[Speaker Zoom video]

Wildfires in Asia

Daspletosaurus_Azonto_Moderato

Climatematch Academy

Wildfires

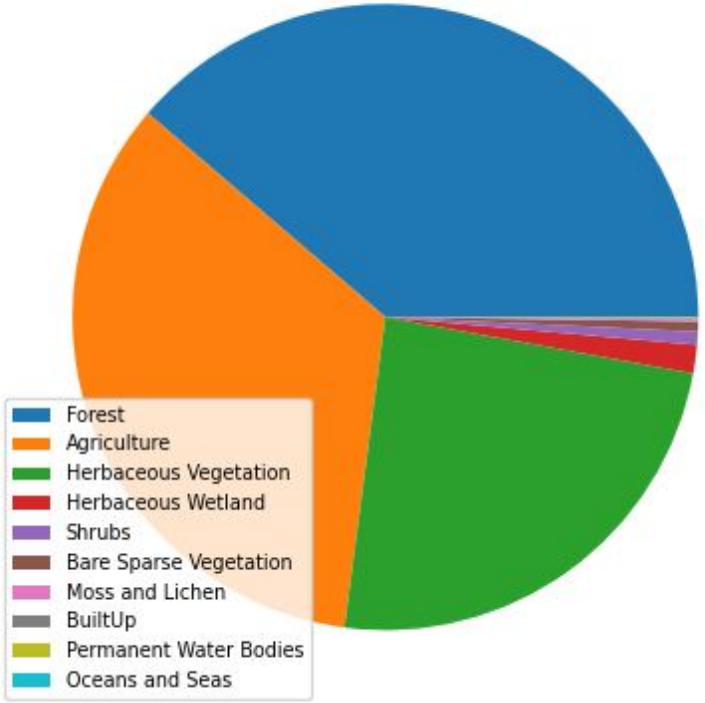
[Speaker Zoom video]

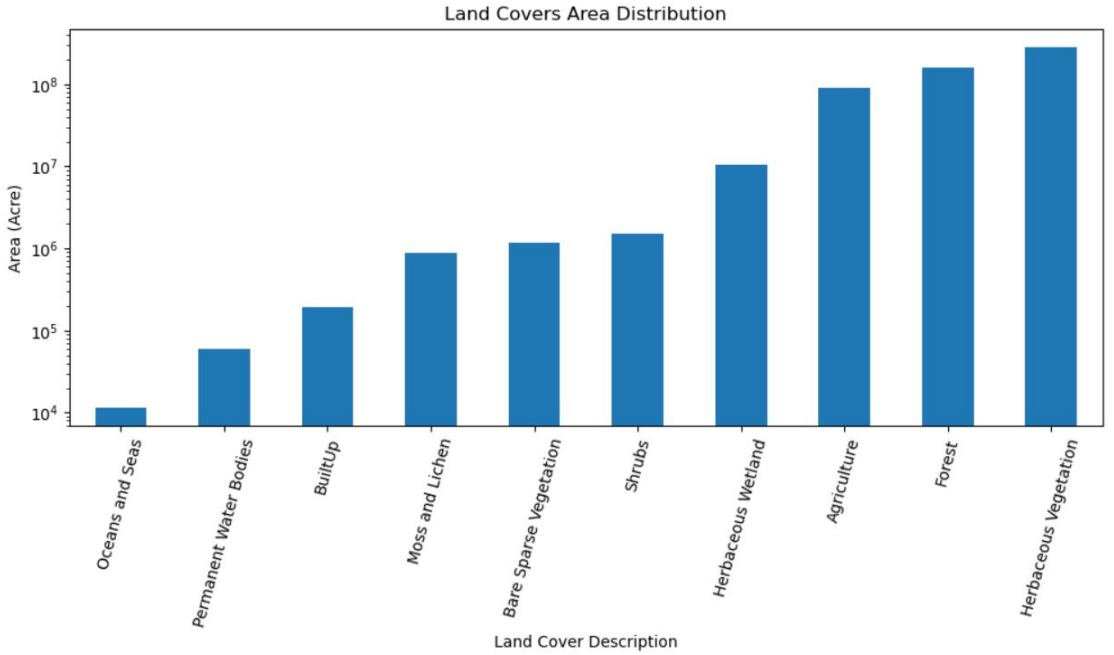
- Negative Impacts
  - Disrupt transportation, communications, power and gas services, and water supply
  - Loss of biodiversity and extinction of plants and animals
  - Destroy valuable timber resources and degradation of catchment areas
  - Impact weather and the climate by releasing large quantities of carbon dioxide, carbon monoxide, and fine particulate matter into the atmosphere
  - Cause a range of health issues, including respiratory and cardiovascular problems
- Positive Impacts
  - Ash from the burnt wood enriches the soil
  - Refreshes the ecosystem

Wildfires in Asia

- Distribution by Land Cover Type

[Speaker Zoom video]

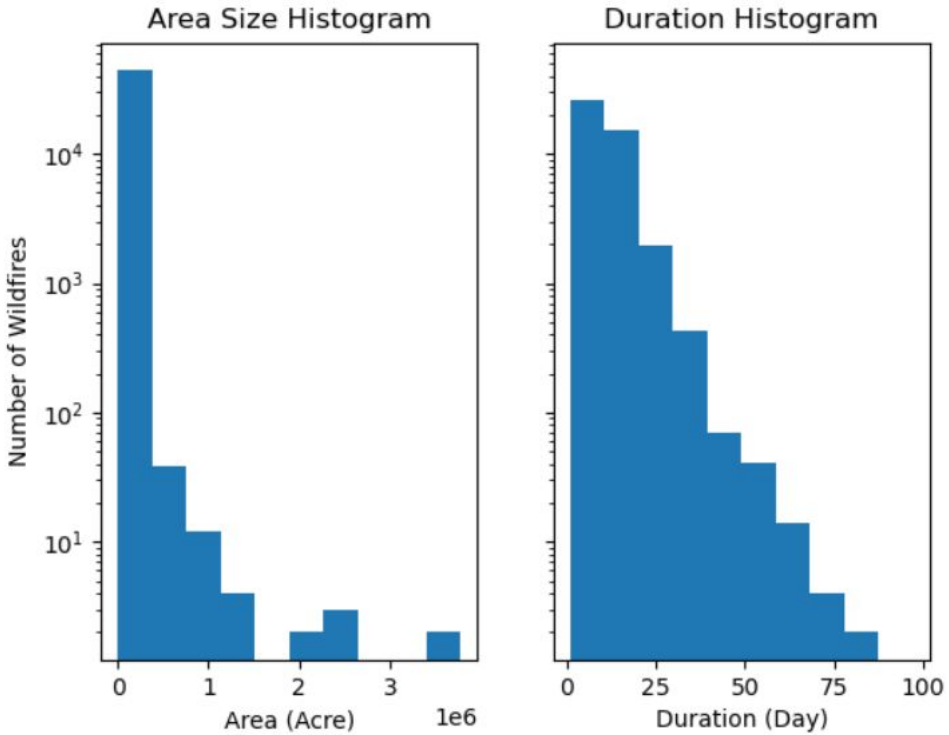




Wildfires in Asia

- Area and duration histograms

[Speaker Zoom video]



