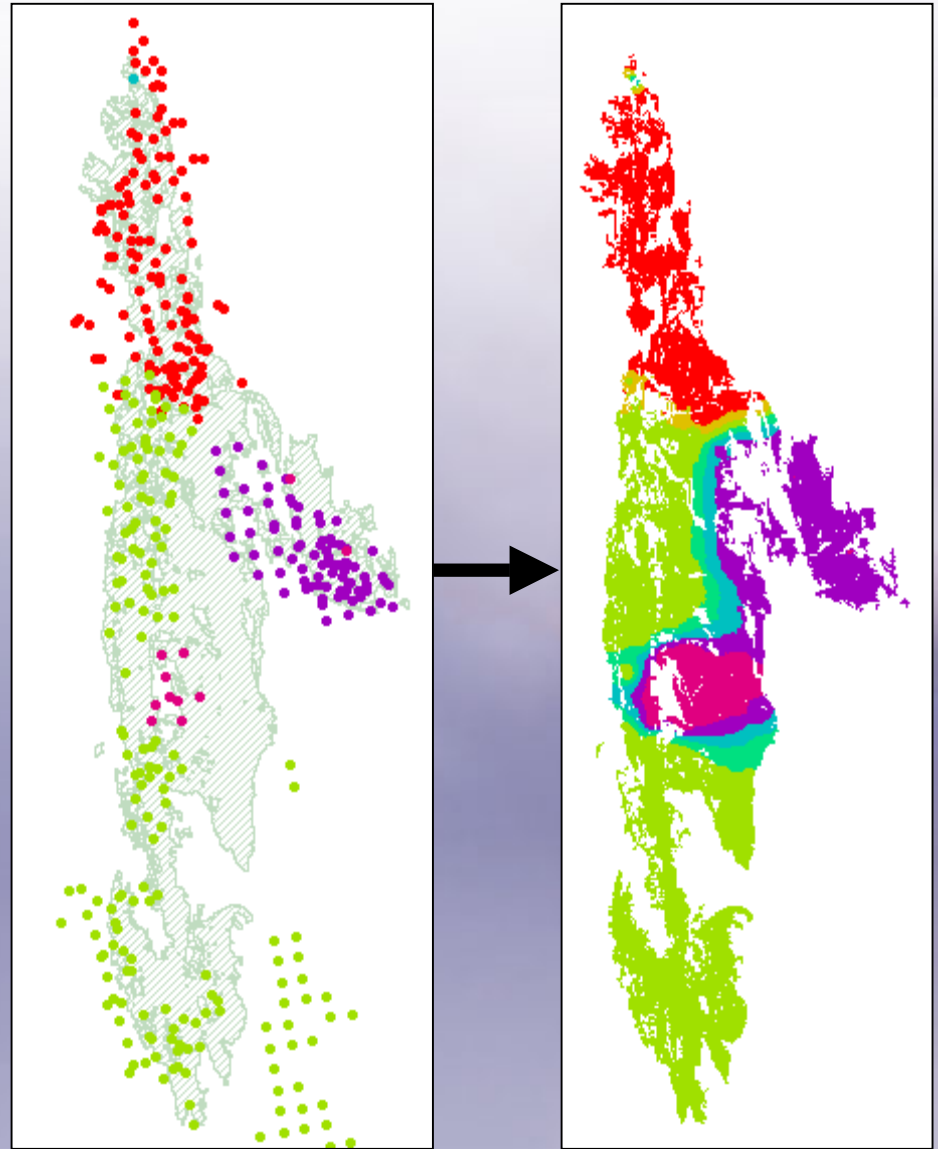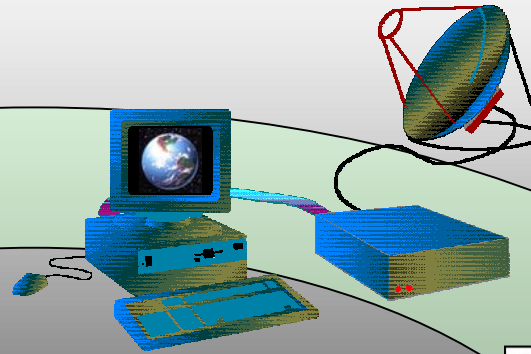- Vegetation (fuel)
- Weather

Method

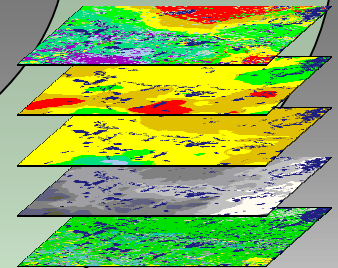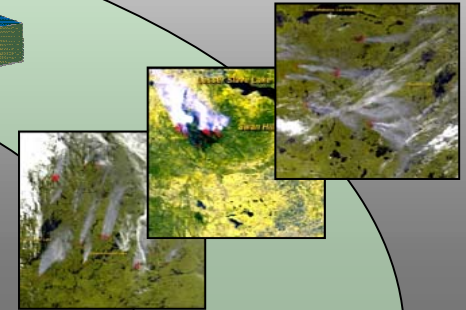Interpolate hotspot
dates to obtain
burn progression
map

