



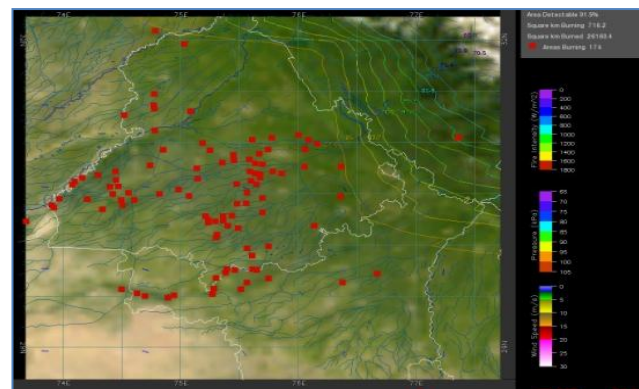
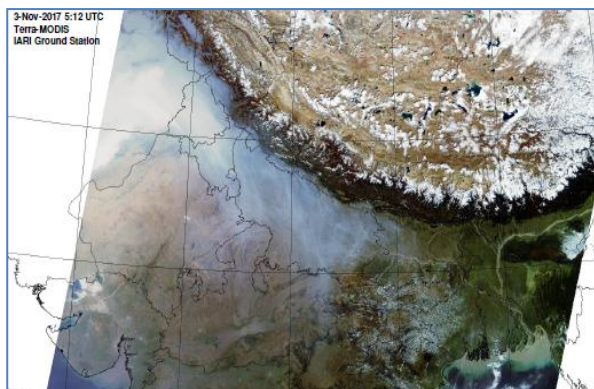
**Bulletin
No. 33**

**Events Date:
02-Nov-2019**

**Issued on:
03-Nov-2019**



MONITORING PADDY RESIDUE BURNING IN NORTH INDIA USING SATELLITE REMOTE SENSING DURING 2019



Prepared by:

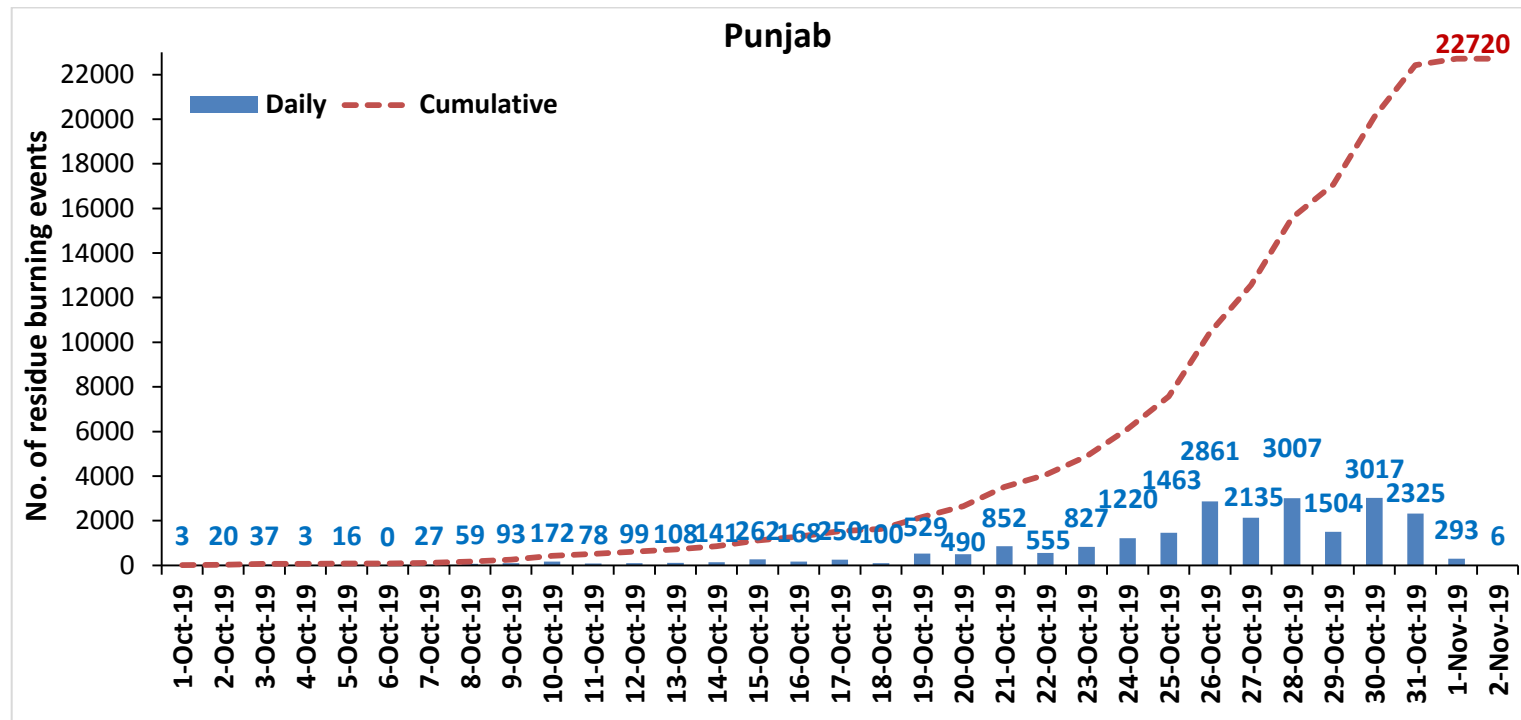
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

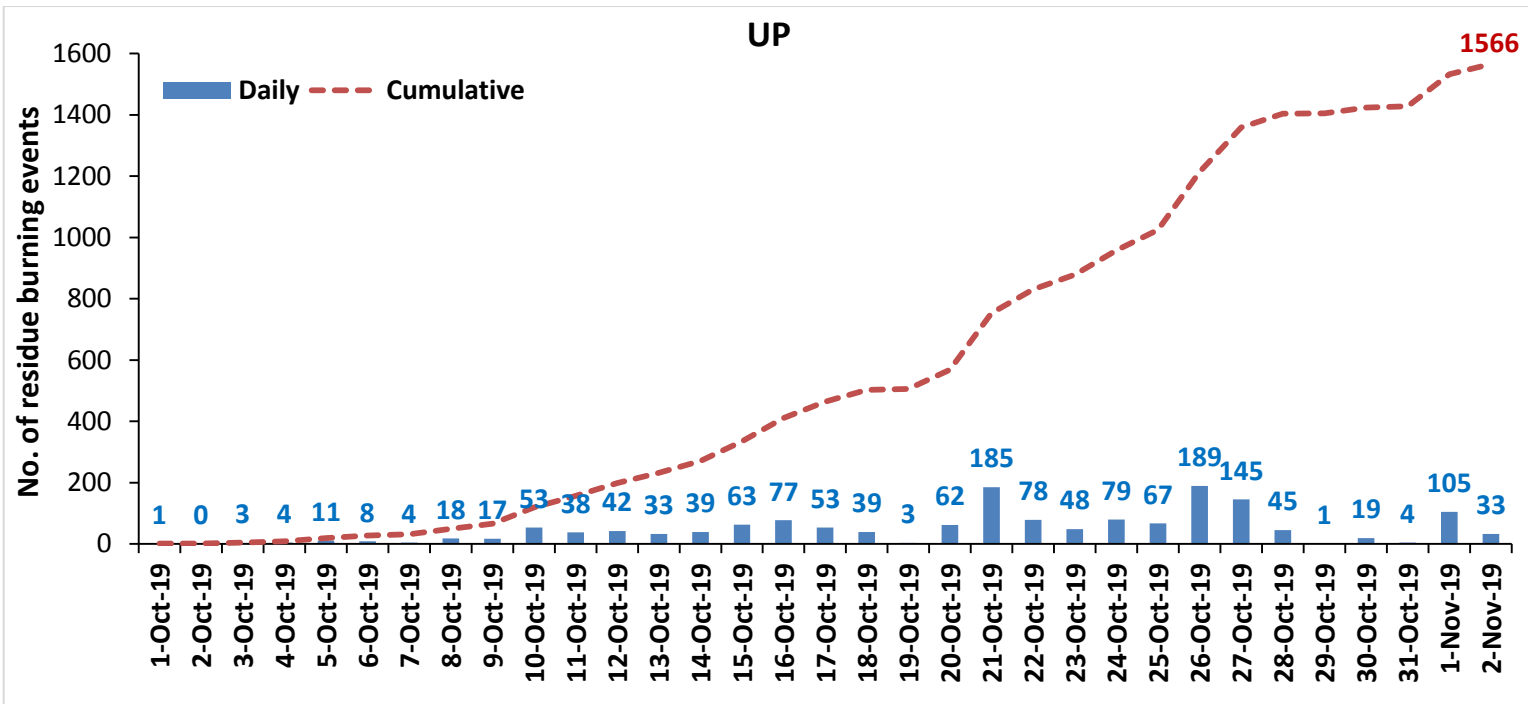
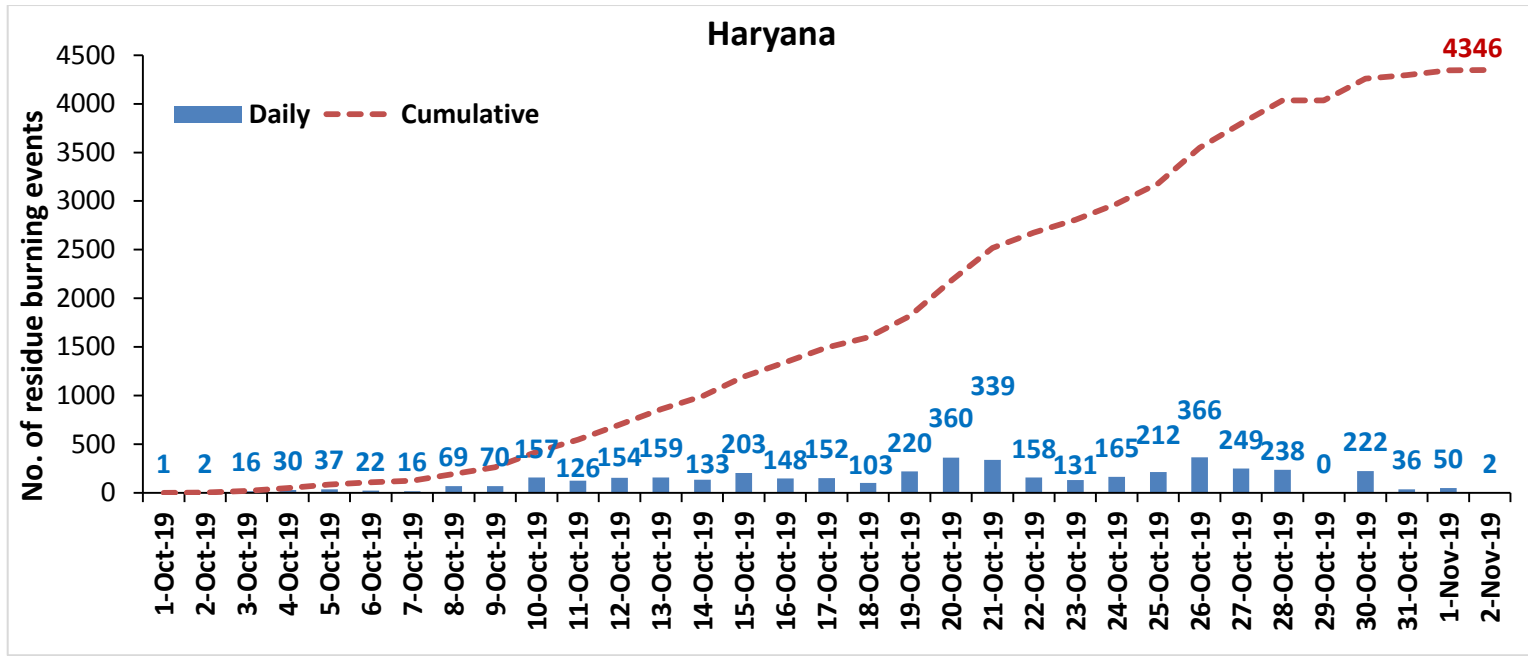
<http://creams.iari.res.in>