Wildfires in Asia

- Wildfires and their correlation with various parameters

	Parameters	No. of Wildfires	Mean Duration	Density of Wildfires	Burned Area	Burned Percentage
0	Population	0.681646	0.125346	-0.026643	0.213795	-0.030285
1	Area	0.705726	0.052733	-0.057312	0.450806	0.141767
2	Pop. Density	-0.046936	0.323068	-0.061209	-0.126028	-0.158410
3	Coastline	-0.211582	0.145785	-0.192776	-0.148099	-0.252007
4	Net Migration	-0.132121	-0.317623	-0.164328	-0.129776	-0.223268
5	Infant Mortality	-0.005532	-0.089039	0.127266	-0.042153	0.100263
6	GDP	-0.192871	-0.077454	-0.259492	-0.078939	-0.232725
7	Literacy	-0.021487	-0.096618	-0.082977	0.117341	0.048172
8	Phones	-0.094242	0.121283	-0.237380	-0.011024	-0.167458
9	Arable	0.280536	0.312799	0.225633	-0.025921	0.077783
12	Birth Rate	-0.168125	-0.161648	-0.013490	-0.145371	-0.078104
13	Death Rate	0.032262	0.075617	0.068033	0.087676	0.138269
14	Agriculture	-0.016965	0.181563	0.293848	-0.109053	0.116488
15	Industry	0.137966	-0.045152	0.046512	0.070190	0.049806
16	Service	-0.121742	-0.106453	-0.291337	0.021858	-0.146560

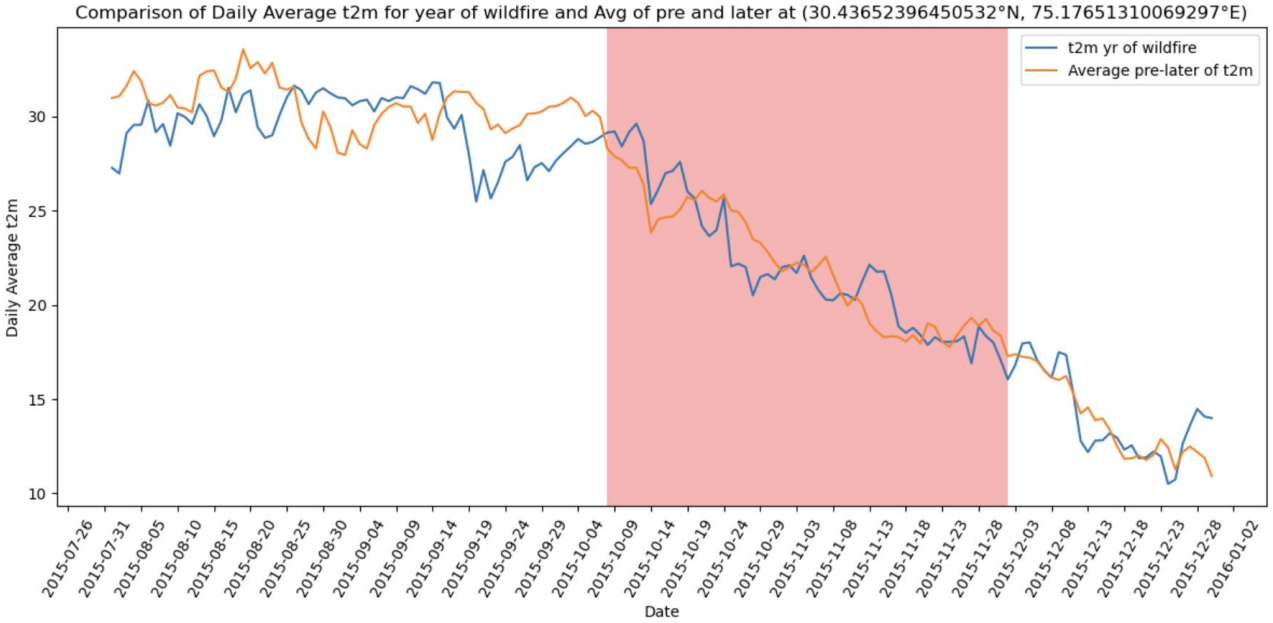
[Speaker Zoom video]

- No. of Wildfires correlates to Area with correlation 0.71
- Mean Duration correlates to Pop. Density with correlation 0.32
- Density of Wildfires correlates to Agriculture with correlation 0.29
- Burned Area correlates to Area with correlation 0.45
- Burned Percentage correlates to Area with correlation 0.14

Wildfire in India and Pakistan

[Speaker Zoom video]

Temperature :

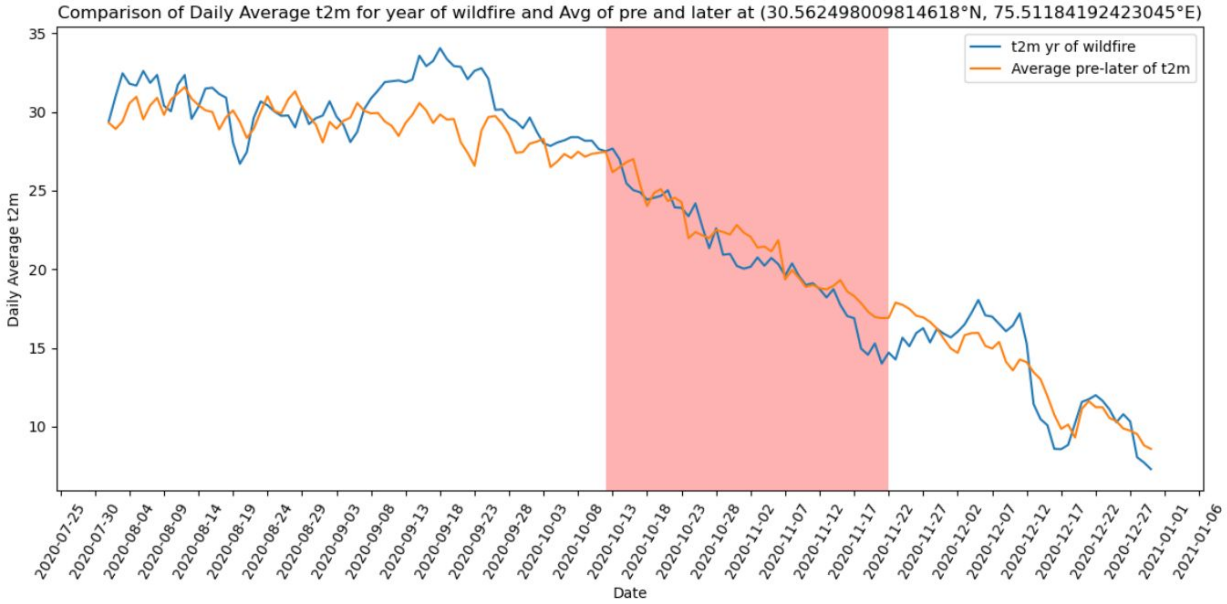


- Occurred in October, 2015
- Agricultural land
- Relatively high temperature when the wildfire starts
- Long duration (almost 2 months)
- Similar pattern compared to the average of the previous and following year

Wildfire in India

[Speaker Zoom video]

Temperature :

