



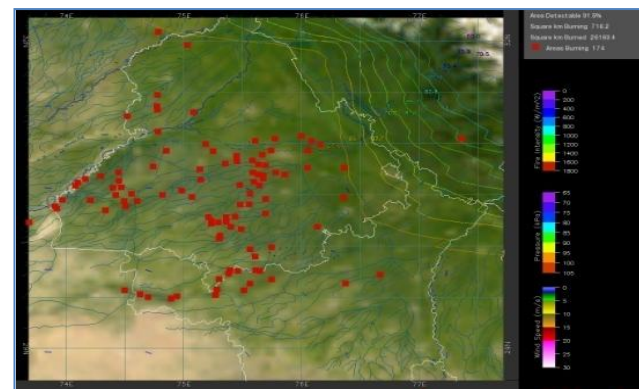
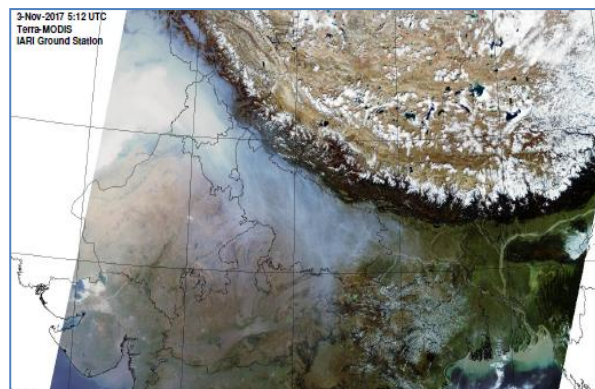
**Bulletin  
No. 57**

**Events Date:  
27-Nov-2018**

**Issued on:  
28-Nov-2018**



# **MONITORING PADDY RESIDUE BURNING IN NORTH INDIA USING SATELLITE REMOTE SENSING DURING 2018**



**Prepared by:**

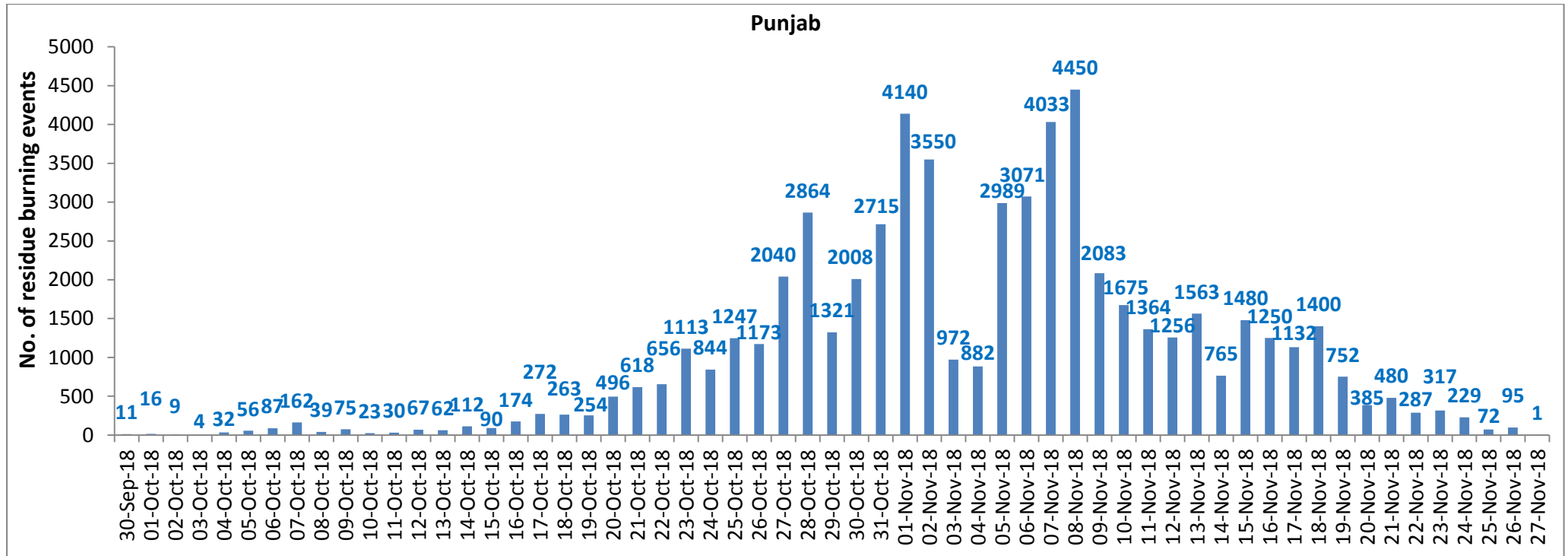
**Consortium for Research on Agroecosystem Monitoring and Modeling from Space (CREAMS) Laboratory,  
Division of Agricultural Physics, ICAR – Indian Agricultural Research Institute, New Delhi – 110012**

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

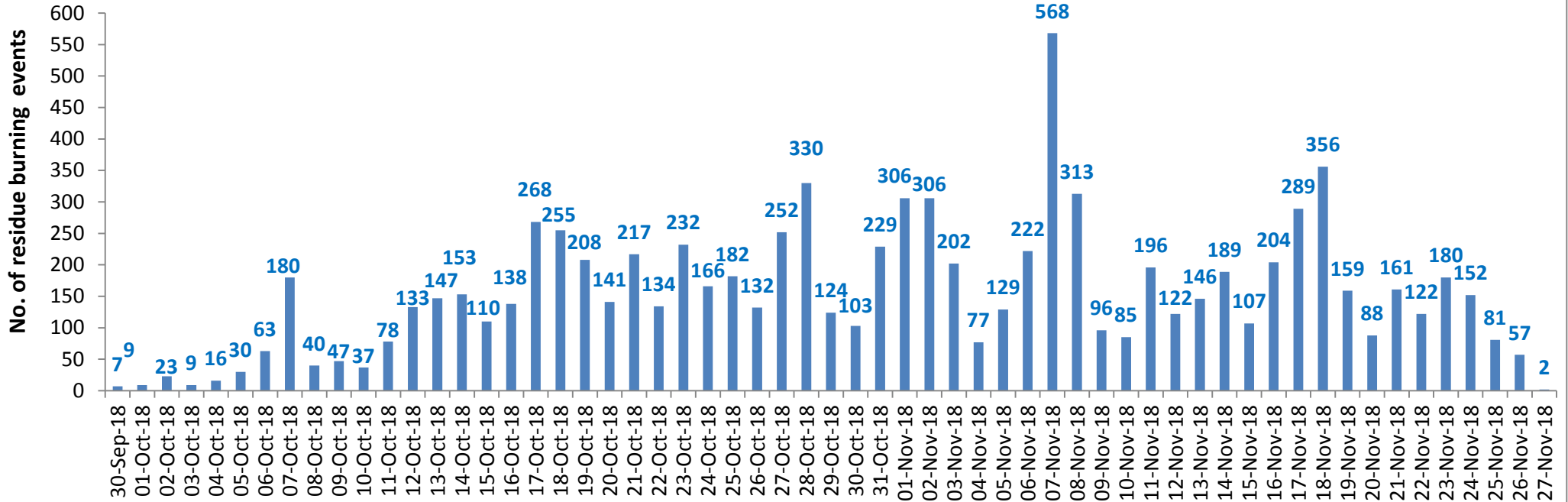
## Highlights for 27-November-2018

- Satellites detected **45** residue burning events in the three States (Punjab, Haryana & UP) on **27-Nov-2018**.
- The burning events detected on **27-Nov-2018** are **01, 02** and **42** in Punjab, Haryana, and UP, respectively.
- The number of events has decreased from **225** on **26-Nov-2018** to **45** on **27-Nov-2018** in the three States.
- Total **75089** burning events were detected in the three States between **30-Sept-2018** and **27-Nov-2018**, which are distributed as **59606, 9108** and **6375** in Punjab, Haryana and UP, respectively.
- Till **27-Nov-2018**, the burning events in the current year are about **85.3%** of the events detected in 2017 and about **59%** of the events detected in 2016.
- Overall, about **15%** and **41%** reduction in burning events are observed in current year (2018) till date as compared to that in 2017 and 2016, respectively.