Highlights for 02-November-2019

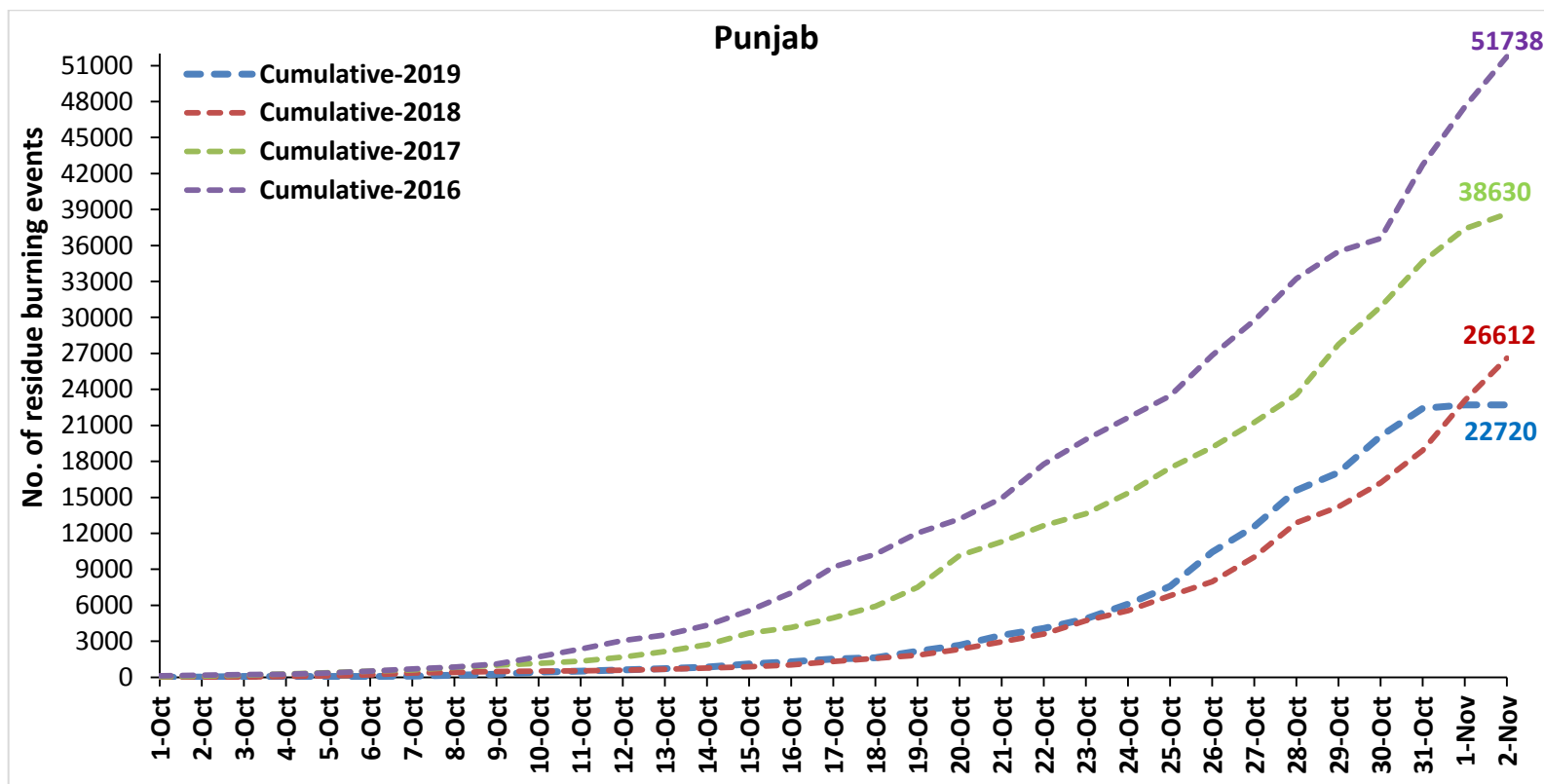
- Satellites detected **41** residue burning events in the three study States on 02-Nov-2019.
- The burning events detected on **02-Nov-2019** are **06, 02** and **33** in Punjab, Haryana and UP, respectively.
- The states of Punjab, Haryana and UP were mostly covered with clouds which prevented fire event detection by satellites.
- The number of events has decreased from **448** on **01-Nov-2019** to **41** on **02-Nov-2019** in the three states.
- Total **28632** burning events were detected in the three States between **01-Oct-2019** and **02-Nov-2019**, which are distributed as **22720, 4346** and **1566** in Punjab, Haryana and UP, respectively.
- Overall, the total burning events recorded in the three states are **16.6%** less than in 2018 till date. UP recorded **46.9%** reduction, Haryana recorded **9.4%** reduction, and Punjab recorded **14.6%** reduction, in the current season than in 2018.