Fire perimeter map
based on Landsat

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Hotspots

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

Hotspots

Actively burning fires are identified and mapped using AVHRR and MODIS imagery.
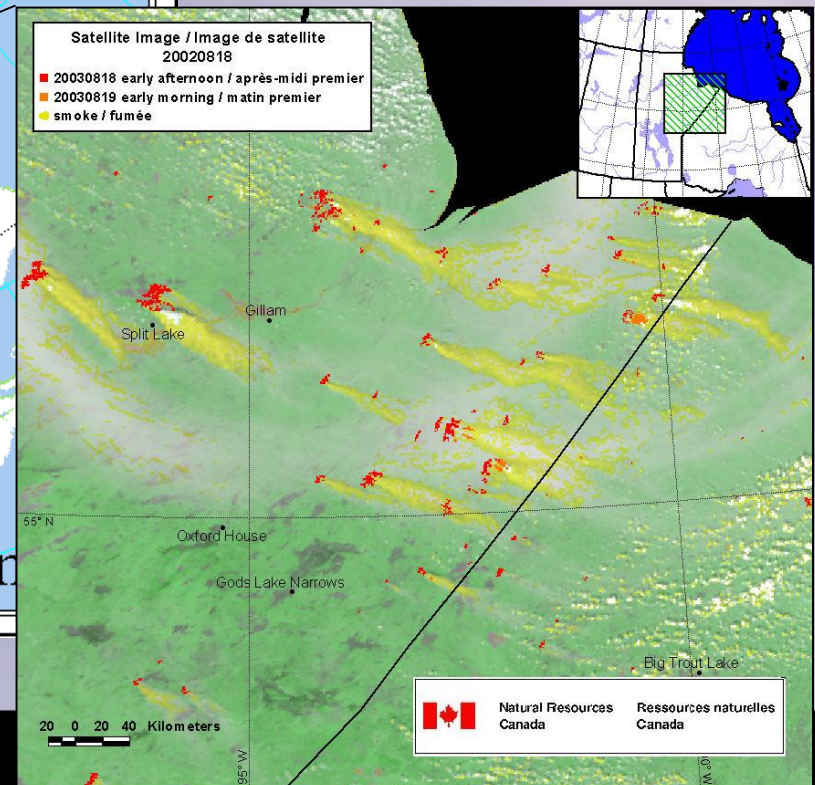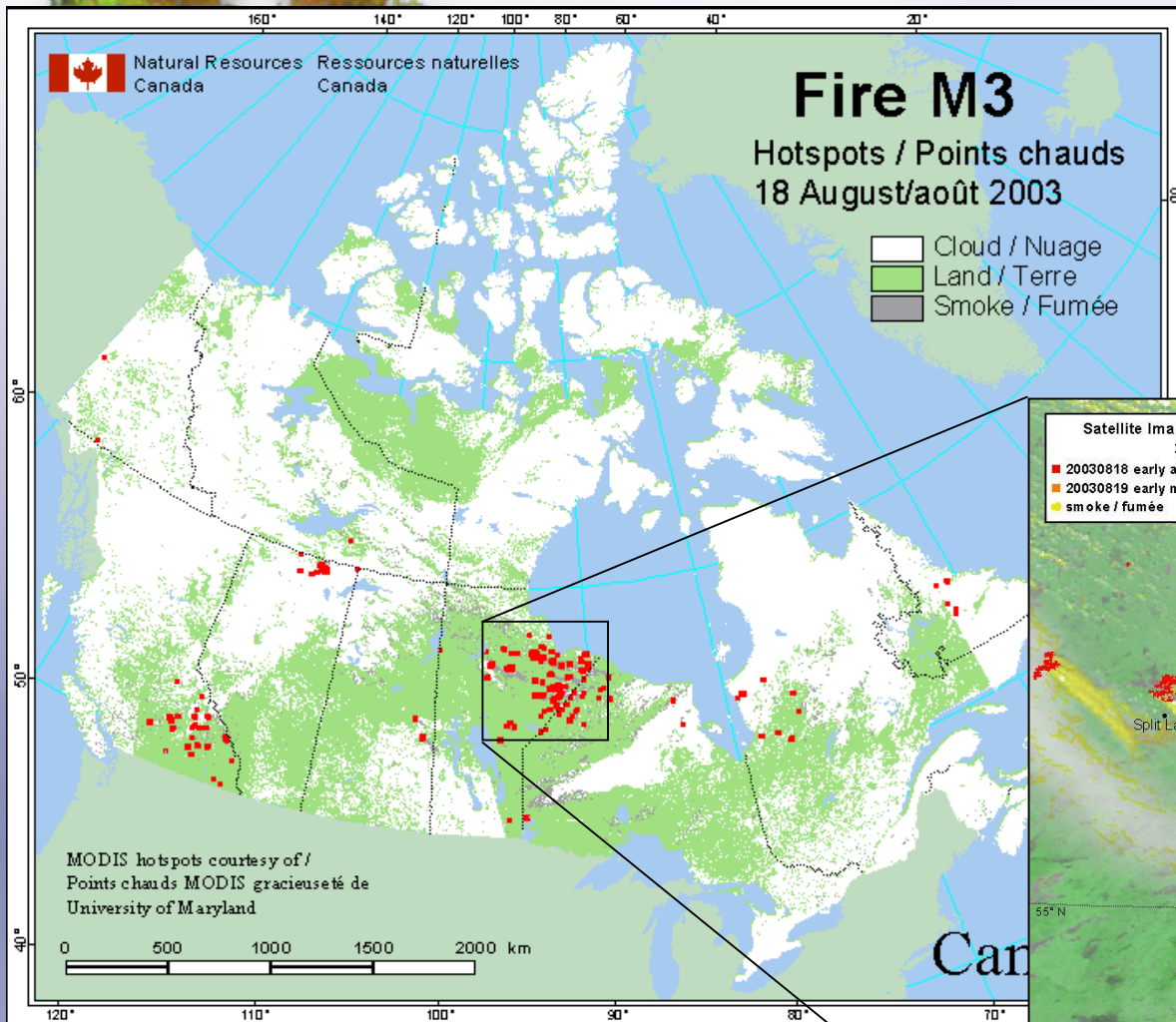
Interpolation methods comparison test fires