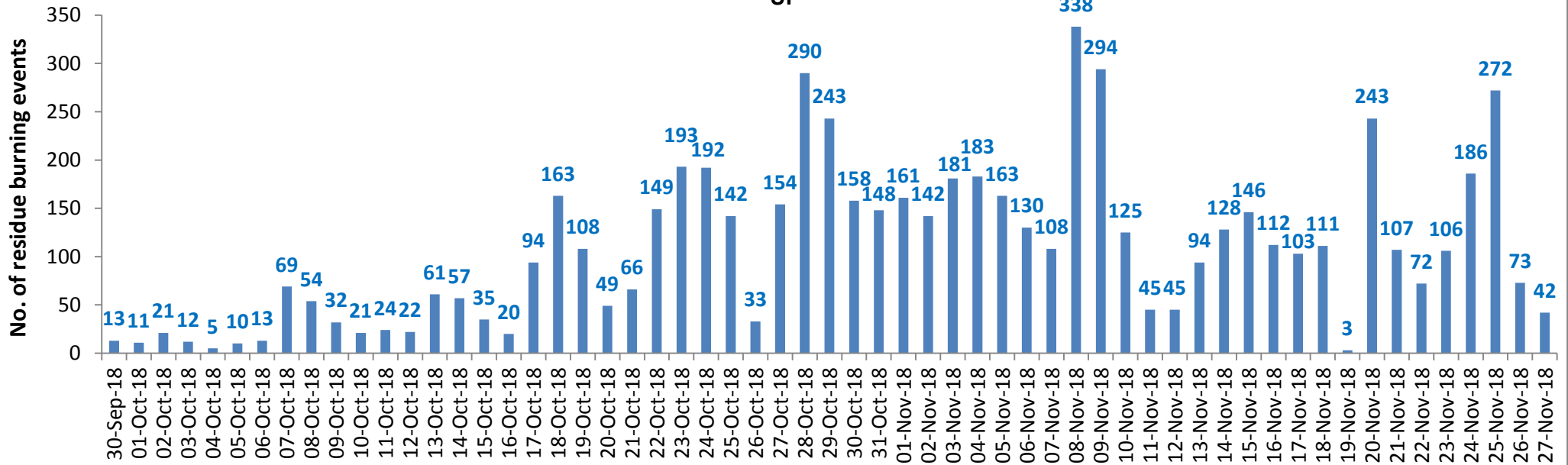
### Temporal distribution of residue burning events for the three study States



### Haryana

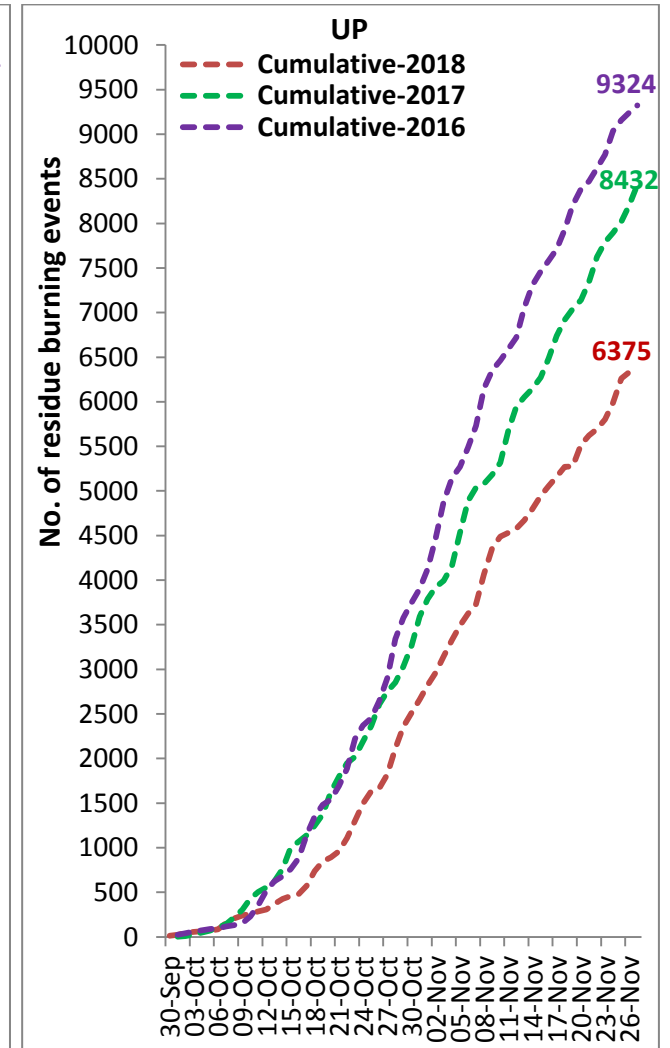
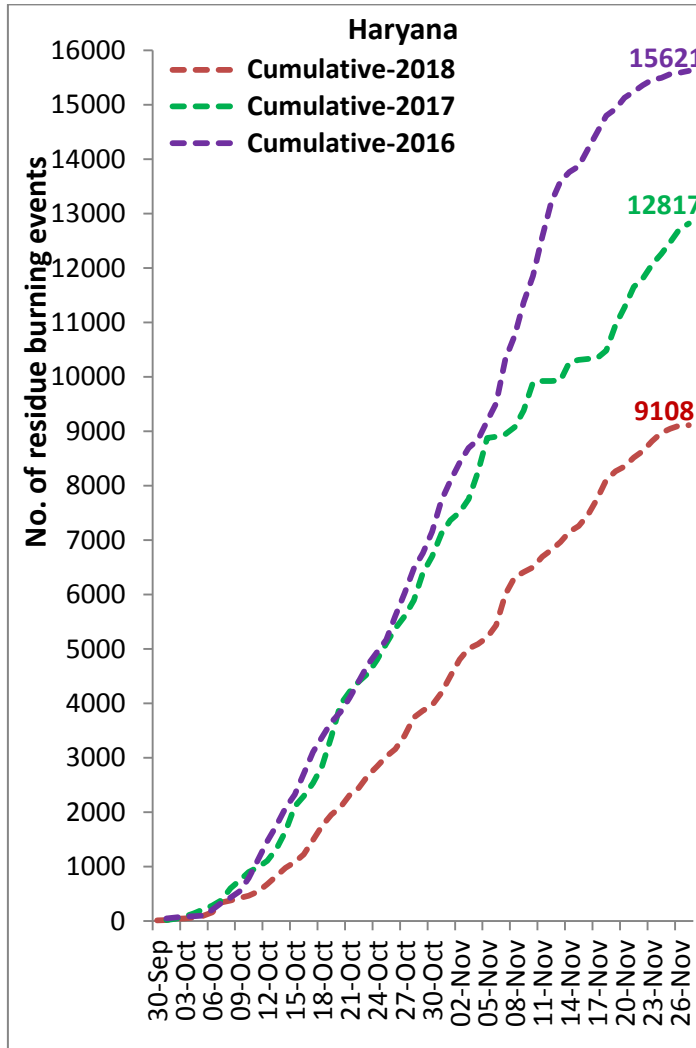
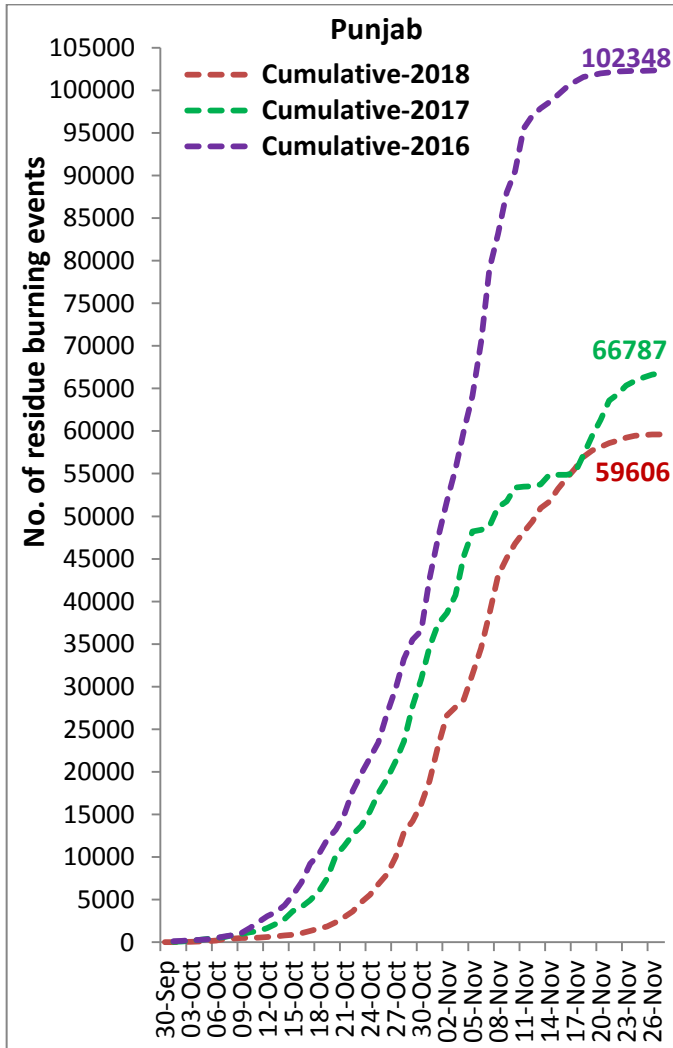