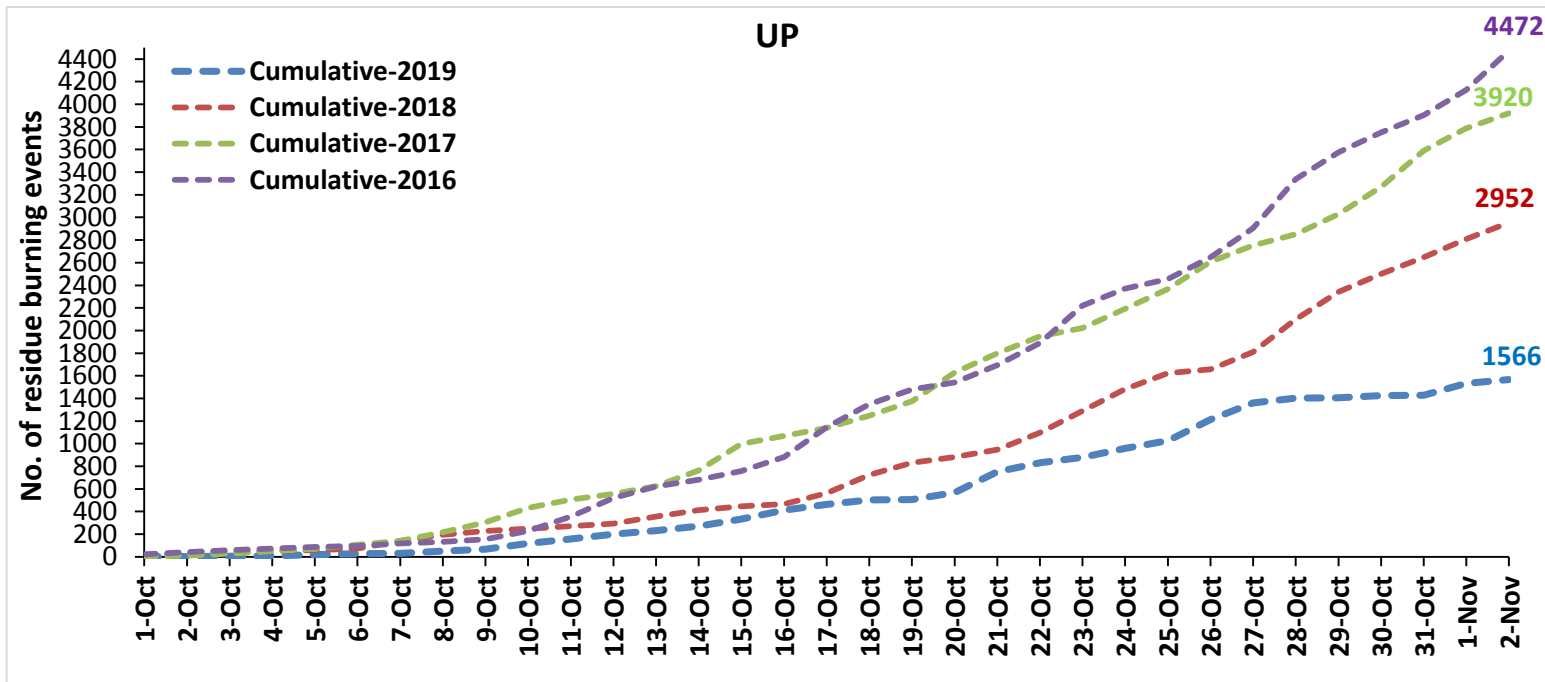
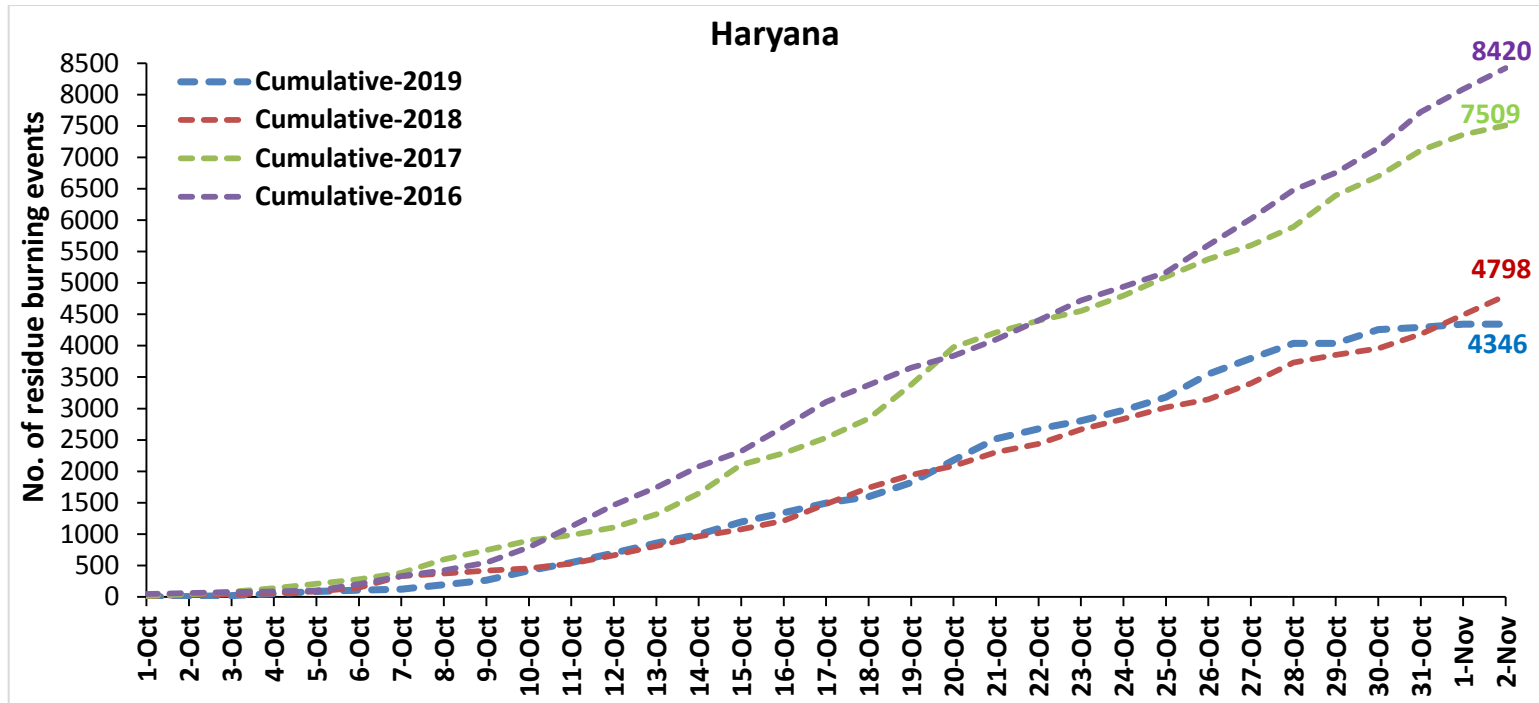
Temporal distribution of residue burning events for the three study States in 2019



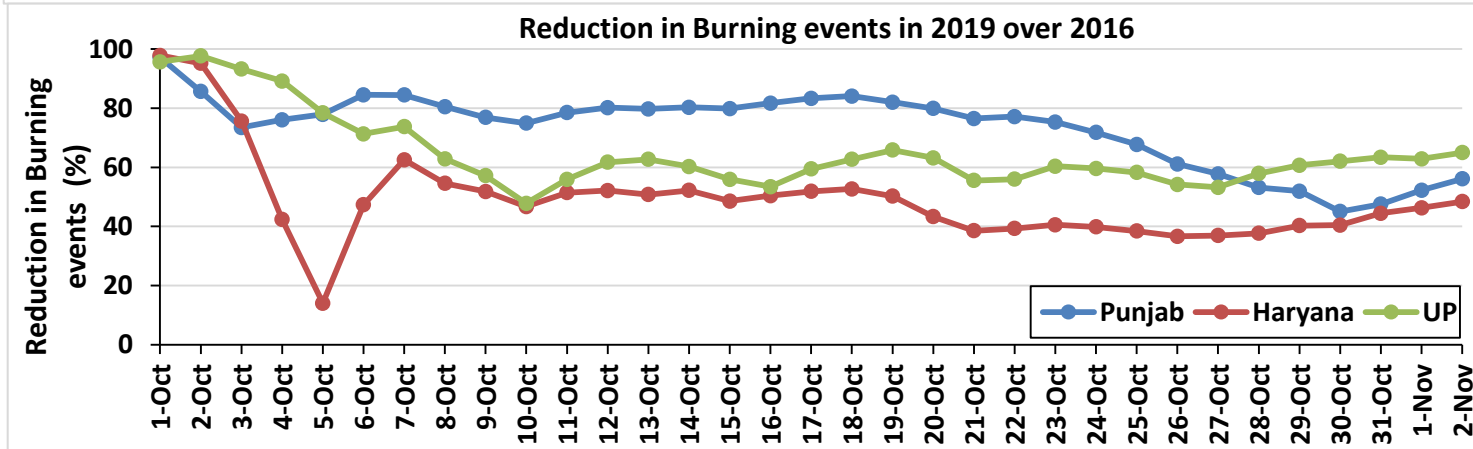
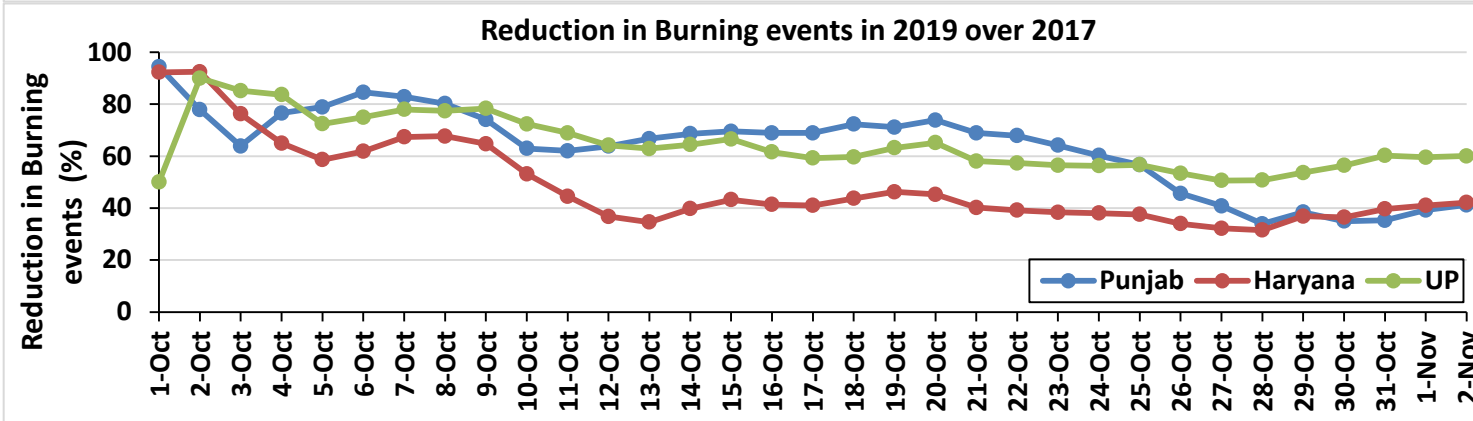
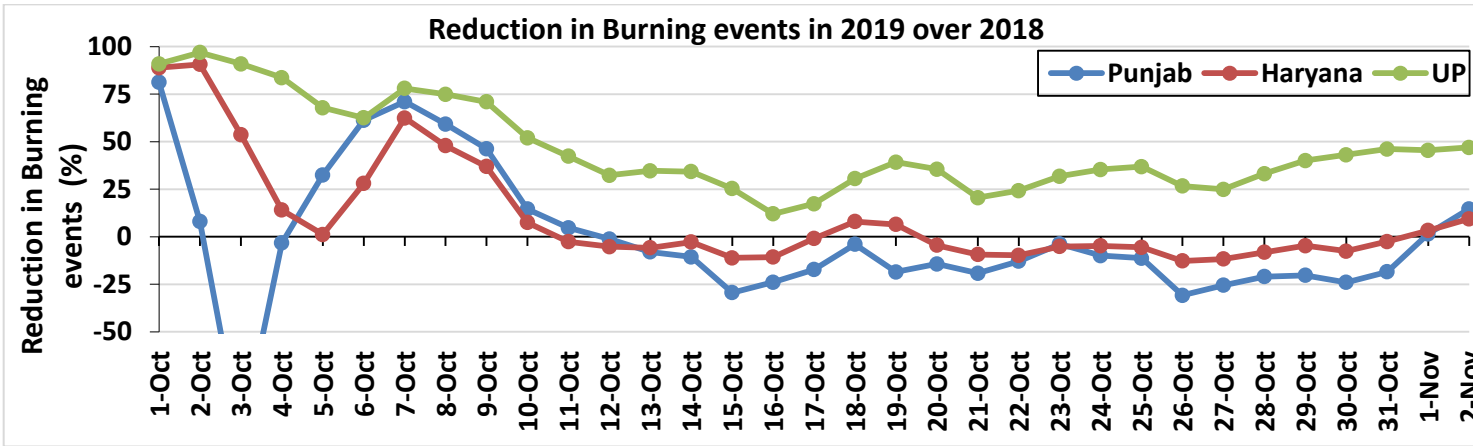