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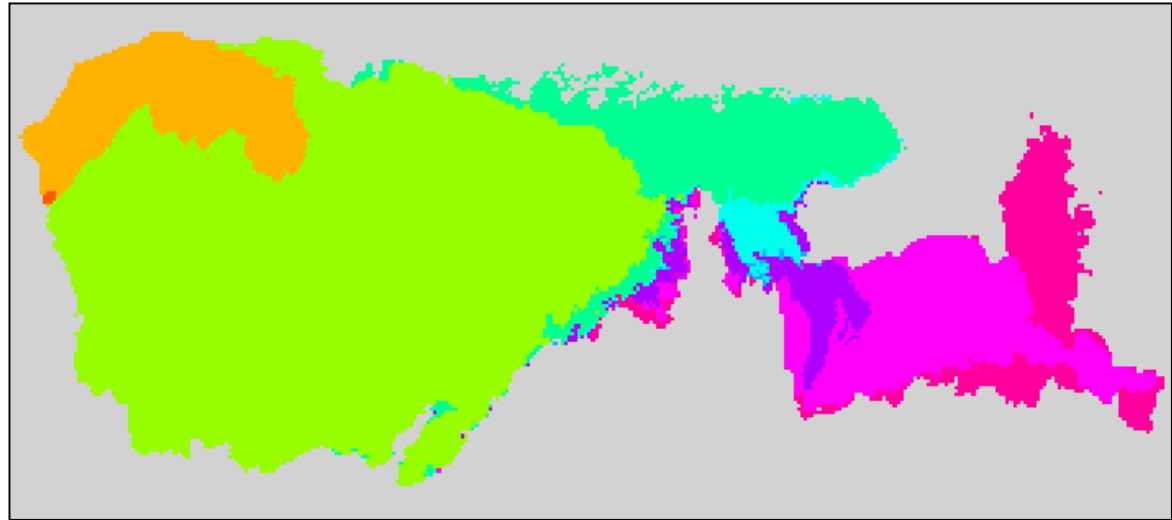Fires in 2003
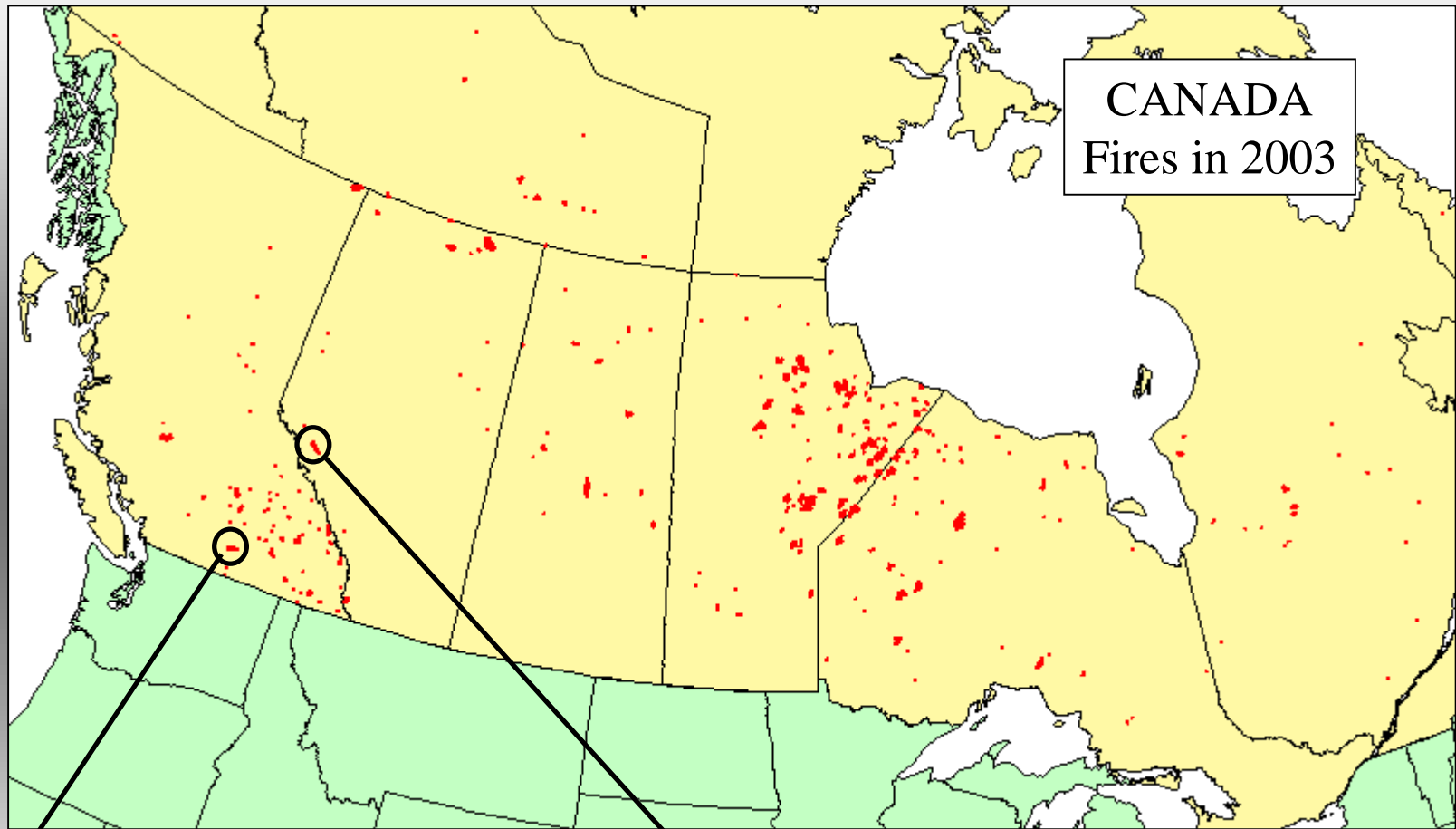
Okanagan Mountain Park
August 16 - Sept. 8, 2003
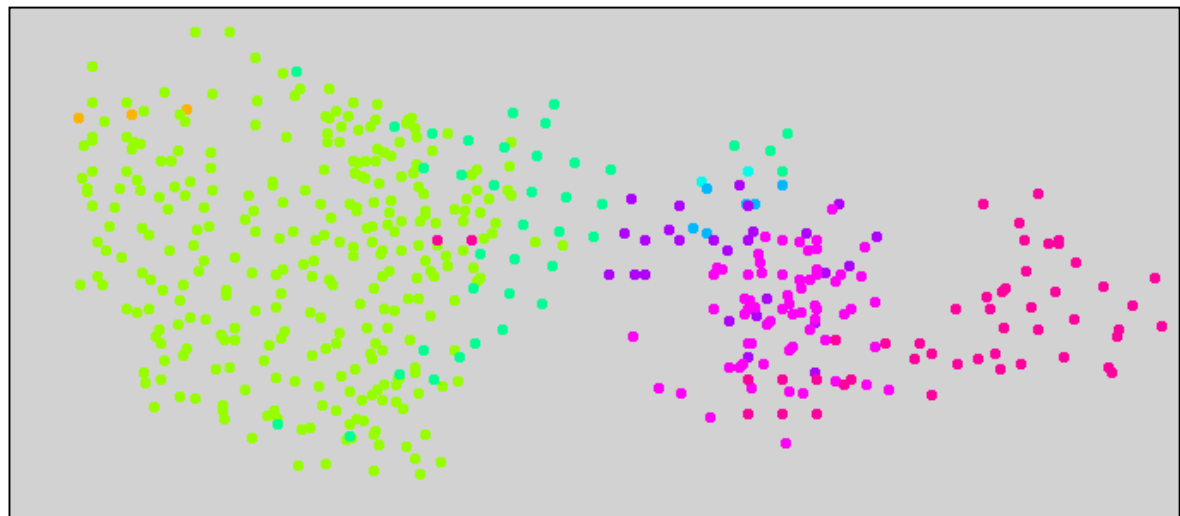25,000 hectares