### UP

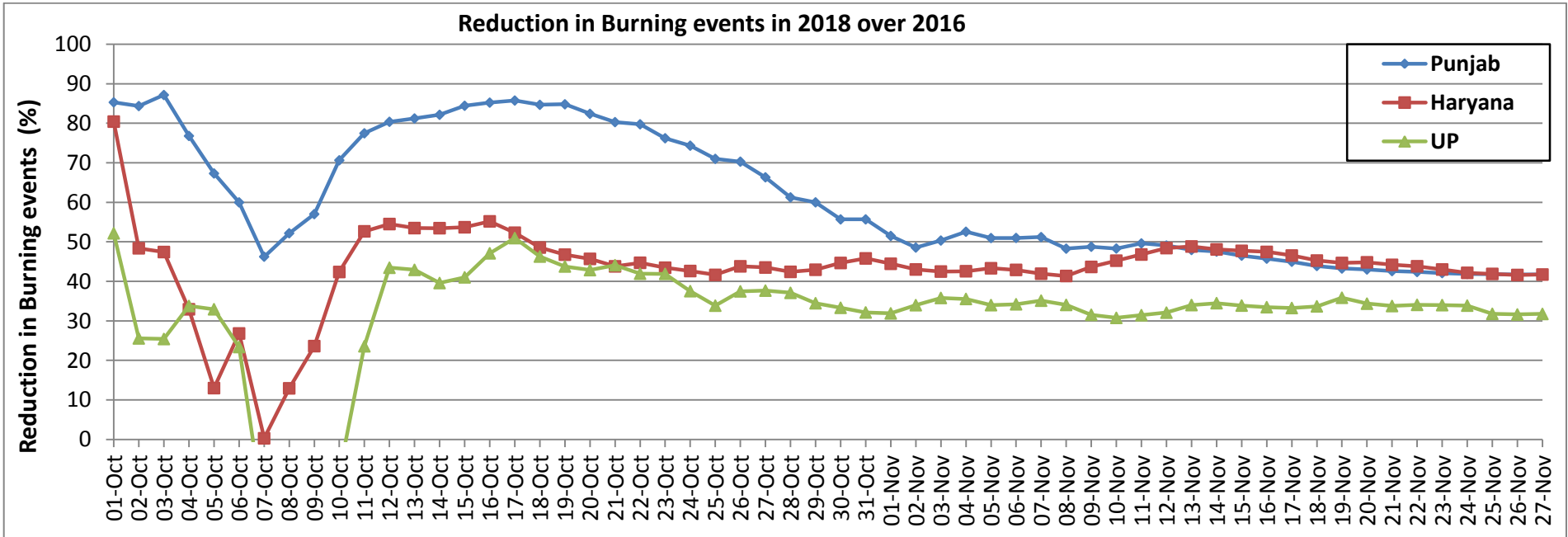
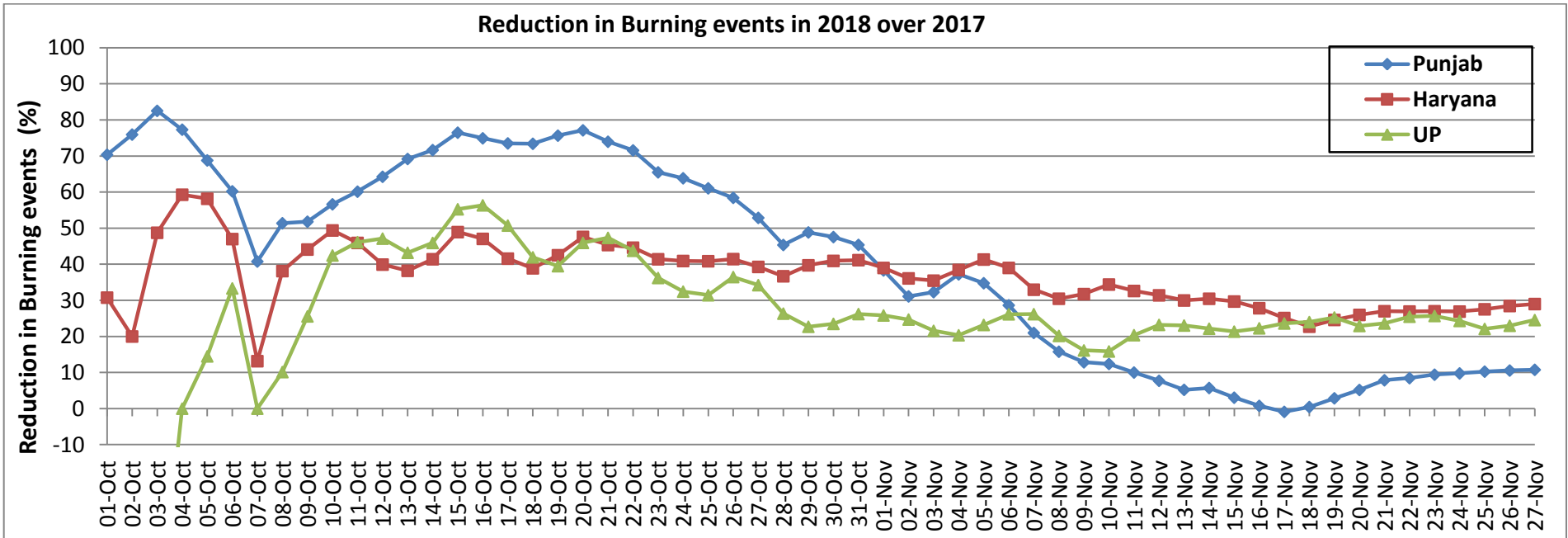