Comparison of residue burning events in current year (2019) with previous years (2018, 2017 & 2016) for the three study States
(01-Oct to 02-Nov)



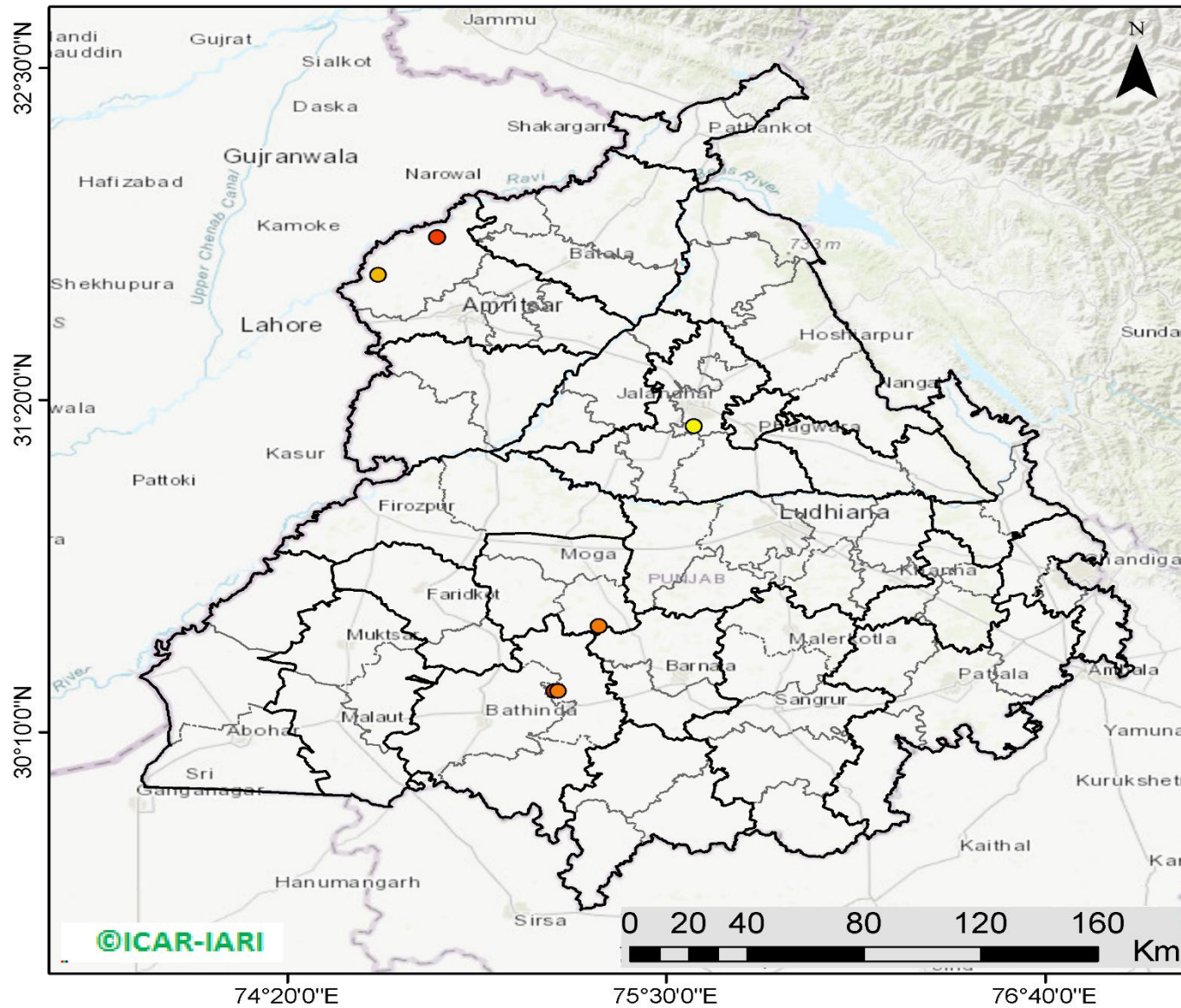


Percent Reduction in Burning events in 2019 over 2018, 2017 and 2016 (Daily Cumulative)