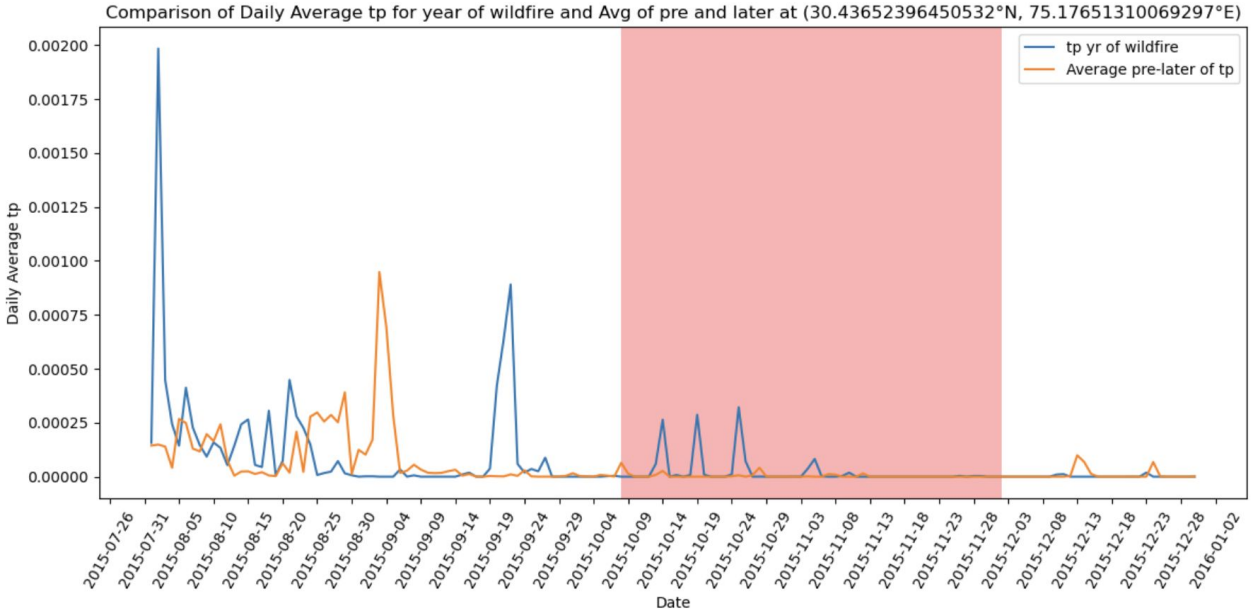


- Occurred in October, 2020
- Agricultural land
- Relatively high temperature before the wildfire starts
- Long duration (almost 1.5 months)
- Similar pattern compared to the average of the previous and following year

Wildfire in India and Pakistan

[Speaker Zoom video]

Precipitation :



- Occurred in October, 2015
- Agricultural land
- Low Precipitation a few days before.
- Pyrocumolonimbus clouds
- Precipitation during the wildfire

Wildfire in India

[Speaker Zoom video]

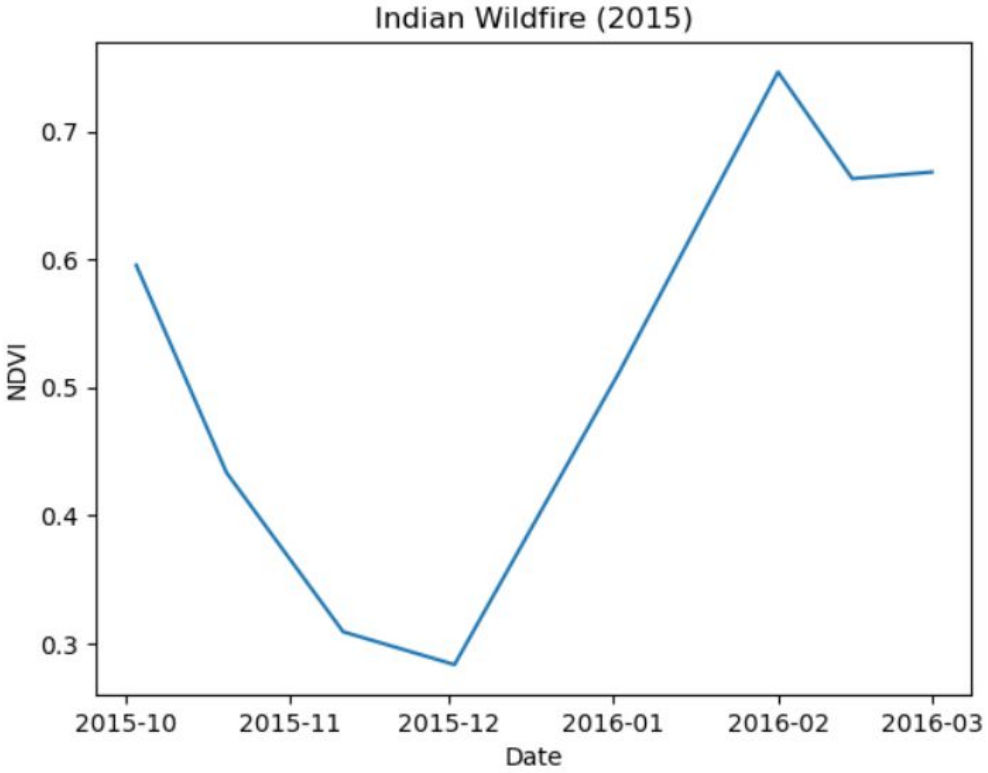
Precipitation :

- Occurred in October, 2020
- Agricultural land
- Low Precipitation a few days before (similar trend)
- Pyrocumolonimbus clouds
- Similar patterns of precipitation during the wildfire.

Wildfire in India and Pakistan

[Speaker Zoom video]

NDVI (Normalized Difference Vegetation Index) :

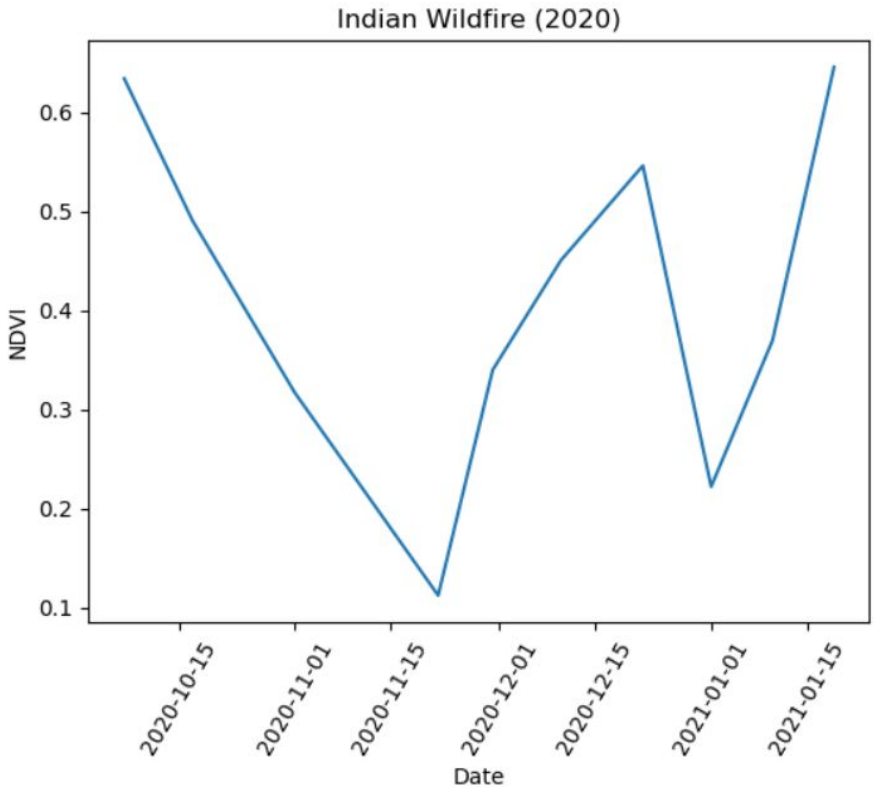


- Wildfire Starting Date: 2015-10-08
- Wildfire Ending Date: 2015-12-02
- NDVI is a value between -1 and +1
- Negative values indicate water or clouds
- Higher positive values indicate denser vegetation
- NDVI decreases with wildfire and starts increasing when it ends

Wildfire in India

[Speaker Zoom video]

NDVI (Normalized Difference Vegetation Index) :