**Comparison of residue burning events in current year (2018) with previous years (2017& 2016) for the three study States**

**(30-Sep to 27-Nov)**



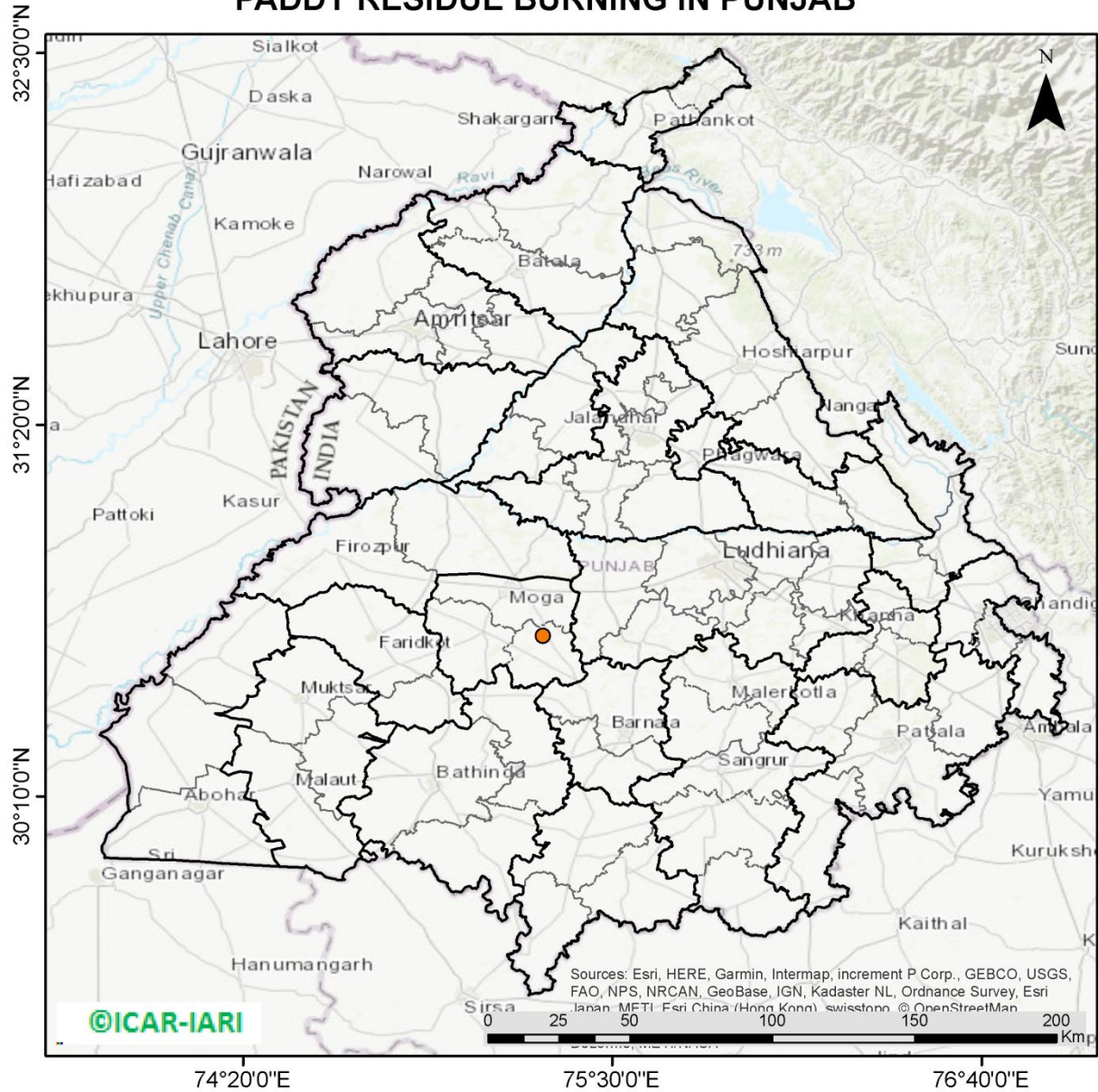
## Percent Reduction in Burning events in 2018 over 2017 and 2016 (Daily Cumulative)





### (a) Punjab

## PADDY RESIDUE BURNING IN PUNJAB



**01** burning events detected in Punjab on 27th November, 2018

### Fire Intensity (W/m<sup>2</sup>)

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

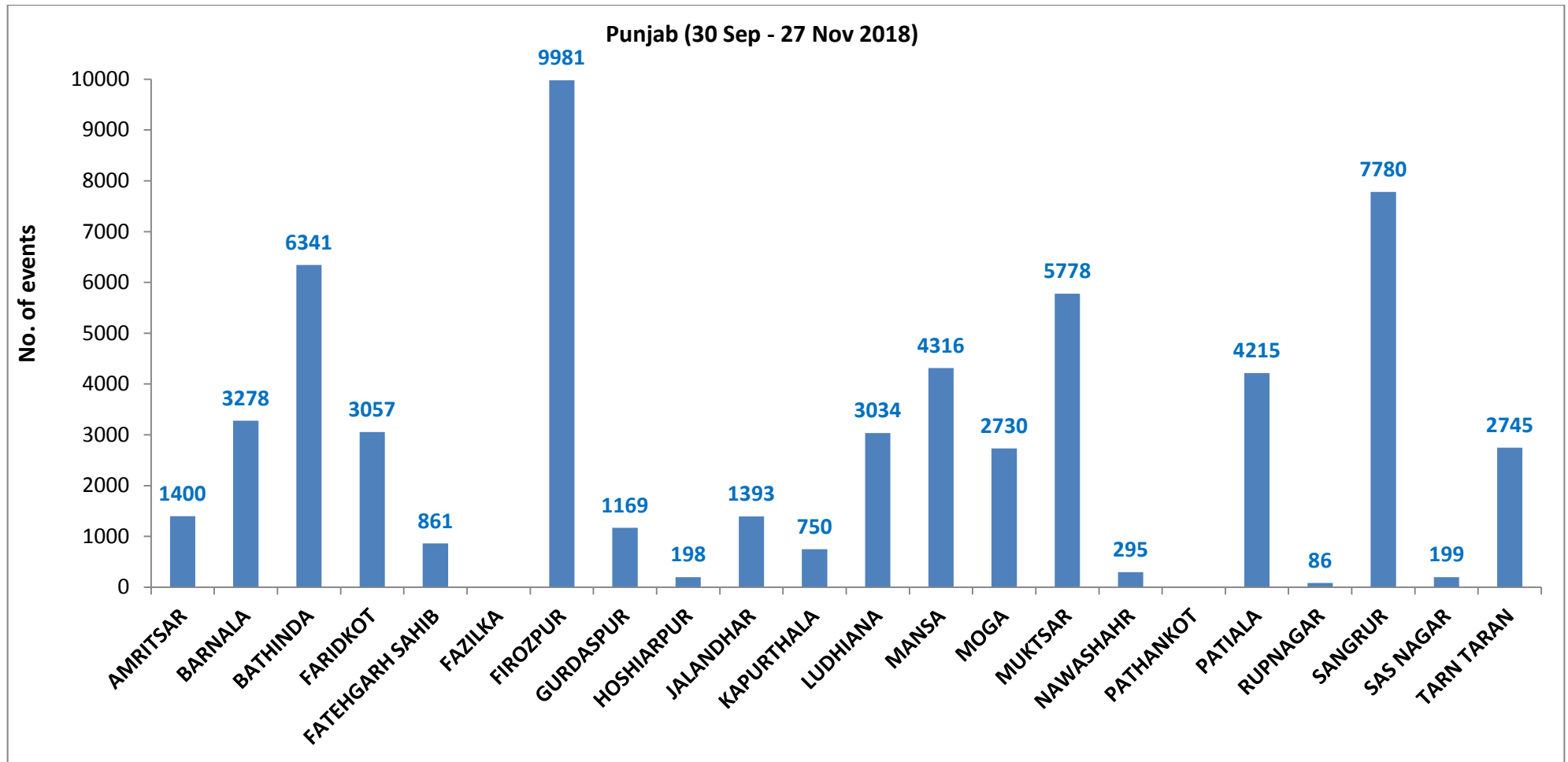
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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap



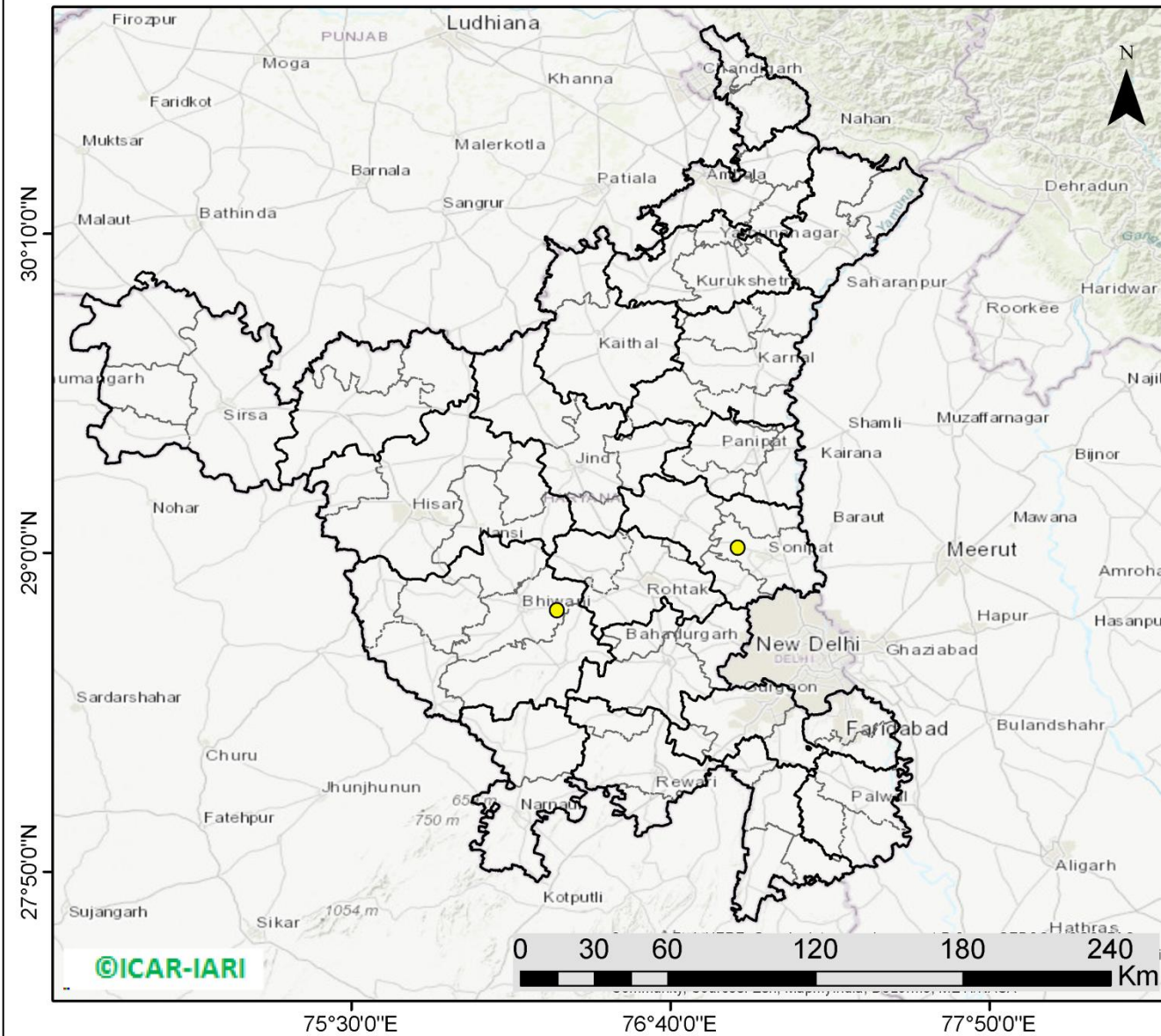
<http://geoportal.icar.gov.in:8080/geoexplorer/composer/>

**District-wise cumulative number of residue burning events in Punjab (30-Sep-2018 to 27-Nov-2018)**



(b) Haryana

PADDY RESIDUE BURNING IN HARYANA



**02** burning events detected in Haryana on 27th November, 2018

Fire Intensity (W/m<sup>2</sup>)