(a) Punjab

RICE RESIDUE BURNING IN PUNJAB



06 burning events detected in Punjab on 02nd November 2019

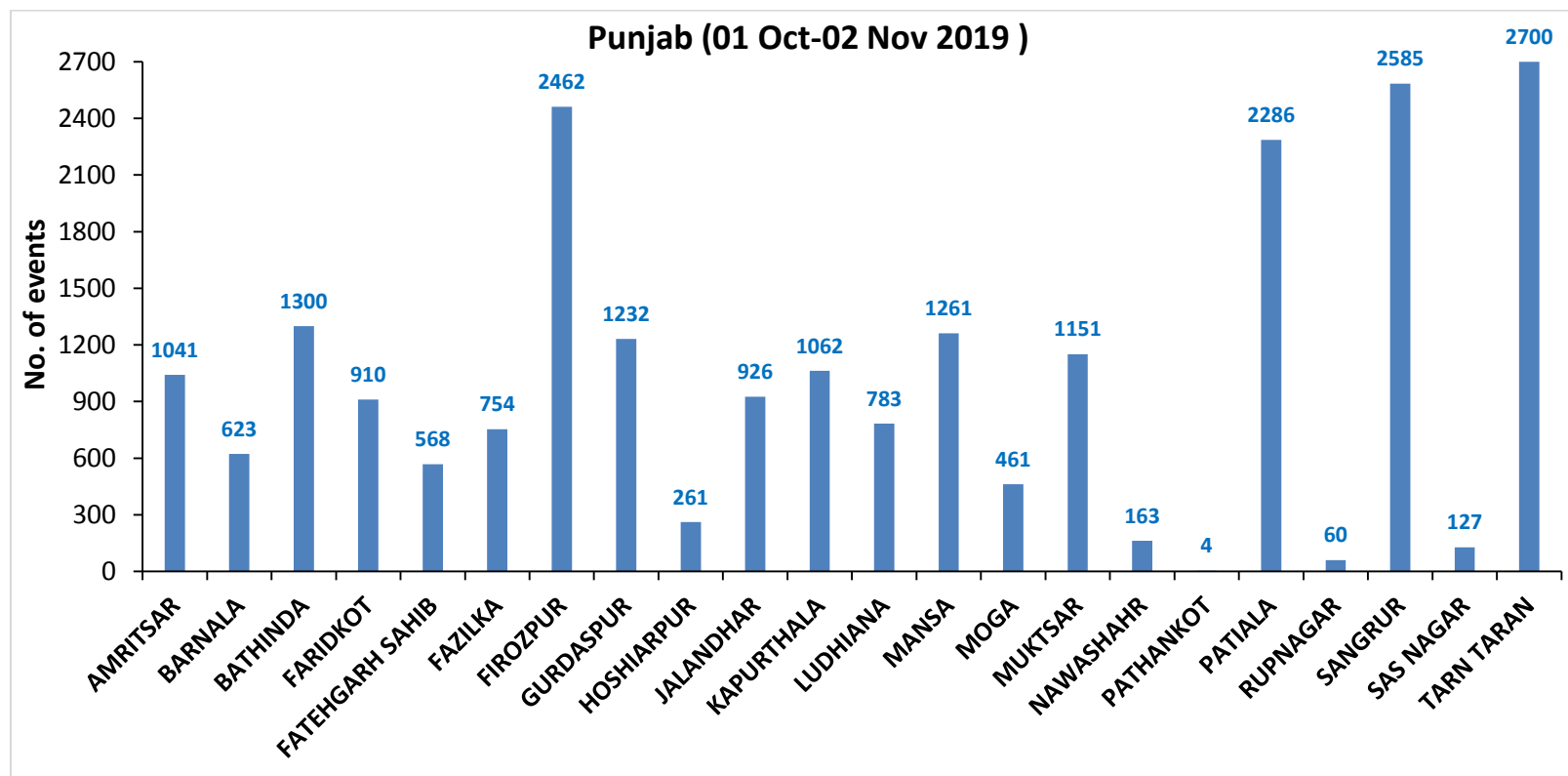
Fire Intensity (W/m²)

-  0 - 5
-  6 - 10
-  11 - 15
-  16 - 20
-  >20



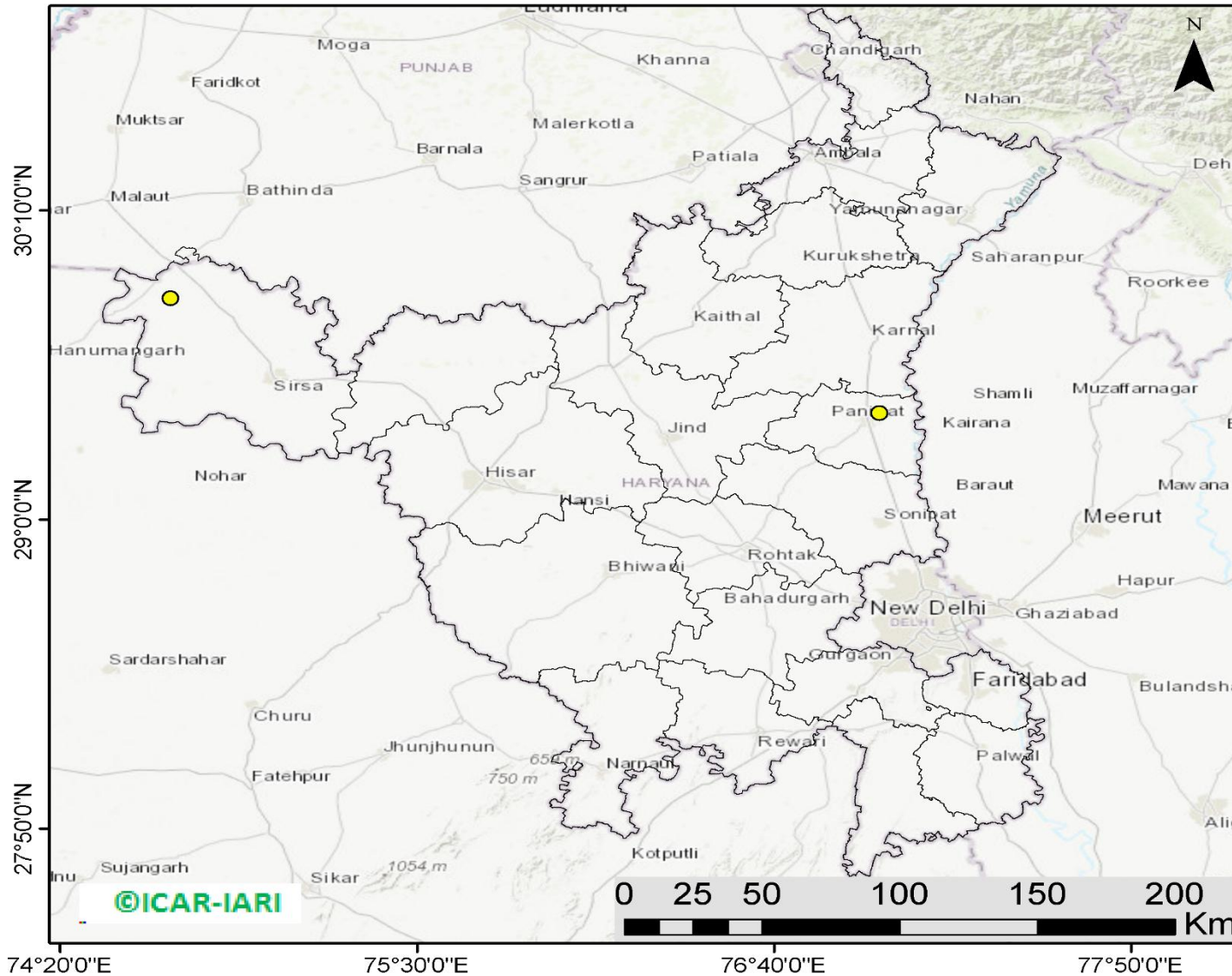
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residue burning events in Punjab (01 Oct to 02-Nov 2019)



(b) Haryana

RICE RESIDUE BURNING IN HARYANA



02 burning events
detected in Haryana on
02nd November 2019

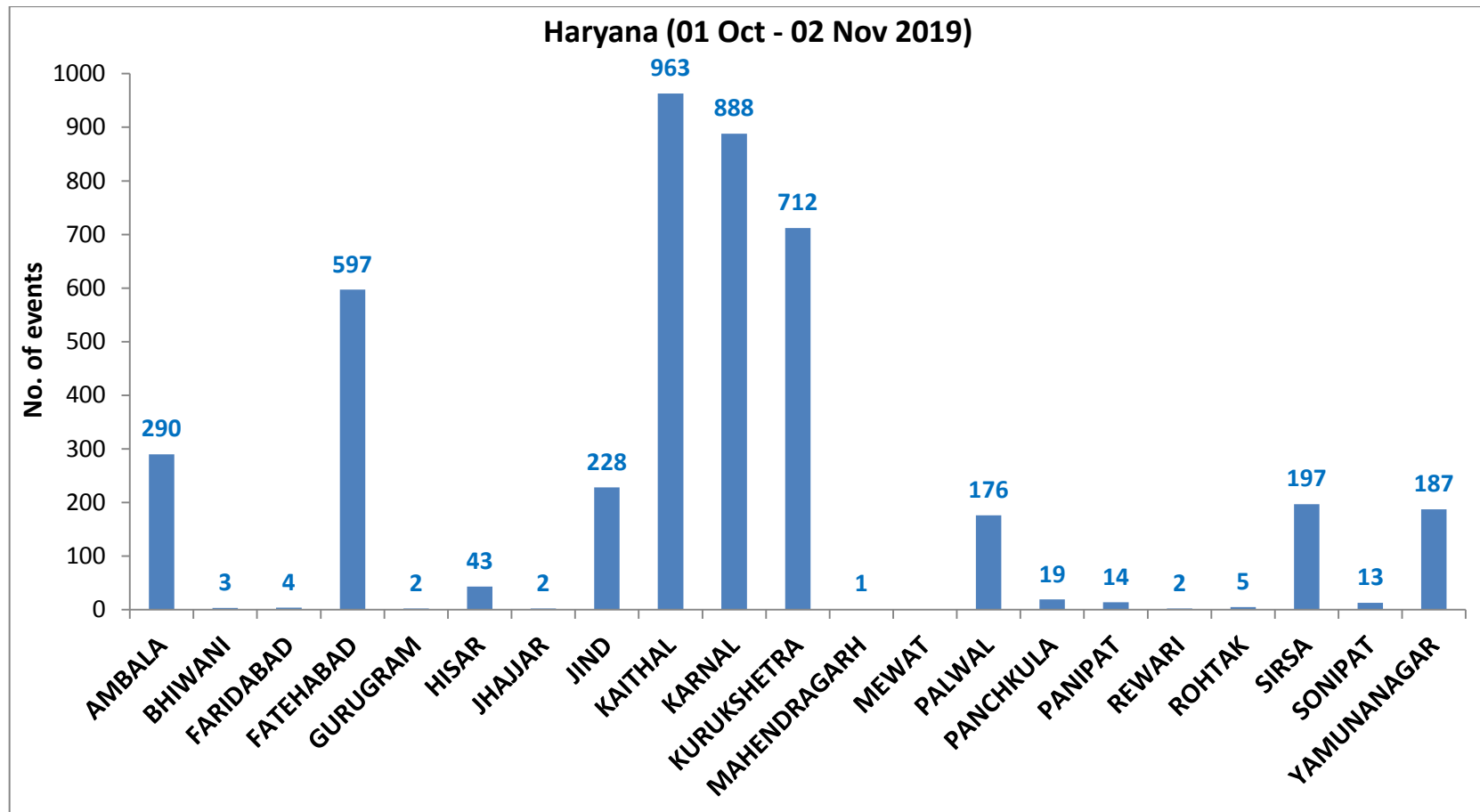
Fire Intensity (W/m²)