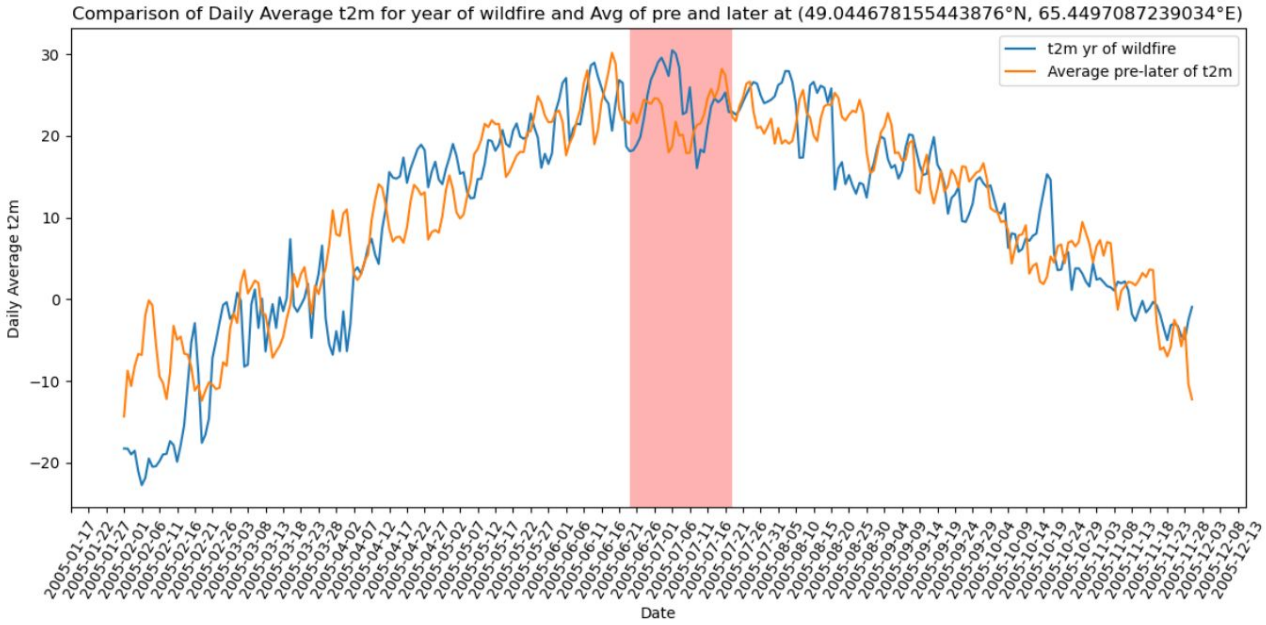


- Wildfire Starting Date: 2020-10-12
- Wildfire Ending Date: 2020-11-22
- NDVI decreases with wildfire and starts increasing when it ends
- Takes almost 2 months to reach 0.6 again

Wildfires in Kazakhstan

[Speaker Zoom video]

Temperature :

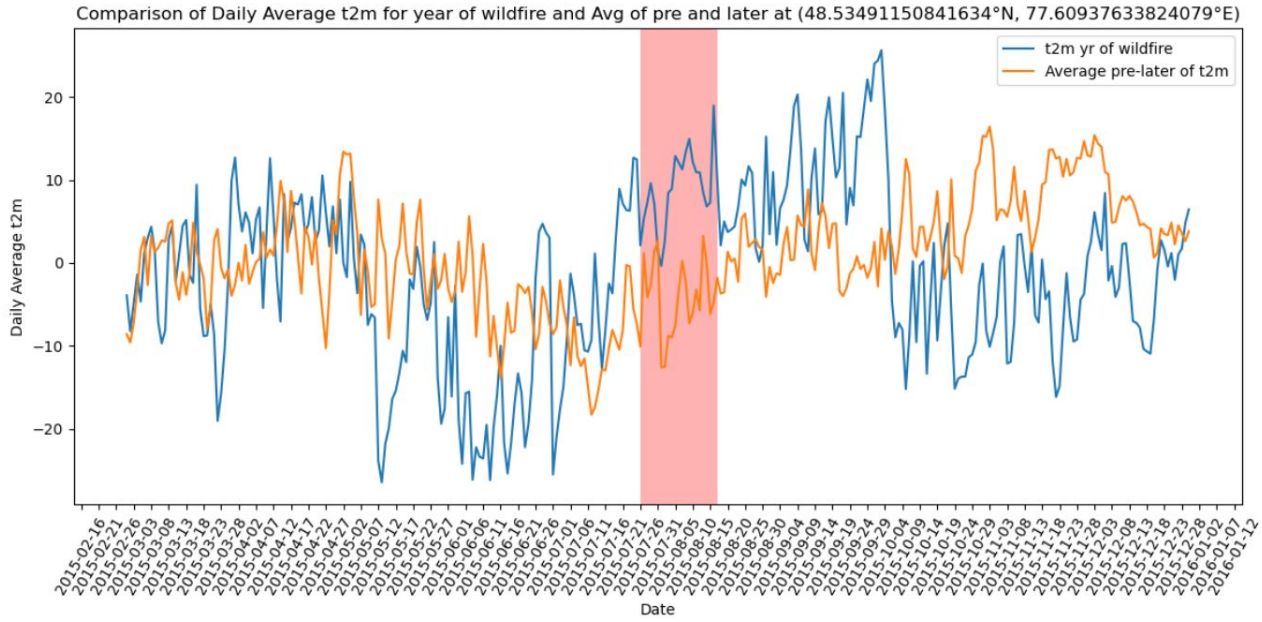


- Occurred in June, 2005
- Herbaceous Vegetation
- The temperature is at peak when the wildfire starts
- Long duration (almost 1 month)
- Higher daily temperature during the wildfire compared to the average temperature of the area

Wildfires in Kazakhstan

[Speaker Zoom video]

Temperature :

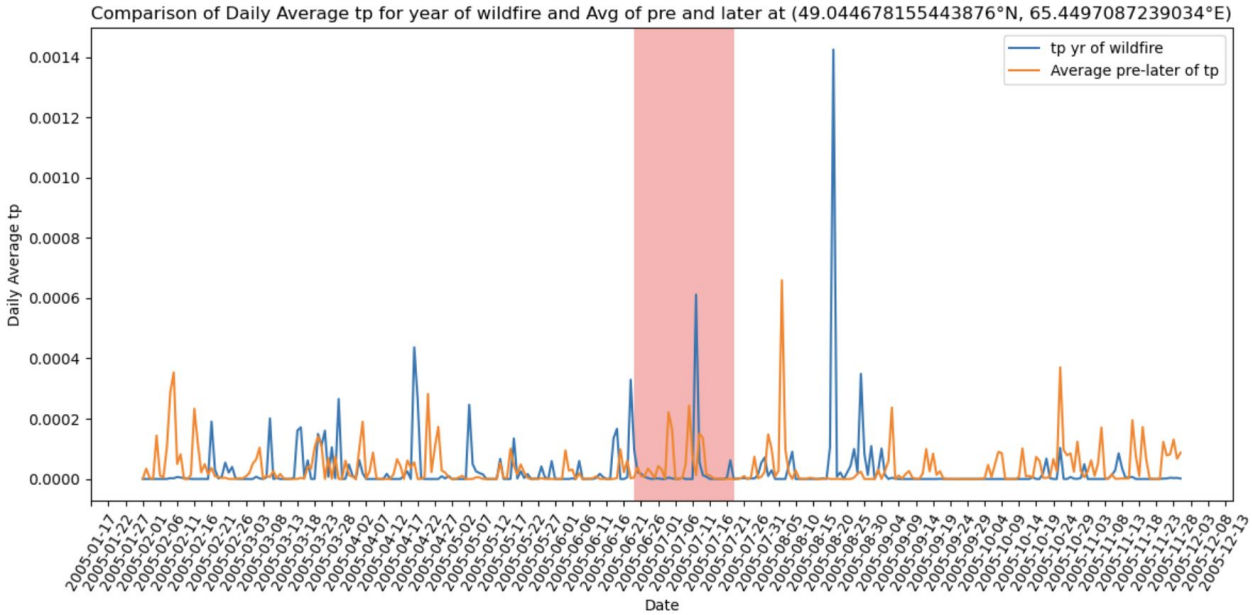


- Occurred in July, 2015
- Herbaceous Vegetation
- Long duration (Less than 1 month)
- Significantly higher daily temperature during and a while after the wildfire compared to the average temperature of the area