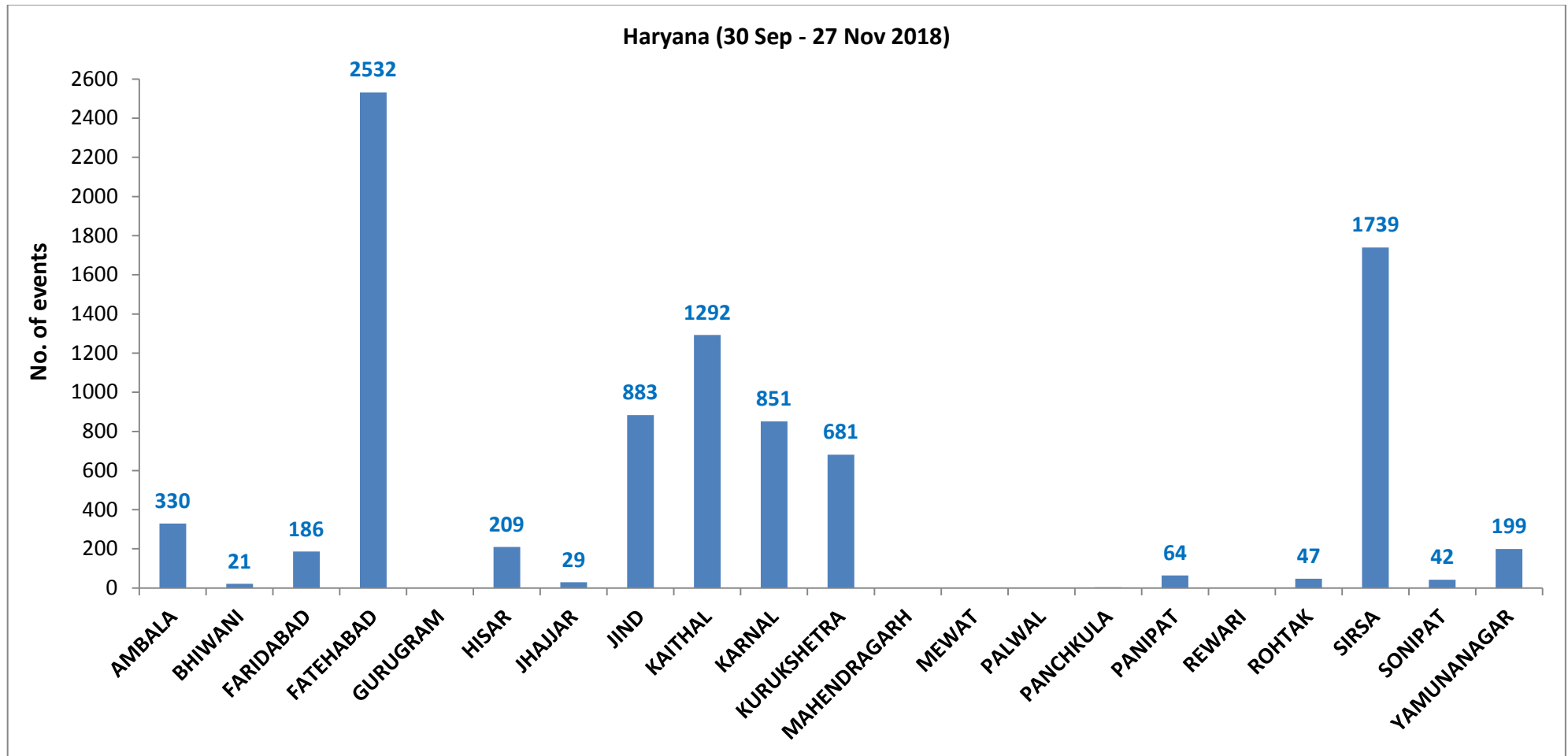
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- >20