-  0 - 5
-  6 - 10
-  11 - 15
-  16 - 20
-  >20



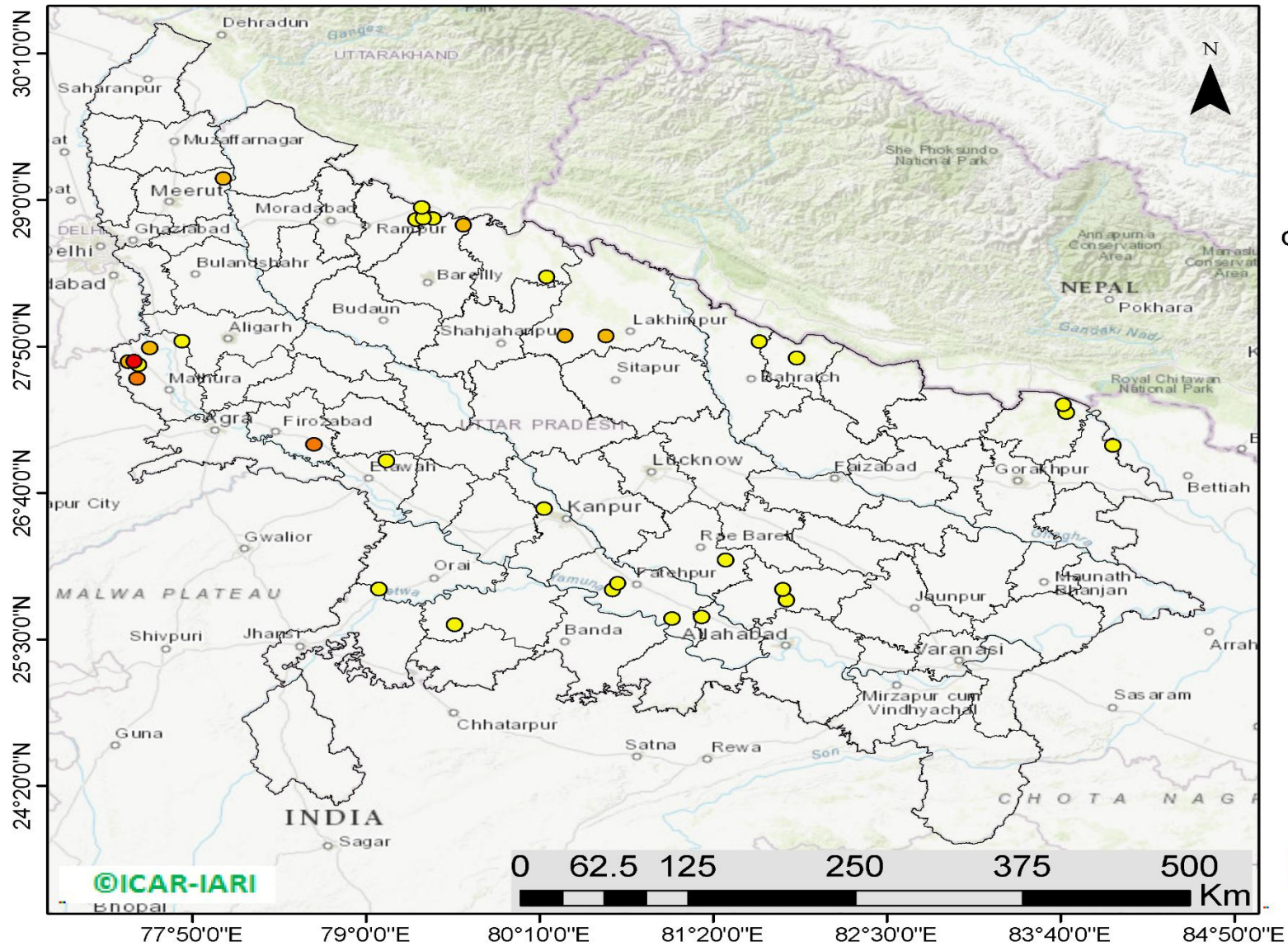
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residue burning events in Haryana (01 Oct to 02-Nov 2019)



(c) UP

RICE RESIDUE BURNING IN UTTAR PRADESH



33 burning events detected in Uttar Pradesh on 02nd November 2019

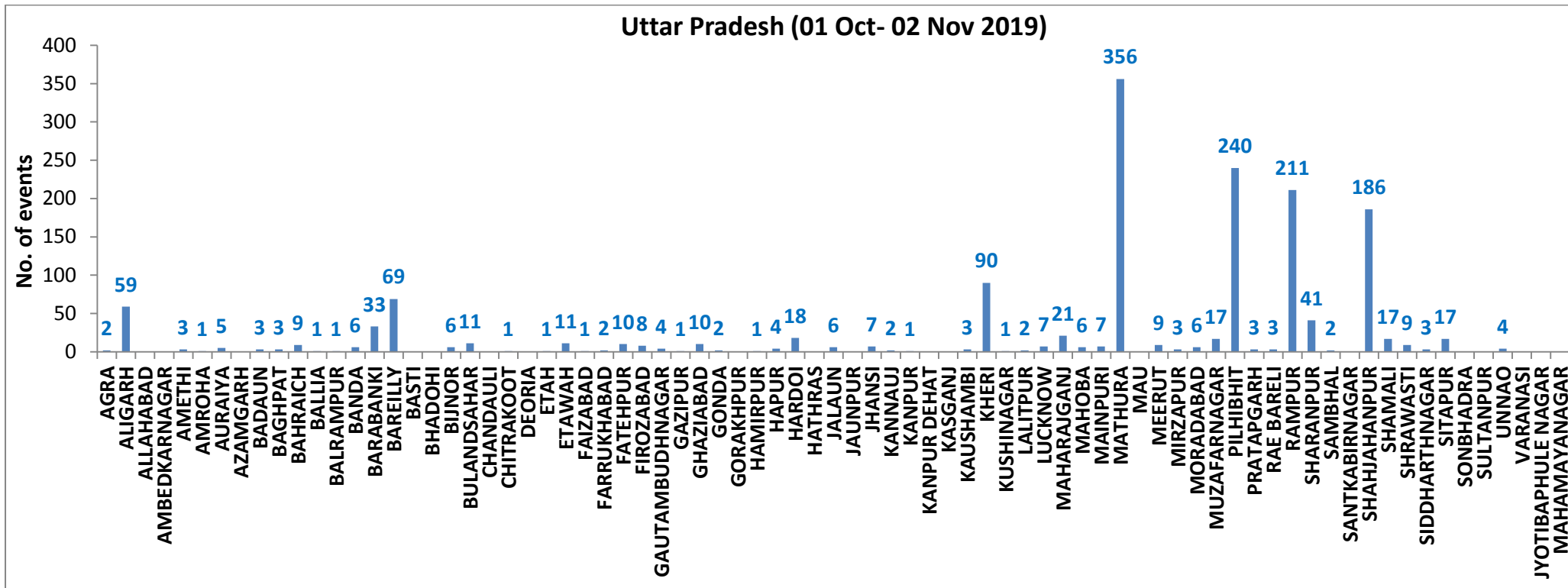
Fire Intensity (W/m²)

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

District-wise cumulative number of residue burning events in Uttar Pradesh (01 Oct to 02-Nov 2019)



State-wise, date-wise and district-wise number of residue burning events detected in 2016, 2017, 2018 and 2019
(Period: 01-Oct to 02-Nov)