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

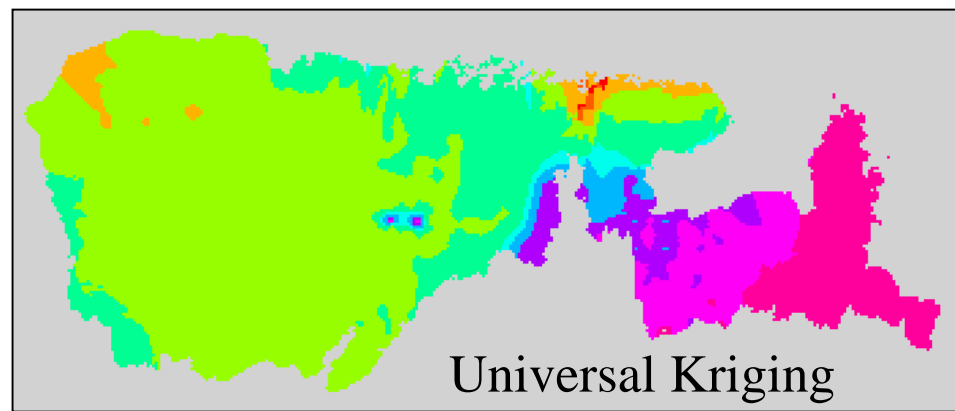# Okanagan Mountain Park
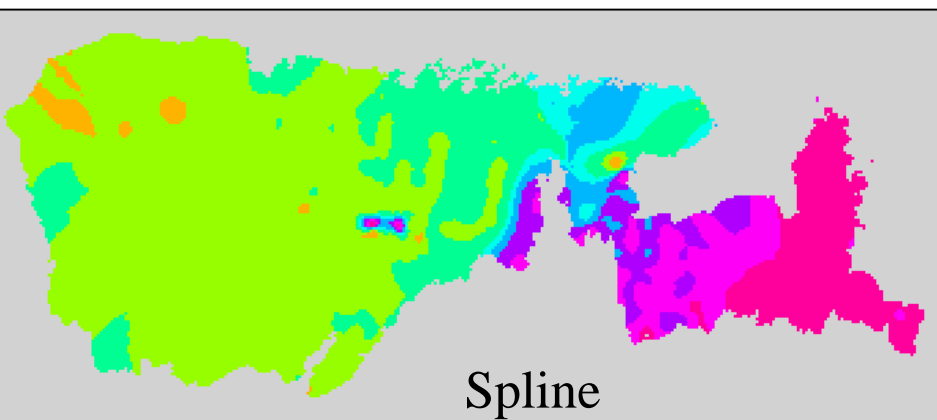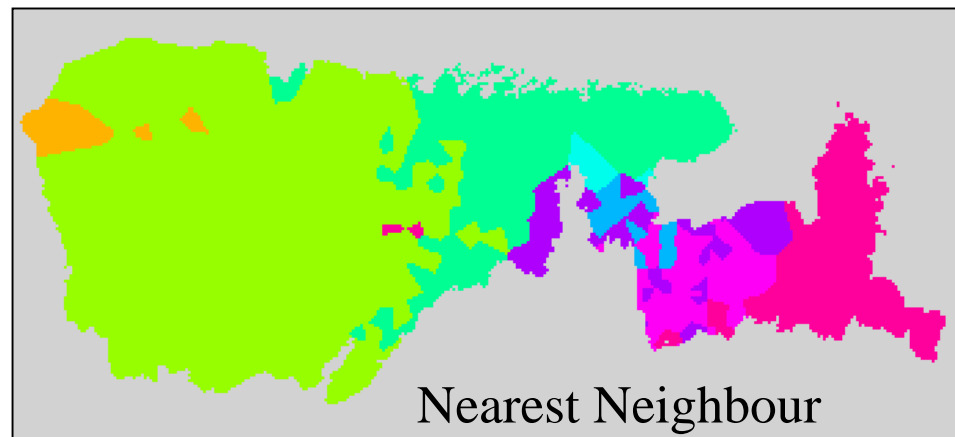## Interpolating burn days