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

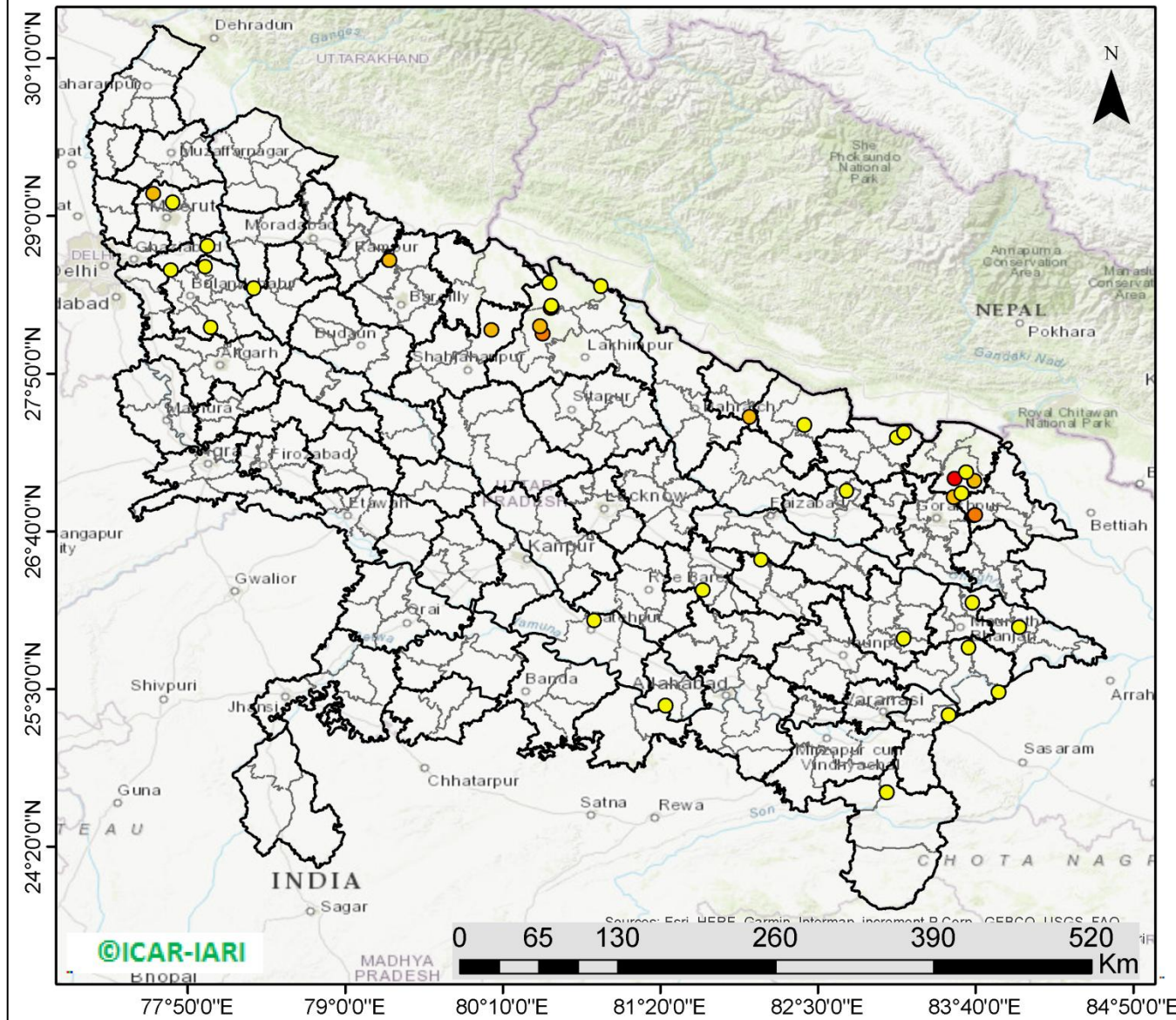


**District-wise cumulative number of residue burning events in Haryana (30-Sep-2018 to 27-Nov-2018)**



(c) Uttar Pradesh

PADDY RESIDUE BURNING IN UTTAR PRADESH



**42** burning events detected in Uttar Pradesh on **27th Nov, 2018**

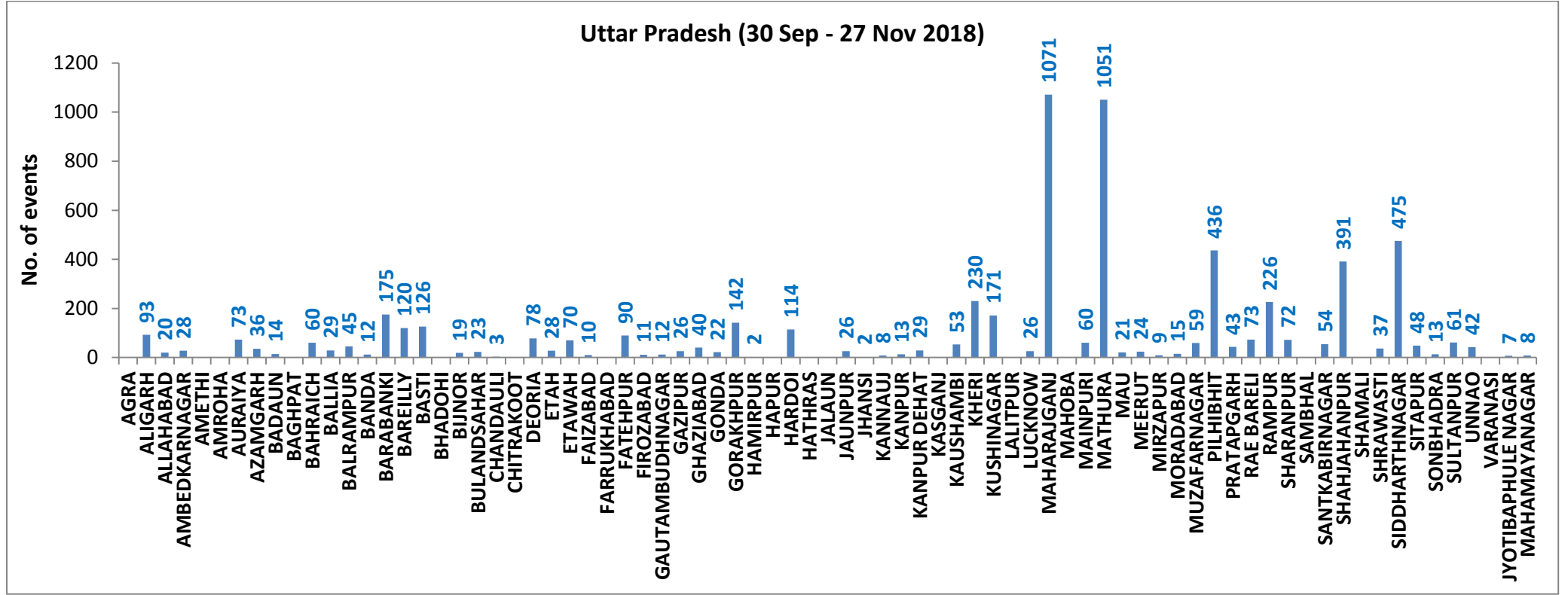
Fire Intensity (W/m<sup>2</sup>)

- 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 (30-Sep-2018 to 27-Nov-2018)**



**State wise, date wise and district-wise number of residue burning events detected in 2016, 2017 and 2018**  
**(Period: 30-Sep to 27-Nov)**

Date	Punjab			Haryana			UP			Total		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
30-Sep	--	--	11	--	---	7	--	---	13	--	---	31
1-Oct	109	54	16	46	13	9	23	2	11	178	69	36
2-Oct	51	50	9	16	27	23	20	8	21	87	85	53
3-Oct	66	62	4	16	40	9	16	17	12	98	119	25
4-Oct	37	103	32	7	60	16	15	22	5	59	185	53
5-Oct	95	106	56	15	68	30	14	20	10	124	194	96
6-Oct	152	138	87	105	75	65	6	39	13	263	252	165
7-Oct	171	105	162	126	97	180	24	31	69	321	233	411
8-Oct	166	215	39	94	218	40	14	75	54	274	508	133
9-Oct	270	163	75	121	148	47	22	87	32	413	398	154
10-Oct	597	164	23	242	151	37	74	126	21	913	441	81
11-Oct	652	177	30	336	87	78	128	74	24	1116	338	132
12-Oct	694	342	67	338	123	133	164	51	22	1196	516	222
13-Oct	467	470	62	284	207	147	102	69	61	853	746	270
14-Oct	812	582	112	328	333	153	60	137	57	1200	1052	322
15-Oct	1215	943	90	248	458	110	76	237	35	1539	1638	235
16-Oct	1478	465	174	385	186	138	125	71	20	1988	722	332
17-Oct	2173	807	272	399	244	268	261	69	94	2833	1120	634
18-Oct	1065	970	263	270	306	255	204	108	163	1539	1384	681
19-Oct	1762	1591	254	276	541	208	132	128	108	2170	2260	570
20-Oct	1175	2653	496	188	597	141	62	255	49	1425	3505	686
21-Oct	1726	1139	618	257	233	217	152	168	66	2135	1540	901
22-Oct	2837	1356	656	309	186	134	194	151	149	3340	1693	939
23-Oct	2040	994	1113	313	155	232	331	72	193	2684	1221	1538
24-Oct	1836	1714	844	221	244	166	152	171	192	2209	2129	1202
25-Oct	1813	2104	1247	229	303	182	83	175	142	2125	2582	1571
26-Oct	3390	1715	1173	434	276	132	195	240	33	4019	2231	1338
27-Oct	2904	2069	2040	417	224	252	255	145	154	3576	2438	2446



<b>28-Oct</b>	3493	2318	2864	458	292	330	435	99	290	4386	2709	3484
<b>29-Oct</b>	2258	4184	1321	278	502	124	237	180	243	2773	4866	1688
<b>30-Oct</b>	1076	3152	2008	395	307	103	175	238	158	1646	3697	2269
<b>31-Oct</b>	6132	3743	2715	575	413	229	153	321	148	6860	4447	3092
<b>01-Nov</b>	4843	2736	4140	362	250	306	223	199	161	5628	3185	4607
<b>02-Nov</b>	4183	1246	3550	332	145	306	345	131	142	4860	1522	3998
<b>03-Nov</b>	3806	2109	972	275	240	202	409	75	181	4409	2424	1355
<b>04-Nov</b>	4477	4603	882	146	499	77	265	168	183	4888	5270	1142
<b>05-Nov</b>	4137	2876	2989	345	625	129	125	367	163	4607	3868	3281
<b>06-Nov</b>	6303	171	3071	322	26	222	215	357	130	6840	327	3423
<b>07-Nov</b>	8575	420	4033	821	46	568	244	149	108	9640	615	4709
<b>08-Nov</b>	4129	2256	4450	432	128	313	419	43	338	4874	2427	5101
<b>09-Nov</b>	4857	675	2083	608	311	96	205	107	294	5670	1093	2473
<b>10-Nov</b>	2468	1642	1675	484	509	85	109	131	125	3061	2282	1885
<b>11-Nov</b>	5040	103	1364	716	29	196	129	358	45	5885	490	1605
<b>12-Nov</b>	1477	33	1256	634	3	122	129	269	45	2240	305	1423
<b>13-Nov</b>	885	237	1563	389	7	146	338	109	94	1612	353	1803
<b>14-Nov</b>	692	1101	765	171	340	189	247	95	128	1110	1536	1082
<b>15-Nov</b>	871	5	1480	107	40	107	154	123	146	1132	168	1733
<b>16-Nov</b>	911	8	1250	318	17	204	123	218	112	1352	243	1566
<b>17-Nov</b>	638	217	1132	299	12	289	130	249	103	1067	478	1524
<b>18-Nov</b>	568	2147	1400	312	139	356	217	180	111	1097	2466	1867
<b>19-Nov</b>	168	2200	752	125	471	159	273	122	3	566	2793	914
<b>20-Nov</b>	240	1857	385	204	325	88	183	101	243	627	2283	716
<b>21-Nov</b>	112	2310	480	115	378	161	86	205	107	313	2893	748
<b>22-Nov</b>	99	719	287	118	154	122	148	281	72	365	1154	481
<b>23-Nov</b>	54	1033	317	97	259	180	151	163	106	302	1455	603
<b>24-Nov</b>	21	507	229	36	192	152	265	105	186	322	794	567
<b>25-Nov</b>	33	443	72	68	219	81	123	124	272	224	786	425
<b>26-Nov</b>	27	334	95	25	240	57	85	186	73	137	760	225
<b>27-Nov</b>	22	151	1	34	99	2	80	227	42	136	477	45
<b>Total</b>	<b>102348</b>	<b>66787</b>	<b>59606</b>	<b>15621</b>	<b>12817</b>	<b>9108</b>	<b>9324</b>	<b>8432</b>	<b>6375</b>	<b>127293</b>	<b>88036</b>	<b>75089</b>