Wildfires in Kazakhstan

[Speaker Zoom video]

Precipitation :

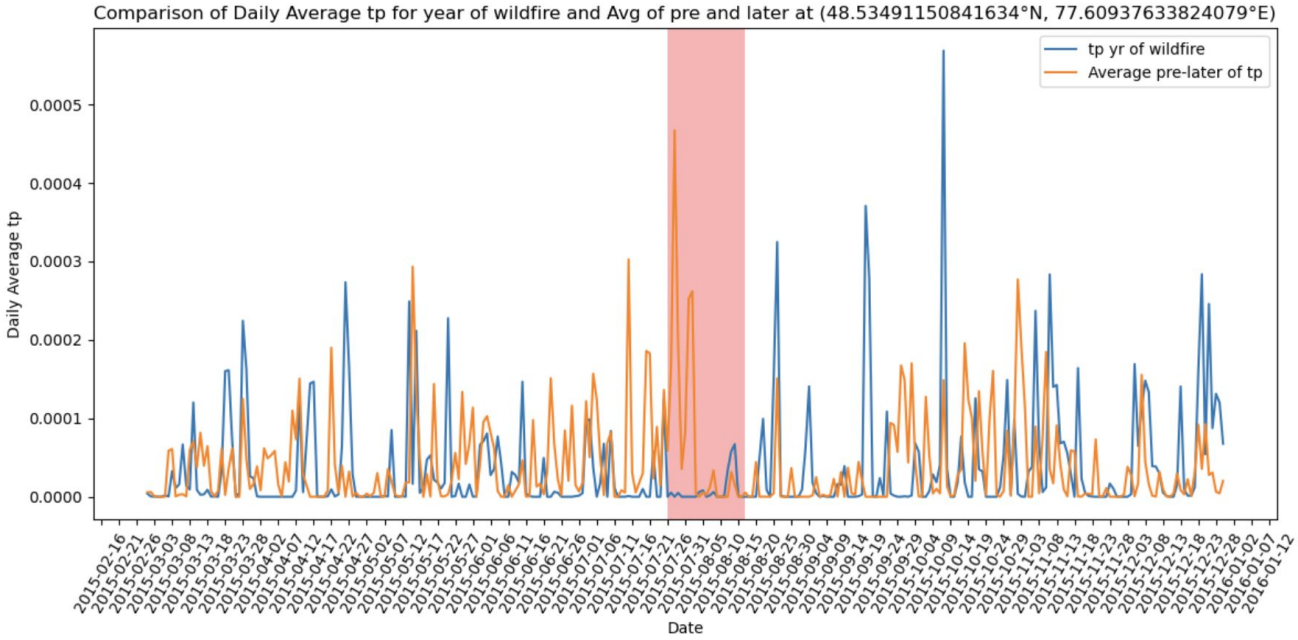


- Occurred in June, 2005
- Herbaceous Vegetation
- No such drop in precipitation before the fire.
- Chances of wildfire caused pyrocumolonimbus clouds and eventual rain.

Wildfires in Kazakhstan

[Speaker Zoom video]

Precipitation :

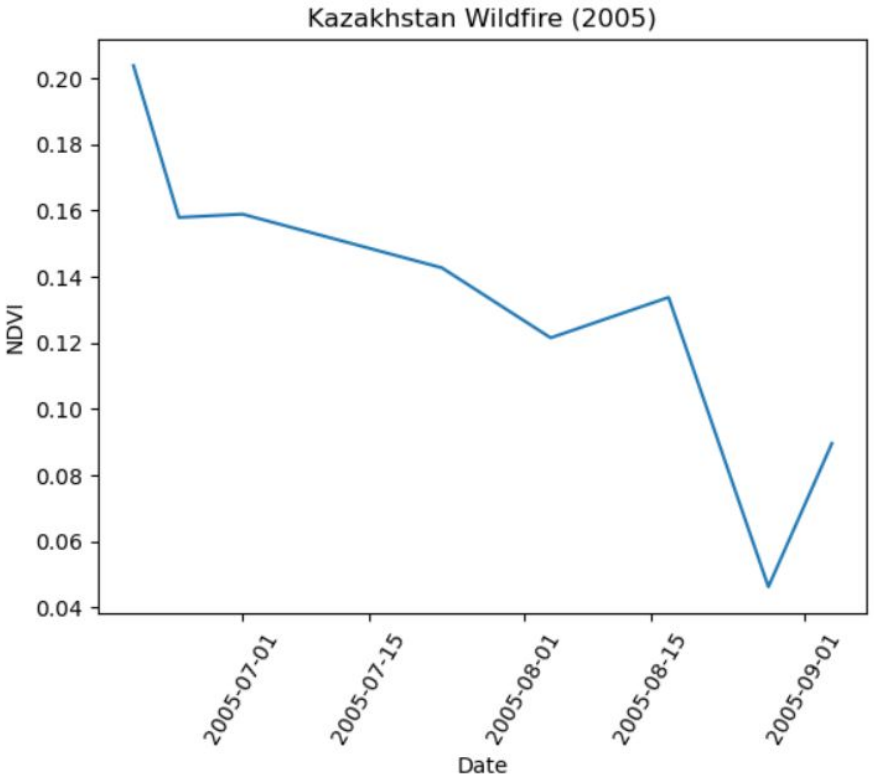


- Occurred in July, 2015
- Herbaceous Vegetation
- Drop in precipitation in the days before as compared to the general condition.
- Little to no rainfall during the wildfire.

Wildfires in Kazakhstan

[Speaker Zoom video]

NDVI (Normalized Difference Vegetation Index) :

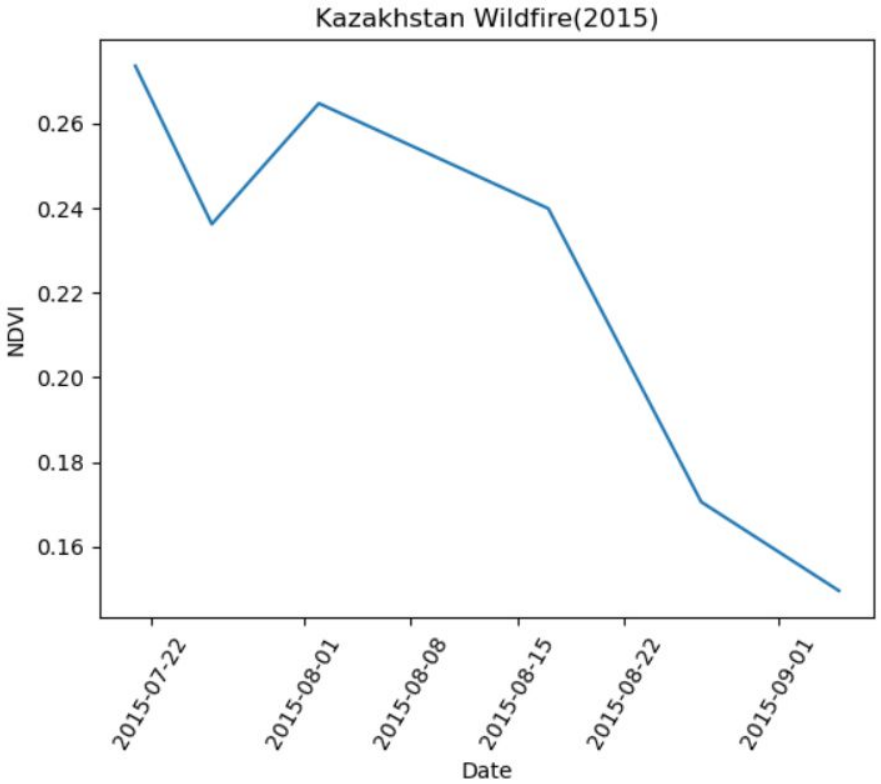


- NDVI decreases with wildfire but the recovery starts much later because it is fall.