Julian date

- 222 - 224
- 225 - 227
- 228 - 230
- 231 - 233
- 234 - 236
- 237 - 238
- 239 - 241
- 242 - 244
- 245 - 247
- 248 - 250

500 hotspots

- 66 AVHRR

- 434 MODIS

Actual (AWIS)

IDW

Linear Kriging
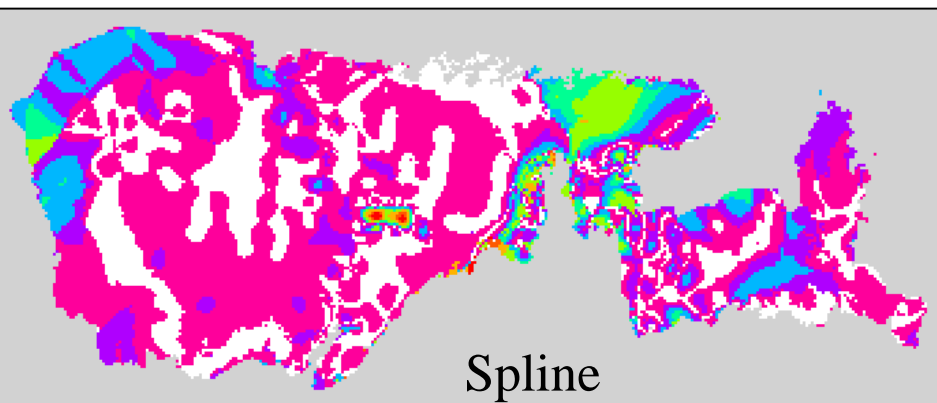
Nearest Neighbour

Spline

Universal Kriging

Burn day anomalies

Legend (Burn day anomalies):
- 0
- 1
- 2
- 3
- 4
- 5 - 6
- 7 - 9
- 10 - 12
- 13 - 16