Date	Punjab				Haryana				UP				Total			
	2019	2018	2017	2016	2019	2018	2017	2016	2019	2018	2017	2016	2019	2018	2017	2016
01-Oct	3	16	54	109	1	9	13	46	1	11	2	23	5	36	69	178
02-Oct	20	9	50	51	2	23	27	16	0	21	8	20	23	53	85	87
03-Oct	37	4	62	66	16	9	40	16	3	12	17	16	56	25	119	98
04-Oct	3	32	103	37	30	16	60	7	4	5	22	15	37	53	185	59
05-Oct	16	56	106	95	37	30	68	15	11	10	20	14	64	96	194	124
06-Oct	0	87	138	152	22	63	75	105	8	13	39	6	30	163	252	263
07-Oct	27	162	105	171	16	180	97	126	4	69	33	24	47	411	235	321
08-Oct	59	39	215	166	69	40	218	94	18	54	76	14	146	133	509	274
09-Oct	93	75	163	270	70	47	148	121	17	32	88	22	180	154	399	413
10-Oct	172	23	164	597	157	37	151	242	53	21	126	74	382	81	441	913
11-Oct	78	30	177	652	126	78	87	336	38	24	74	128	242	131	338	1116
12-Oct	99	67	342	694	154	133	123	338	42	22	51	164	295	222	516	1196
13-Oct	108	62	470	467	159	147	207	284	33	61	69	102	300	270	746	853
14-Oct	141	112	582	812	133	153	333	328	39	57	137	60	313	322	1052	1200
15-Oct	262	90	943	1215	203	110	458	248	63	35	237	76	528	235	1638	1539
16-Oct	168	174	465	1478	148	138	186	385	77	20	71	125	393	332	722	1988
17-Oct	250	272	807	2173	152	268	244	399	53	94	69	261	455	634	1120	2833
18-Oct	100	263	970	1065	103	255	306	270	39	163	108	204	242	681	1384	1539
19-Oct	529	254	1591	1762	220	208	541	276	3	108	128	132	752	570	2260	2170
20-Oct	490	496	2653	1175	360	141	597	188	62	49	255	62	912	686	3505	1425
21-Oct	852	618	1139	1726	339	217	233	257	185	66	168	152	1376	901	1540	2135
22-Oct	555	656	1356	2837	158	134	186	309	78	149	151	194	791	939	1693	3340
23-Oct	827	1113	994	2040	131	232	155	313	48	193	72	331	1006	1538	1221	2684
24-Oct	1220	844	1714	1836	165	166	244	221	79	192	171	152	1464	1202	2129	2209
25-Oct	1463	1247	2104	1813	212	182	303	229	67	142	175	83	1742	1571	2582	2125
26-Oct	2861	1173	1715	3390	366	132	276	434	189	33	240	195	3416	1338	2231	4019
27-Oct	2135	2040	2069	2904	249	252	224	417	145	154	145	255	2529	2446	2438	3576
28-Oct	3007	2864	2318	3493	238	330	292	458	45	290	99	435	3290	3484	2709	4386
29-Oct	1504	1321	4184	2258	0	124	502	278	1	243	180	237	1505	1688	4866	2773
30-Oct	3017	2008	3152	1076	222	103	307	395	19	158	238	175	3258	2269	3697	1646
31-Oct	2325	2715	3743	6132	36	229	413	575	4	148	321	153	2365	3092	4477	6860
01-Nov	293	4140	2736	4843	50	306	250	362	105	161	199	223	448	4607	3185	5428
02-Nov	6	3550	1246	4183	2	306	145	332	33	142	131	345	41	3998	1522	4860

Total	22720	26612	38630	51738	4346	4798	7509	8420	1566	2952	3920	4472	28632	34362	50059	64630
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(a) Punjab

Districts	01Oct-02 Nov			
	2016	2017	2018	2019
AMRITSAR	1484	1074	999	1041
BARNALA	1624	1217	767	623
BATHINDA	4138	3285	2541	1300
FARIDKOT	2666	2410	1430	910
FATEHGARH SAHIB	2158	1339	554	568
FAZILKA	0	0	0	754
FIROZPUR	5131	4430	4471	2462
GURDASPUR	1704	1137	828	1232
HOSHIARPUR	702	386	96	261
JALANDHAR	2960	1439	684	926
KAPURTHALA	2518	1208	488	1062
LUDHIANA	3600	2327	650	783
MANSA	2004	2203	1878	1261
MOGA	2144	1145	749	461
MUKTSAR	3771	2783	2547	1151
NAWASHAHR (SBS Nagar)	1077	594	175	163
PATHANKOT	0	0	0	4
PATIALA	4850	4025	2499	2286
RUPNAGAR	581	218	35	60
SANGRUR	5543	4815	3024	2585
SAS NAGAR	113	104	97	127
TARN TARAN	2970	2491	2100	2700
Total	51738	38630	26612	22720

(b) Haryana

Districts	01Oct-02 Nov			
	2016	2017	2018	2019
AMBALA	501	470	257	290
BHIWANI	14	11	7	3
FARIDABAD	174	274	165	4
FATEHABAD	1686	1447	980	597
GURUGRAM	0	0	0	2
HISAR	115	89	67	43
JHAJJAR	6	5	7	2
JIND	492	494	334	228
KAITHAL	1621	1365	1028	963
KARNAL	1467	1394	710	888
KURUKSHETRA	1046	1126	666	712
MAHENDRAGARH	0	0	0	1
MEWAT	0	0	0	0
PALWAL	0	0	0	176
PANCHKULA	0	0	3	19
PANIPAT	53	49	38	14
REWARI	0	0	0	2
ROHTAK	21	14	2	5
SIRSA	981	467	376	197
SONIPAT	29	31	19	13
YAMUNANAGAR	214	273	139	187
Total	8420	7509	4798	4346

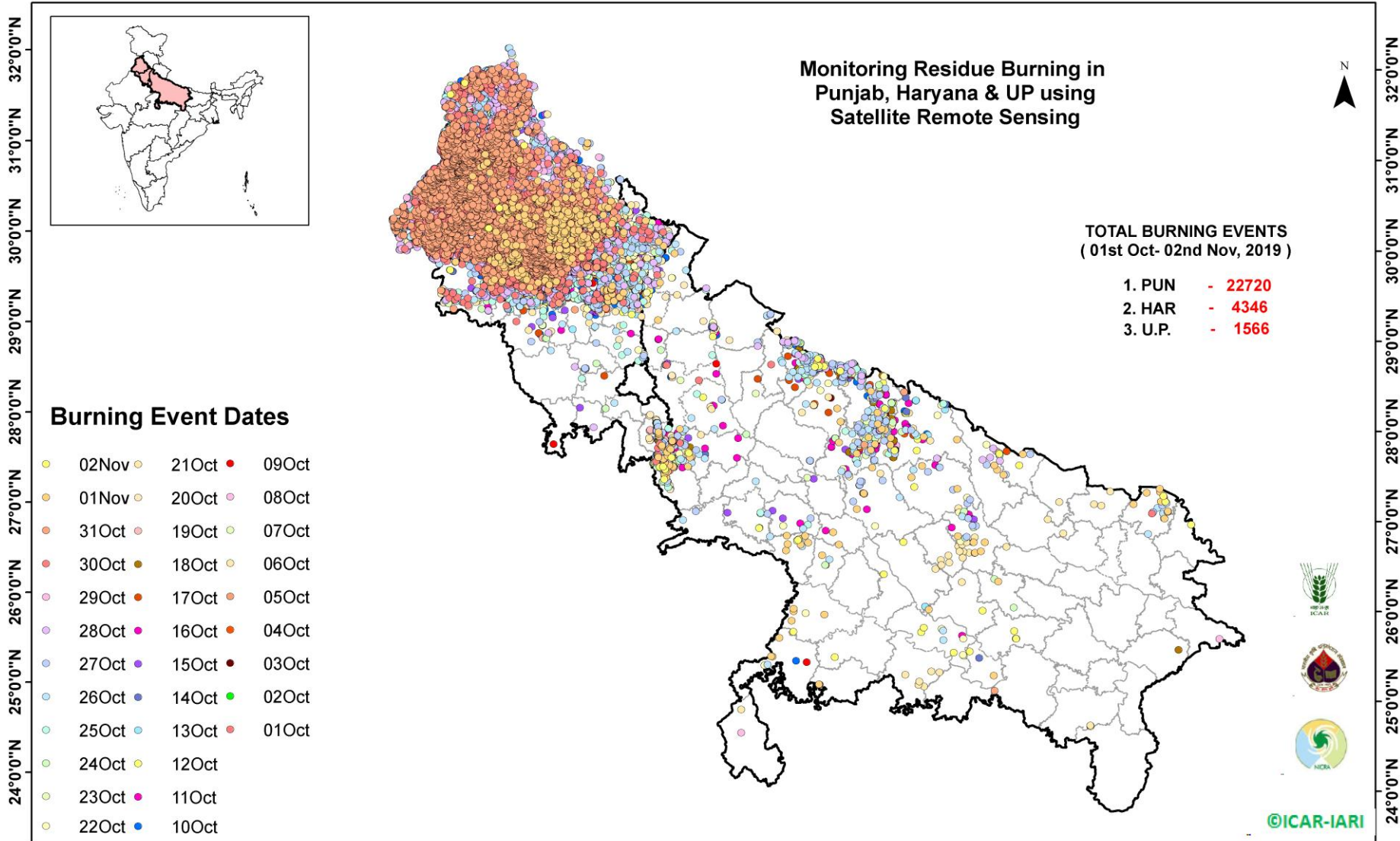
(c) Uttar Pradesh

Districts	01Oct-02 Nov			
	2016	2017	2018	2019
AGRA	0	0	0	2
ALIGARH	33	65	56	59
ALLAHABAD	0	1	4	0
AMBEDKARNAGAR	9	6	2	0
AMETHI	0	0	0	3
AMROHA	0	0	0	1
AURAIYA	97	84	23	5
AZAMGARH	3	1	2	0
BADAUN	3	4	3	3
BAGHPAT	0	0	0	3
BAHRAICH	20	12	33	9
BALLIA	1	2	2	1
BALRAMPUR	2	5	13	1
BANDA	1	1	4	6
BARABANKI	135	88	127	33
BAREILLY	192	145	107	69
BASTI	13	20	9	0
BHADOHI	0	0	0	0
BIJNOR	28	11	5	6
BULANDSAHAR	8	13	10	11
CHANDAULI	2	0	0	0
CHITRAKOOT	0	0	0	1
DEORIA	7	4	8	0
ETAH	8	18	14	1
ETAWAH	16	29	11	11
FAIZABAD	2	2	3	1
FARRUKHABAD	0	0	0	2
FATEHPUR	21	16	31	10
FIROZABAD	10	12	6	8