Wildfires in Kazakhstan

[Speaker Zoom video]

NDVI (Normalized Difference Vegetation Index) :

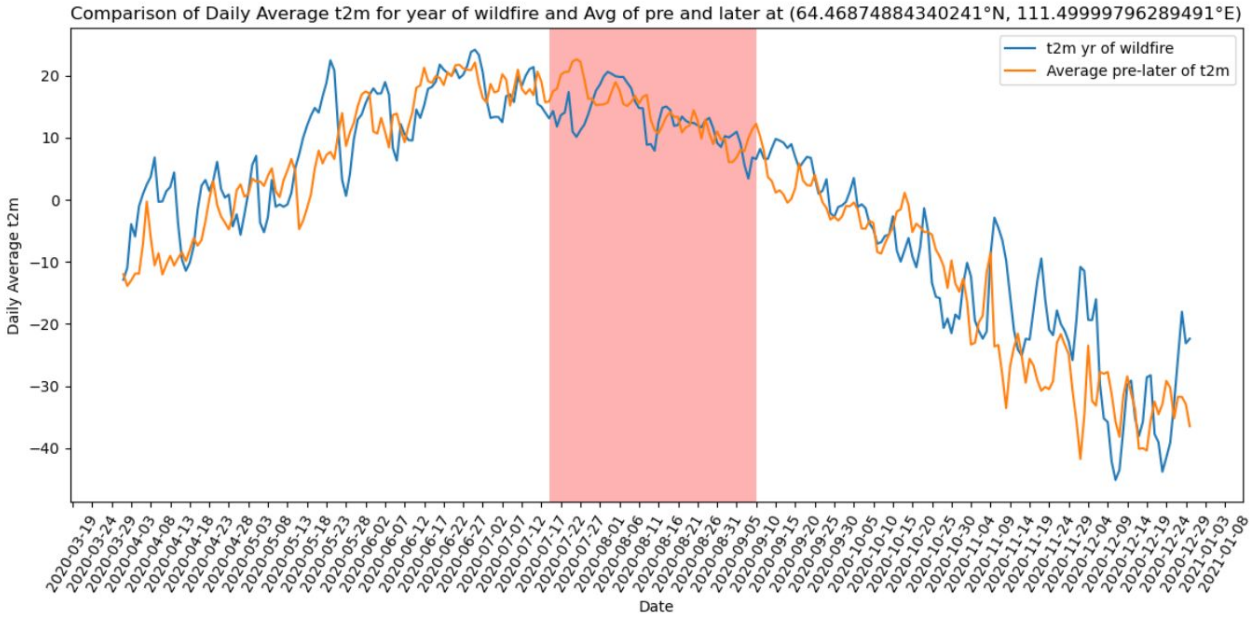


- More vegetation compared to the previous wildfire
- NDVI decreases with wildfire but the recovery starts much later because it is fall.

Wildfire in Russia

[Speaker Zoom video]

Temperature :

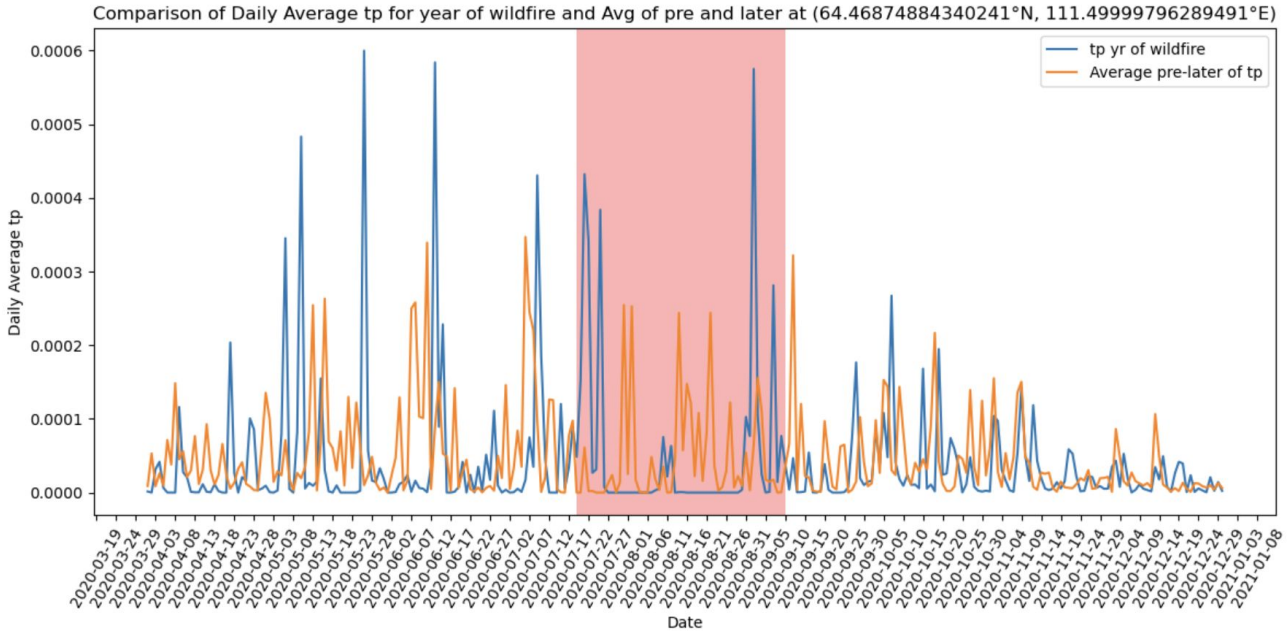


- Occurred in July, 2020
- Forest
- Temperature is at peak when the wildfire starts
- Temperature varies in range of -50 to +20 degrees celsius
- Long duration (almost 2 month)
- Similar pattern to the average temperature of the area

Wildfire in Russia

[Speaker Zoom video]

Precipitation :