IDW

Linear Kriging

Nearest Neighbour

Spline

Universal Kriging
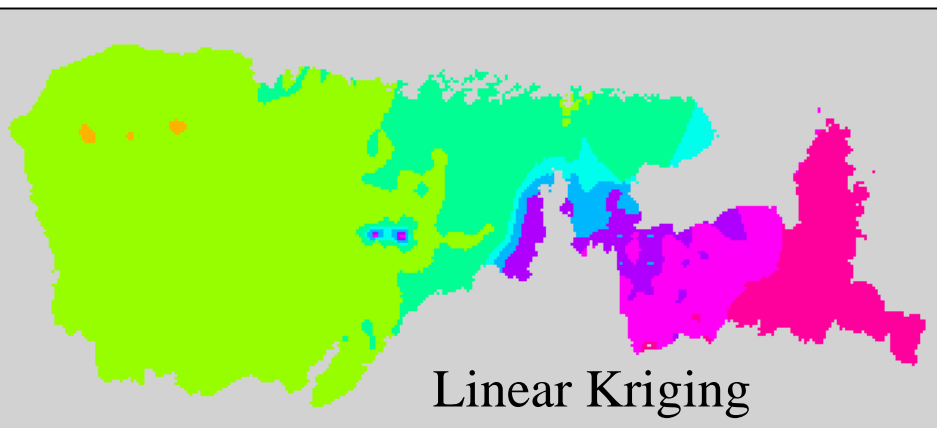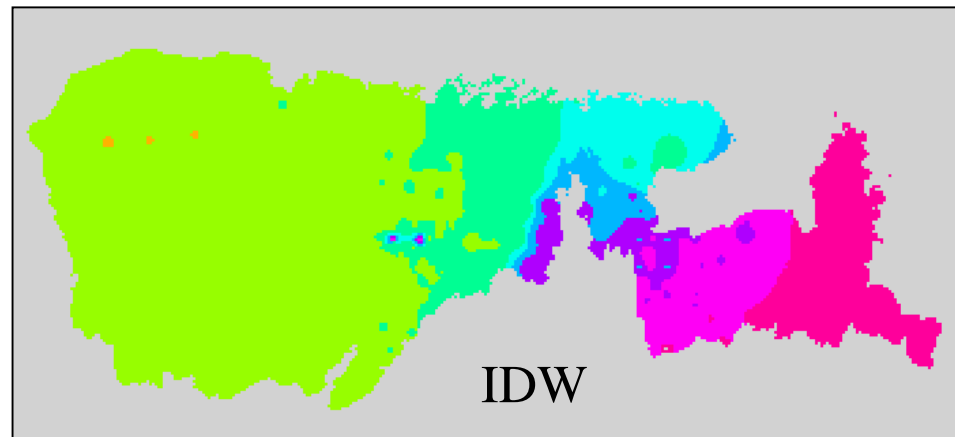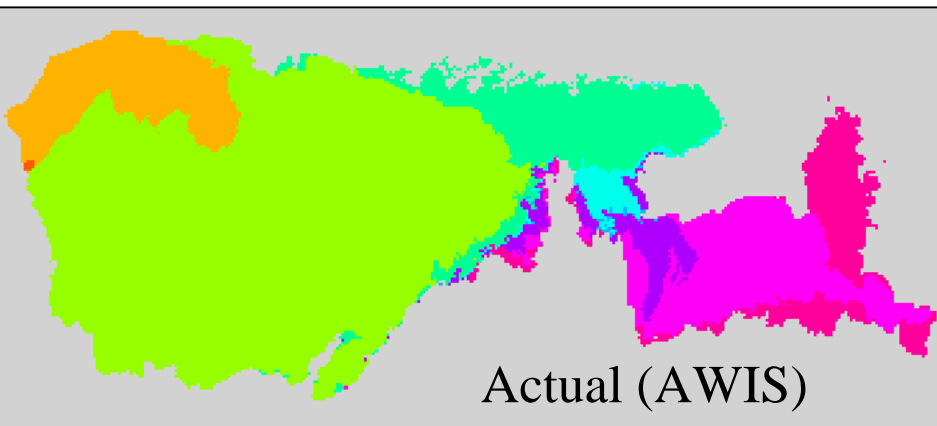