GAUTAMBUDHNAGAR	11	21	8	4
GAZIPUR	7	0	1	1
GHAZIABAD	29	13	7	10
GONDA	6	12	6	2
GORAKHPUR	11	8	17	0
HAMIRPUR	0	0	1	1
HAPUR	0	0	0	4
HARDOI	137	91	67	18
HATHRAS	0	0	0	0
JALAUN	0	0	0	6
JAUNPUR	2	1	4	0
JHANSI	0	0	2	7
KANNAUJ	1	7	3	2
KANPUR	3	3	3	1
KANPUR DEHAT	4	11	3	0
KASGANJ	0	0	0	0
KAUSHAMBI	5	14	16	3
KHERI	279	176	140	90
KUSHINAGAR	4	3	5	1
LALITPUR	0	0	0	2
LUCKNOW	28	16	15	7
MAHARAJGANJ	46	139	222	21
MAHOBA	0	0	0	6
MAINPURI	13	39	19	7
MATHURA	756	834	911	356
MAU	2	1	2	0
MEERUT	33	21	6	9
MIRZAPUR	0	8	4	3
MORADABAD	27	18	9	6
MUZAFARNAGAR	81	74	22	17
PILHIBHIT	716	565	342	240
PRATAPGARH	3	1	4	3

RAE BARELI	12	6	9	3
RAMPUR	567	536	197	211
SHARANPUR	60	71	41	41
SAMBHAL	0	0	0	2
SANTKABIRNAGAR	11	5	7	0
SHAHJAHANPUR	877	612	259	186
SHAMALI	0	0	0	17
SHRAWASTI	6	9	19	9
SIDDHARTHANAGAR	15	13	58	3
SITAPUR	68	33	19	17
SONBHADRA	8	1	7	0
SULTANPUR	6	3	3	0
UNNAO	21	11	17	4
VARANASI	0	0	0	0
JYOTIBAPHULE NAGAR	6	3	2	0
MAHAMAYANAGAR	0	2	2	0
Total	4472	3920	2952	1566

Map of Cumulative Burning Events (01 Oct – 02 Nov 2019)



[\(http://geoportal.icar.gov.in:8080/geoexplorer/composer/\)](http://geoportal.icar.gov.in:8080/geoexplorer/composer/)

Details of residue burning events in Punjab on 02-Nov-2019

S. No.	District	Tehsil / Block	Satellite	Longitude	Latitude	Time (IST)	Day / Night	Fire Power (W/m2)
1	AMRITSAR	AJNALA	AQUA	74.61300	31.77300	13:50:00	D	5.50
2	AMRITSAR	AJNALA	AQUA	74.79400	31.90600	13:50:00	D	19.00
3	BATHINDA	RAMPURA PHUL	AQUA	75.15600	30.31000	13:50:00	D	16.20
4	BATHINDA	RAMPURA PHUL	AQUA	75.16800	30.31100	13:50:00	D	13.50
5	JALANDHAR	JALANDHAR I	S-NPP	75.58395	31.24129	01:36:00	N	0.90
6	MOGA	NIHAL SINGH WALA	AQUA	75.29200	30.53900	13:50:00	D	13.00

Details of residue burning events in Haryana on 02-Nov-2019

S. No.	District	Tehsil / Block	Satellite	Longitude	Latitude	Time (IST)	Day / Night	Fire Power (W/m2)
1	PANIPAT	PANIPAT	S-NPP	77.01076	29.40217	12:54:00	D	1.40
2	SIRSA	DABWALI	S-NPP	74.69553	29.83587	01:36:00	N	0.60

Details of residue burning events in Uttar Pradesh on 02-Nov-2019

S. No.	District	Tehsil / Block	Satellite	Longitude	Latitude	Time (IST)	Day / Night	Fire Power (W/m ²)
1	ALIGARH	KHAIR	S-NPP	77.76436	27.87522	01:36:00	N	0.80
2	BAREILLY	BAHERI	S-NPP	79.65508	28.79974	12:54:00	D	5.90
3	BAREILLY	BAHERI	S-NPP	79.45097	28.85158	12:54:00	D	2.40
4	BAREILLY	BAHERI	S-NPP	79.38522	28.85529	12:54:00	D	1.80
5	ETAWAH	ETAWAH	S-NPP	79.13510	26.92097	12:48:00	D	2.60
6	FATEHPUR	FATEHPUR	S-NPP	80.65780	25.89562	12:48:00	D	1.90
7	FATEHPUR	FATEHPUR	S-NPP	80.69059	25.94418	12:48:00	D	3.40
8	FATEHPUR	KHAGA	S-NPP	81.05608	25.66467	12:48:00	D	4.20
9	FIROZABAD	SIKOHABAD	AQUA	78.65100	27.05100	13:50:00	D	12.20
10	HAMIRPUR	RATH	S-NPP	79.59644	25.61722	12:48:00	D	1.90
11	JALAUN	KONCH	S-NPP	79.08499	25.89994	12:48:00	D	4.30
12	KANPUR	BILHAUR	S-NPP	80.19665	26.54111	12:48:00	D	3.40
13	KAUSHAMBI	SIRATHU	S-NPP	81.25400	25.67727	12:48:00	D	2.30
14	KHERI	GOLA	TERRA	80.33700	27.91800	10:40:00	D	6.70
15	KHERI	LAKHIMPUR	S-NPP	80.61294	27.91549	12:48:00	D	5.80
16	KUSHINAGAR	PADRAUNA	S-NPP	84.01878	27.04207	12:48:00	D	3.80
17	MAHARAJGANJ	NICHLAUL	S-NPP	83.70579	27.30573	12:48:00	D	2.80
18	MAHARAJGANJ	NICHLAUL	S-NPP	83.68526	27.36840	12:48:00	D	2.10
19	MATHURA	CHHATA	AQUA	77.46200	27.57800	13:50:00	D	12.90
20	MATHURA	CHHATA	S-NPP	77.46992	27.68870	12:54:00	D	4.90
21	MATHURA	CHHATA	AQUA	77.40300	27.71300	13:50:00	D	7.40
22	MATHURA	CHHATA	AQUA	77.44300	27.71700	13:50:00	D	28.00
23	MATHURA	CHHATA	S-NPP	77.54538	27.82123	12:54:00	D	6.90
24	MEERUT	MAWANA	S-NPP	78.04263	29.17037	12:54:00	D	7.80
25	PILHIBHIT	PURANPUR	S-NPP	80.21364	28.38475	12:54:00	D	3.70
26	PRATAPGARH	LALGANJ	S-NPP	81.80205	25.89935	12:48:00	D	5.00
27	PRATAPGARH	PRATAPGARH	S-NPP	81.82386	25.81387	12:48:00	D	2.10
28	PRATAPGARH	PRATAPGARH	S-NPP	81.82637	25.81395	12:48:00	D	4.00
29	RAIBEARELI	SALON	S-NPP	81.41712	26.13066	01:36:00	N	0.40
30	RAMPUR	BILASPUR	S-NPP	79.33549	28.84522	12:54:00	D	3.10
31	RAMPUR	BILASPUR	S-NPP	79.37280	28.93802	12:54:00	D	2.00

32	SHRAWASTI	BHINGA	S-NPP	81.89291	27.74138	12:48:00	D	2.90
33	SHRAWASTI	BHINGA	S-NPP	81.64476	27.87210	12:48:00	D	3.00

The study used images received from following Satellites at IARI Satellite Ground Station

S. No.	Satellite Name	Sensor	Resolution (meter)	Day / Night Passes
1.	Suomi NPP	VIIRS	375 / 1000	Both
2.	Terra	MODIS	1000	Both
3.	Aqua	MODIS	1000	Both
4.	NOAA – 18	AVHRR	1000	Night
5.	NOAA – 19	AVHRR	1000	Night
6.	Metop - 1	AVHRR	1000	Night
7.	Metop - 2	AVHRR	1000	Night

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GIS Maps of fire events can be visualized online on ICAR KRISHI Geoportal website: <http://geoportal.icar.gov.in:8080/geoexplorer/composer/>
(Part of KRISHI Portal: <https://krishi.icar.gov.in> initiative)