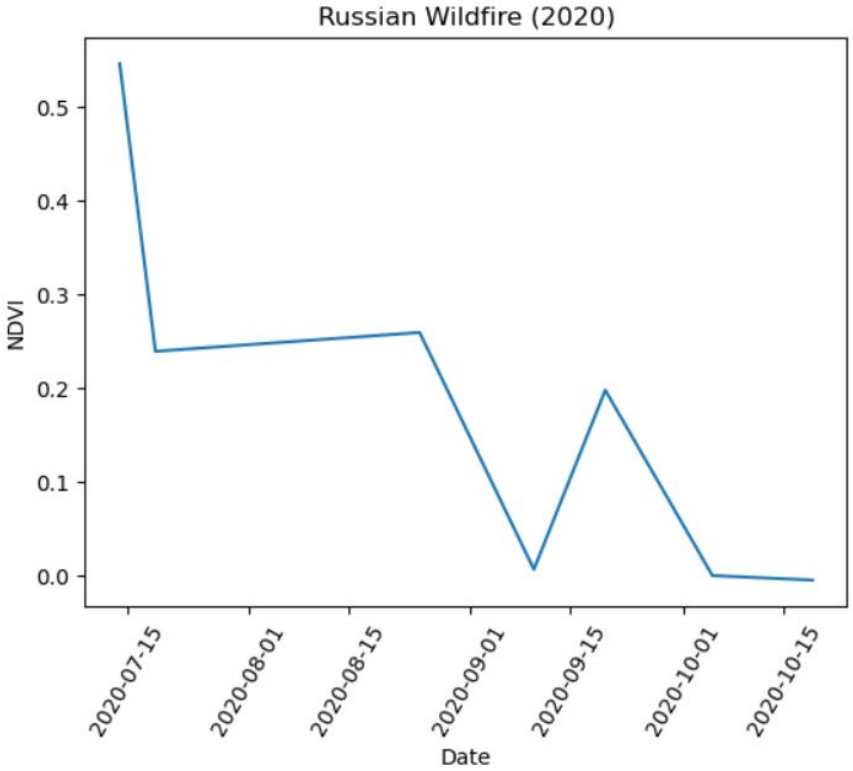


- Occurred in July, 2020
- Forest
- Rainfall during the start and end of the wildfire.
- Very little rainfall during the middle period of the wildfire.
- A small peak in the middle could suggest pyrocumolonimbus clouds formation.

Wildfire in Russia

[Speaker Zoom video]

NDVI (Normalized Difference Vegetation Index) :

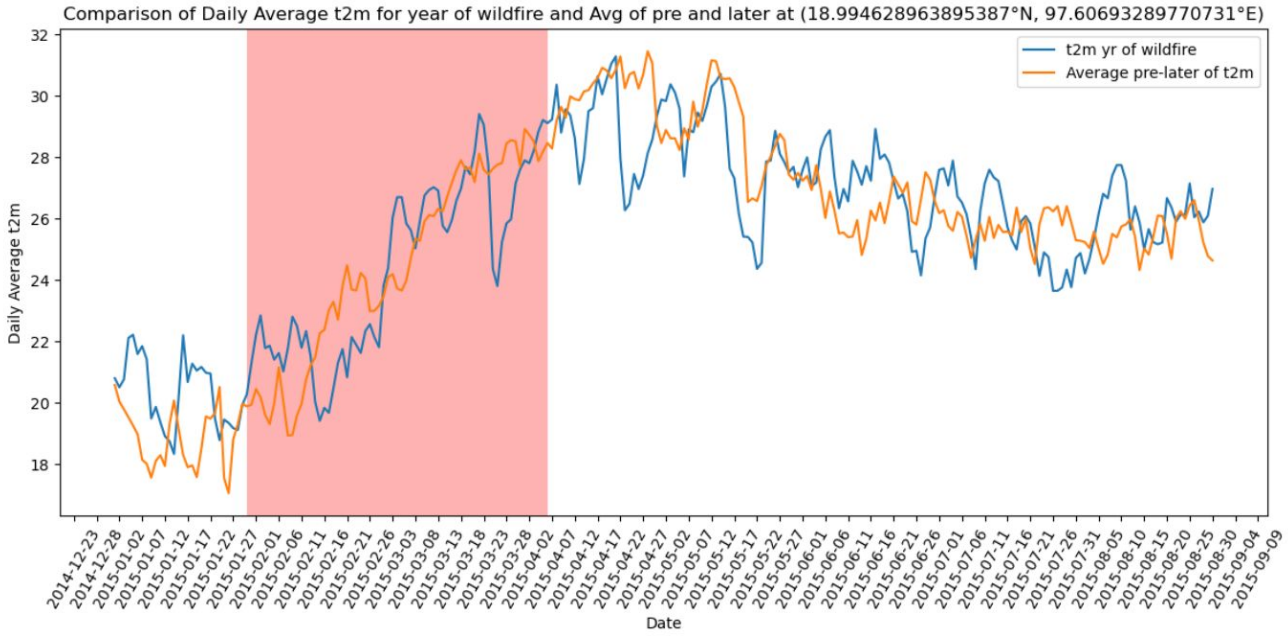


- NDVI decreases with wildfire
- Since there are trees in forests, it takes longer for the area to recover

Wildfire in Thailand and Myanmar

[Speaker Zoom video]

Temperature :

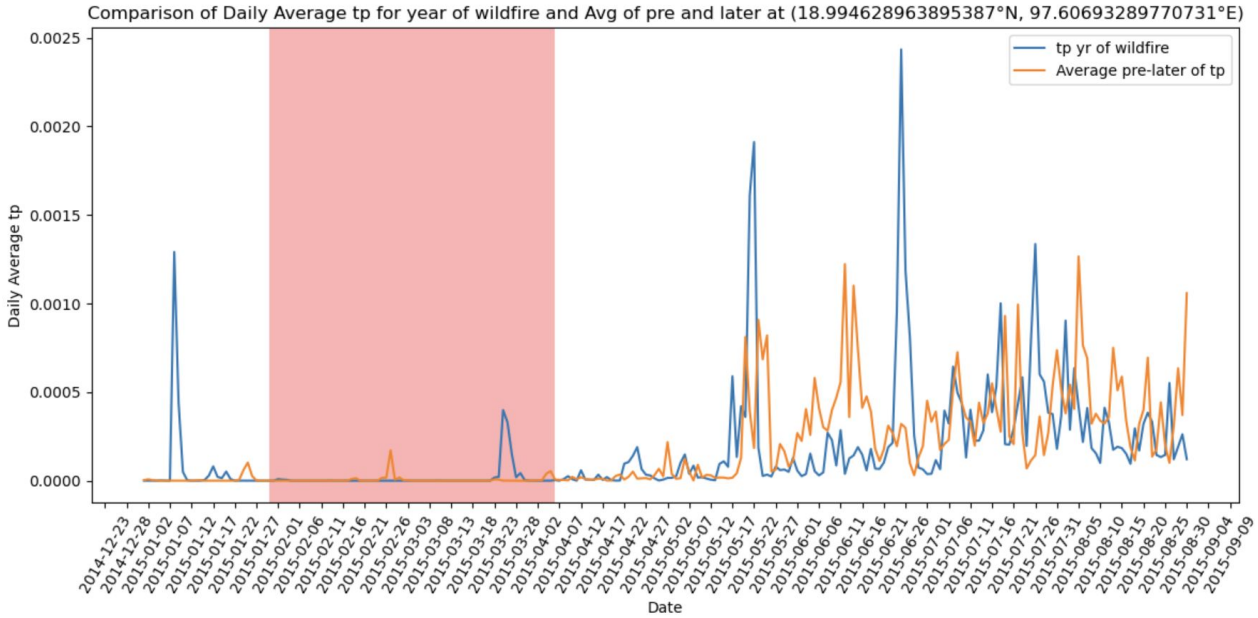


- Occurred in February, 2015
- Forest
- Long duration (almost 2 month)
- Temperature is significantly higher than the average a while before the wildfire starts

Wildfire in Thailand and Myanmar

[Speaker Zoom video]

Precipitation:

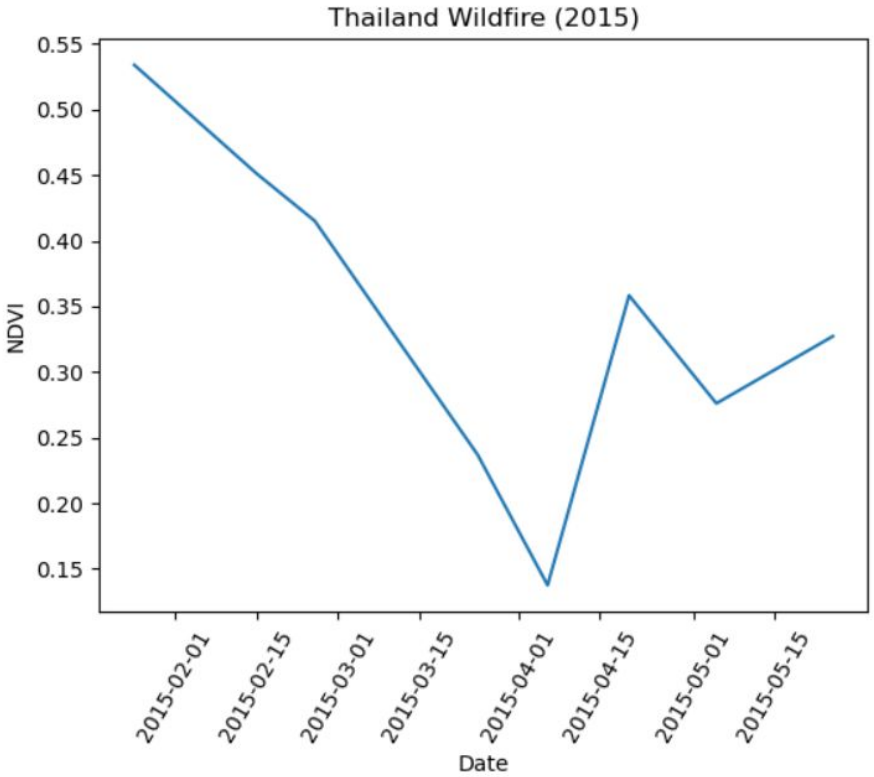


- Occurred in February, 2015
- Forest
- Little rainfall in the days building to the wildfire.
- No rainfall during the wildfire except for a sudden peak in rainfall which is different from the general condition.

Wildfire in Thailand and Myanmar

[Speaker Zoom video]

NDVI (Normalized Difference Vegetation Index) :



- NDVI decreases with wildfire and starts increasing after the end of it
- Since there are trees in forests, it takes longer for the area to recover

Appendix

[Speaker Zoom video]

Data Sources:

- “ERA5 Reanalysis Data” for Temperature, Precipitation, and other Climate Variables
- “NOAA NDVI CDR Data” from AWS for NDVI
- “Global Wildfire Information Systems: Climate Action Large Wildfire Dataset” for Wildfires

Appendix

Landcover	IDate	LC_descrip	Id	Area_Acres	FDate	CONTINENT	name	region	minLon	maxLon	minLat	maxLat	Country_Ar	Duration
40	2015-10-08 00:00:00	Agriculture	18171818	3.775245e+06	2015-12-02 00:00:00	Asia	Pakistan	Southern Asia	73.891113	76.461914	29.408204	31.464844	1.986576e+08	55
40	2015-10-08 00:00:00	Agriculture	18171818	3.775245e+06	2015-12-02 00:00:00	Asia	India	Southern Asia	73.891113	76.461914	29.408204	31.464844	8.123799e+08	55
40	2020-10-12 00:00:00	Agriculture	23935183	2.392731e+06	2020-11-22 00:00:00	Asia	India	Southern Asia	74.511842	76.511842	29.999998	31.124998	8.123799e+08	41
112	2015-01-30 00:00:00	Forest	17243512	7.579189e+05	2015-04-06 00:00:00	Asia	Myanmar	South-Eastern Asia	97.193848	98.020017	18.256349	19.732909	6.455074e+07	66
112	2015-01-30 00:00:00	Forest	17243512	7.579189e+05	2015-04-06 00:00:00	Asia	Thailand	South-Eastern Asia	97.193848	98.020017	18.256349	19.732909	1.270120e+08	66
113	2020-07-19 00:00:00	Forest	23565076	6.827065e+05	2020-09-10 00:00:00	Asia	Russian Federation	Eastern Europe	110.449998	112.549998	64.124999	64.812499	4.219367e+09	53
30	2005-06-24 00:00:00	Herbaceous Vegetation	5432001	2.638234e+06	2005-07-23 00:00:00	Asia	Kazakhstan	Central Asia	64.223634	66.675783	48.273439	49.815918	6.714584e+08	29
30	2015-07-26 00:00:00	Herbaceous Vegetation	17781659	1.935741e+06	2015-08-17 00:00:00	Asia	Kazakhstan	Central Asia	76.295411	78.923342	47.930663	49.139160	6.714584e+08	22

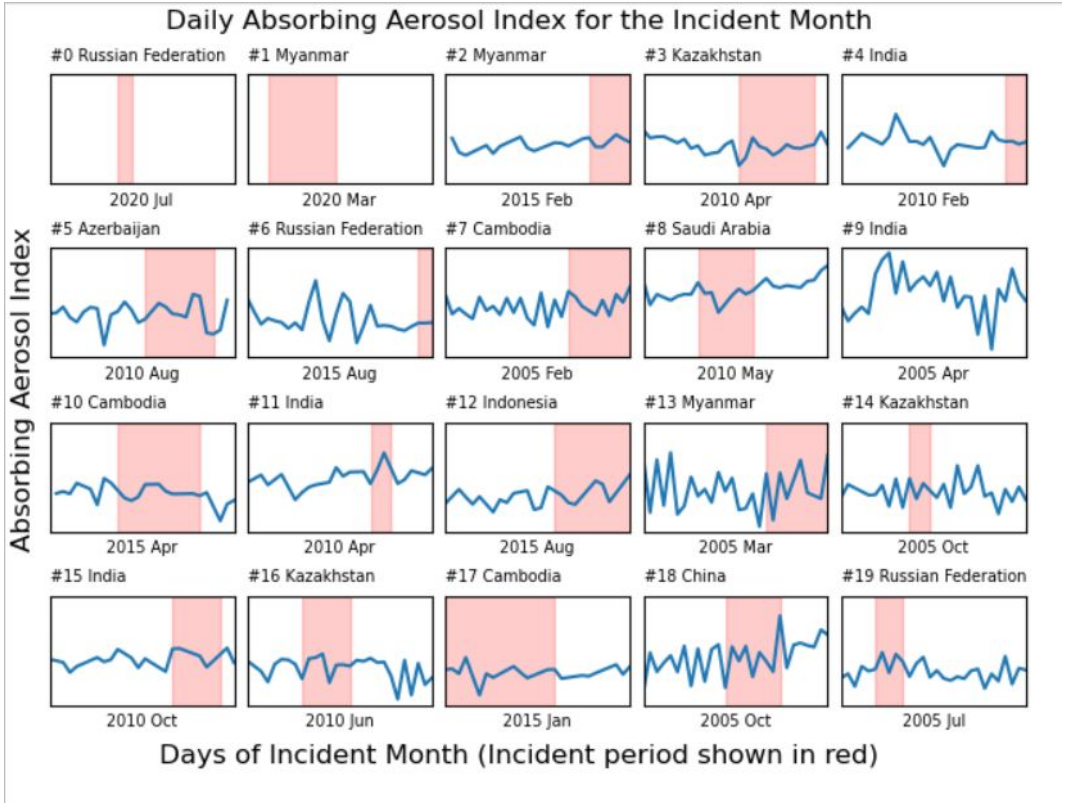
[Speaker Zoom video]

Wildfires' Data

Appendix

[Speaker Zoom video]

The absorbing aerosol index (AAI) for 20 random wildfires



Thank You

[Speaker Zoom video]