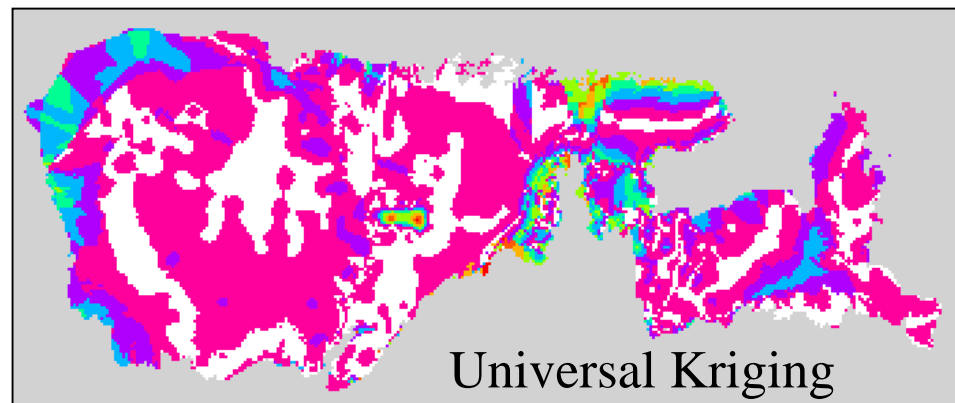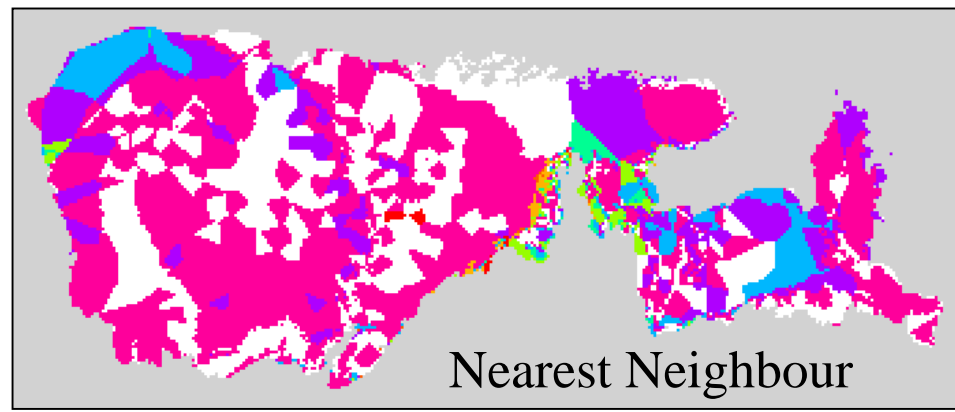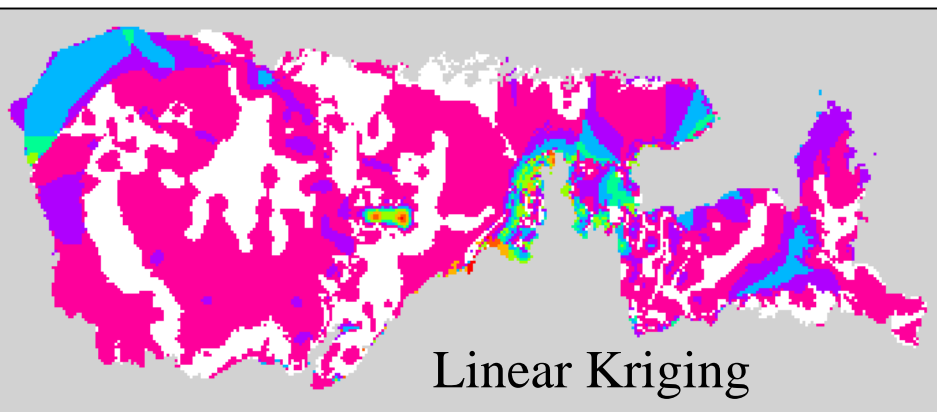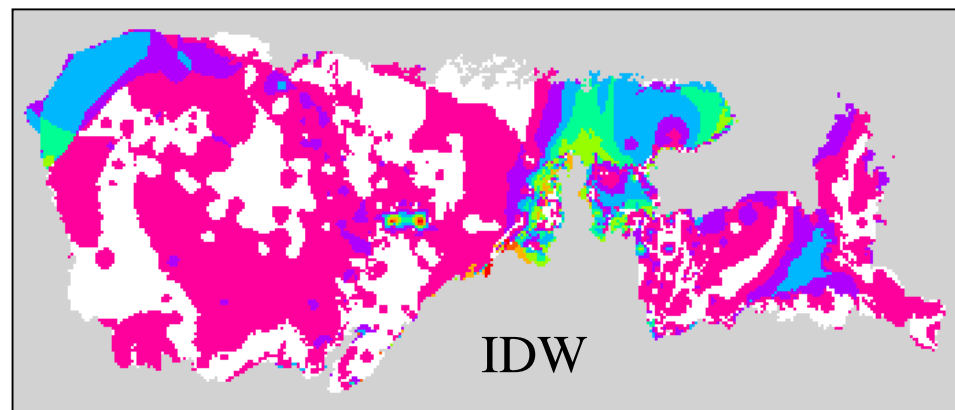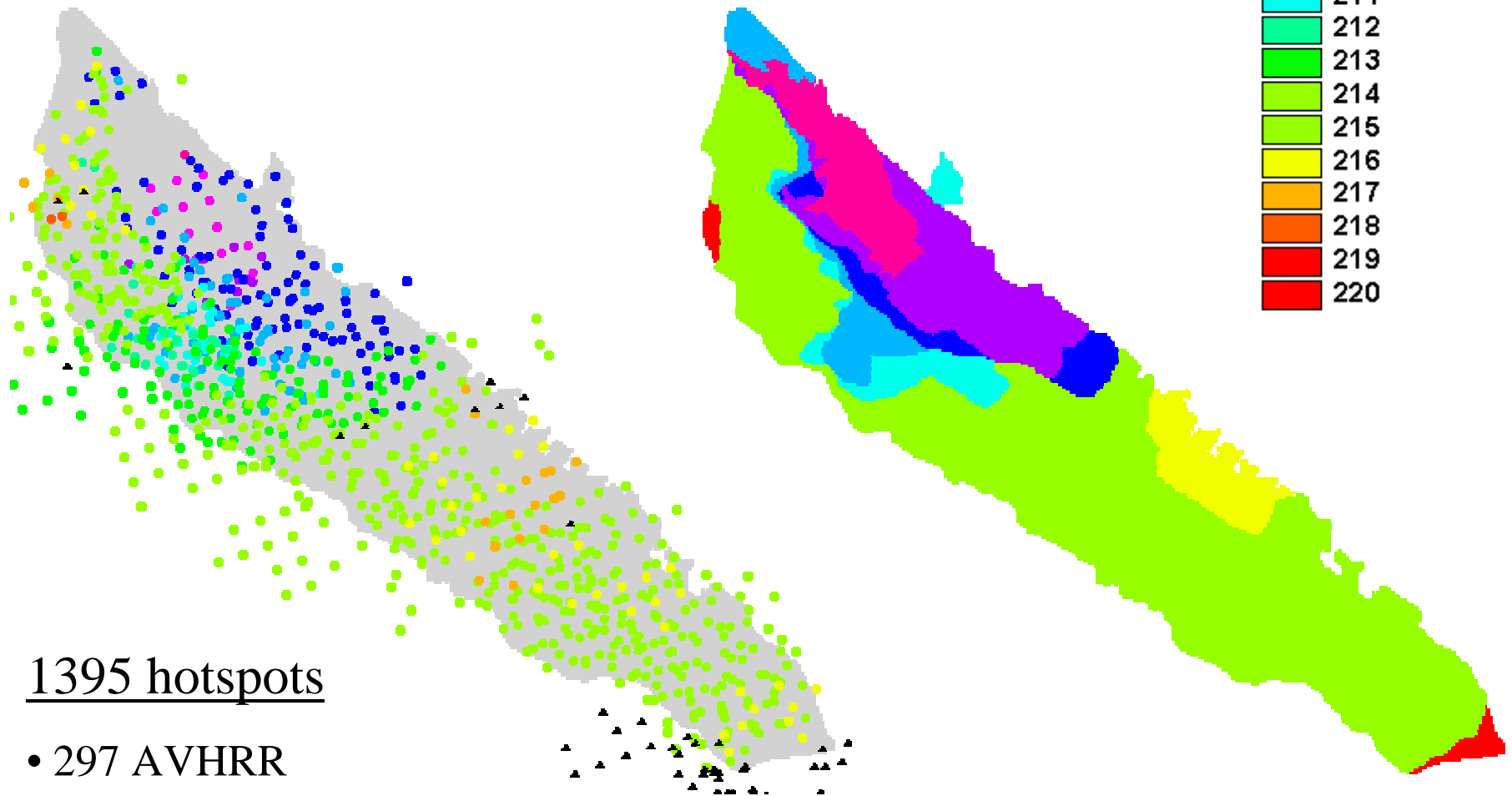
Syncline Ridge

1395 hotspots

- 297 AVHRR

- 1098 MODIS

Burn day anomalies
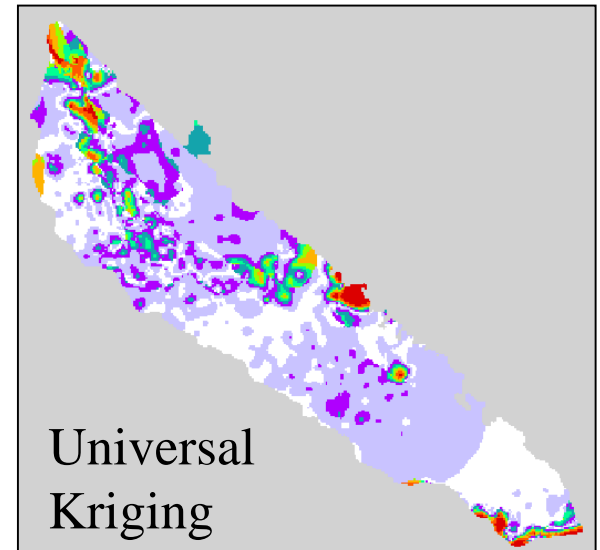
Total Fuel Consumed
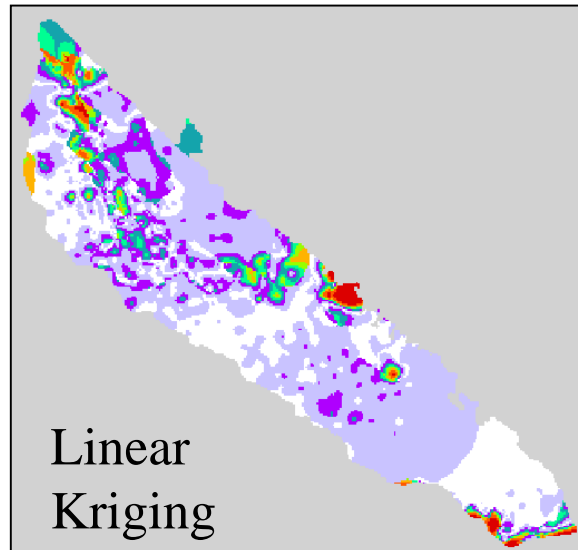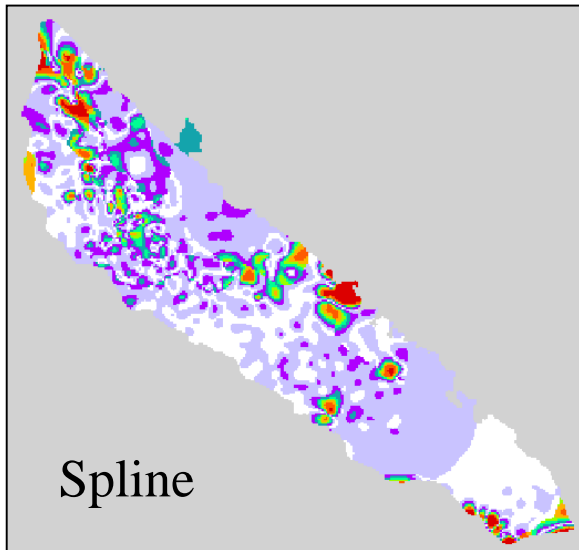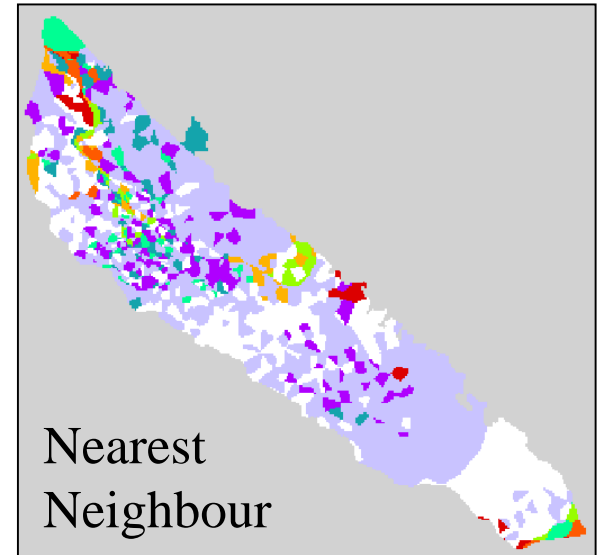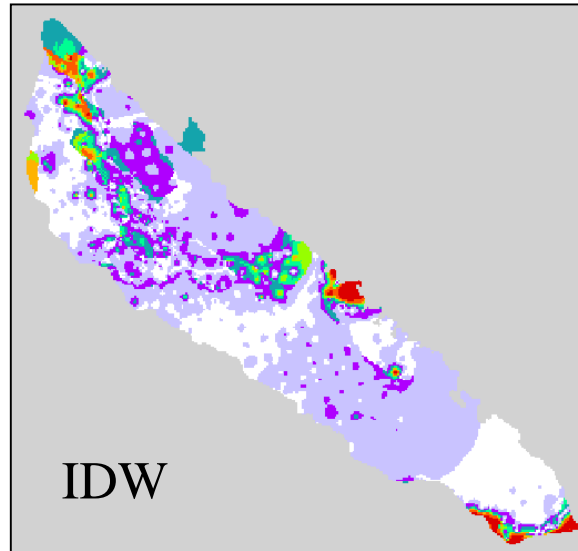
Interpolation method	*Okanagan Mountain*	*Syncline Ridge*
Actual	1195.2 kt	750.2 kt
Nearest neighbour	1196.4	759.5
IDW	1190.8	749.1
Spline	1195.0	745.3
Linear Kriging	1194.0	748.5
Universal Kriging	1195.7	748.3