**(a) Punjab**

Districts	01 Oct - 27Nov		
	2016	2017	2018
AMRITSAR	2170	1355	1400
BARNALA	5701	3419	3278
BATHINDA	8845	5750	6341
FARIDKOT	4628	3469	3057
FATEHGARH SAHIB	2461	1642	861
FAZILKA	0	0	0
FIROZPUR	13638	9900	9981
GURDASPUR	2218	1590	1169
HOSHIARPUR	901	497	198
JALANDHAR	4660	2118	1393
KAPURTHALA	3136	1623	750
LUDHIANA	9546	4734	3034
MANSA	5651	4486	4316
MOGA	6393	2764	2730
MUKTSAR	7035	5417	5778
NAWASHAHR (SBS Nagar)	1364	683	295
PATHANKOT	0	0	0
PATIALA	6544	5034	4215
RUPNAGAR	717	328	86
SANGRUR	11862	8428	7780
SAS NAGAR	365	246	199
TARN TARAN	4513	3304	2745
<b>Total</b>	<b>102348</b>	<b>66787</b>	<b>59606</b>

**(b) Haryana**

Districts	01 Oct - 27Nov		
	2016	2017	2018
AMBALA	534	500	330
BHIWANI	89	47	21
FARIDABAD	288	343	186
FATEHABAD	4829	3710	2532
GURUGRAM	0	0	0
HISAR	410	189	209
JHAJJAR	37	19	29
JIND	859	943	883
KAITHAL	1748	1512	1292
KARNAL	1639	1511	851
KURUKSHETRA	1078	1148	681
MAHENDRAGARH	0	0	0
MEWAT	0	0	0
PALWAL	0	0	0
PANCHKULA	0	0	3
PANIPAT	98	105	64
REWARI	0	0	0
ROHTAK	100	92	47
SIRSA	3574	2297	1739
SONIPAT	94	81	42
YAMUNANAGAR	244	320	199
<b>Total</b>	<b>15621</b>	<b>12817</b>	<b>9108</b>

<b>(c) Uttar Pradesh</b>				<b>FATEHPUR</b>	78	64	90	<b>MUZAFARNAGAR</b>	145	175	59
				<b>FIROZABAD</b>	23	18	11	<b>PILHIBHIT</b>	958	743	436
<b>Distritcs</b>	<b>01 Oct - 27Nov</b>			<b>GAUTAMBUDH</b>				<b>PRATAPGARH</b>	45	61	43
	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>NAGAR</b>	30	46	12	<b>RAE BARELI</b>	115	141	73
<b>AGRA</b>	0	0	0	<b>GAZIPUR</b>	16	20	26	<b>RAMPUR</b>	626	649	226
<b>ALIGARH</b>	55	82	93	<b>GHAZIABAD</b>	90	64	40	<b>SHARANPUR</b>	124	157	72
<b>ALLAHABAD</b>	6	17	20	<b>GONDA</b>	48	38	22	<b>SAMBHAL</b>	0	0	0
<b>AMBEDKAR</b>				<b>GORAKHPUR</b>	66	113	142	<b>SANTKABIR</b>			
<b>NAGAR</b>	77	65	28	<b>HAMIRPUR</b>	0	0	2	<b>NAGAR</b>	56	64	54
<b>AMETHI</b>	0	0	0	<b>HAPUR</b>	0	0	0	<b>SHAHJAHANPUR</b>	1154	702	391
<b>AMROHA</b>	0	0	0	<b>HARDOI</b>	257	208	114	<b>SHAMALI</b>	0	0	0
<b>AURAIYA</b>	280	244	73	<b>HATHRAS</b>	0	0	0	<b>SHRAWASTI</b>	37	32	37
<b>AZAMGARH</b>	38	52	36	<b>JALAUN</b>	0	0	0	<b>SIDDHARTH</b>			
<b>BADAUN</b>	12	10	14	<b>JAUNPUR</b>	25	41	26	<b>NAGAR</b>	262	188	475
<b>BAGHPAT</b>	0	0	0	<b>JHANSI</b>	0	0	2	<b>SITAPUR</b>	137	83	48
<b>BAHRAICH</b>	81	41	60	<b>KANNAUJ</b>	35	18	8	<b>SONBHADRA</b>	16	16	13
<b>BALLIA</b>	19	43	29	<b>KANPUR</b>	20	14	13	<b>SULTANPUR</b>	78	77	61
<b>BALRAMPUR</b>	37	27	45	<b>KANPUR DEHAT</b>	70	73	29	<b>UNNAO</b>	67	59	42
<b>BANDA</b>	2	23	12	<b>KASGANJ</b>	0	0	0	<b>VARANASI</b>	2	0	0
<b>BARABANKI</b>	222	168	175	<b>KAUSHAMBI</b>	34	53	53	<b>JYOTIBAPHULE</b>			
<b>BAREILLY</b>	262	234	120	<b>KHERI</b>	481	331	230	<b>NAGAR</b>	12	18	7
<b>BASTI</b>	146	187	126	<b>KUSHINAGAR</b>	66	154	171	<b>MAHAMAYA</b>			
<b>BHADOHI</b>	0	0	0	<b>LALITPUR</b>	0	0	0	<b>NAGAR</b>	2	2	8
<b>BIJNOR</b>	66	67	19	<b>LUCKNOW</b>	62	30	26	<b>Total</b>	<b>9324</b>	<b>8432</b>	<b>6375</b>
<b>BULANDSAHAR</b>	33	37	23	<b>MAHARAJGANJ</b>	719	1022	1071				
<b>CHANDAULI</b>	18	19	3	<b>MAHOBA</b>	0	0	0				
<b>CHITRAKOOT</b>	0	0	0	<b>MAINPURI</b>	94	94	60				
<b>DEORIA</b>	62	81	78	<b>MATHURA</b>	1462	1083	1051				
<b>ETAH</b>	22	33	28	<b>MAU</b>	15	22	21				
<b>ETAWAH</b>	182	140	70	<b>MEERUT</b>	93	110	24				
<b>FAIZABAD</b>	18	16	10	<b>MIRZAPUR</b>	5	19	9				
<b>FARRUKHABAD</b>	0	0	0	<b>MORADABAD</b>	61	44	15				

**Details of residue burning events in Punjab on 27-Nov-2018**

Event S. No.	District	Tehsil/Block	Satellite	Longitude	Latitude	Time (IST)	Day/Night	Fire Power (W/m <sup>2</sup> )
1	MOGA	NIHAL SINGH WALA	TERRA-1	75.28158	30.67062	11:00:00	D	14.00

**Details of residue burning events in Haryana on 27-Nov-2018**

Event S. No.	District	Tehsil/Block	Satellite	Longitude	Latitude	Time (IST)	Day/Night	Fire Power (W/m <sup>2</sup> )
1	BHIWANI	BHIWANI	S-NPP	76.25124	28.79007	14:06:00	D	2.00
2	SONIPAT	SONIPAT	S-NPP	76.91367	29.01936	14:06:00	D	2.00

**Details of residue burning events in Uttar Pradesh on 27-Nov-2018**

Event S.No.	District	Tehsil/Block	Satellite	Longitude	Latitude	Time (IST)	Day/Night	Fire Power (W/m <sup>2</sup> )
1	AZAMGARH	MEHNAGAR	S-NPP	83.13429	25.87248	12:24:00	D	5.00
2	BALLIA	SIKANDARPUR	S-NPP	83.98923	25.95548	12:24:00	D	4.00
3	BALRAMPUR	TULSIPUR	S-NPP	82.40045	27.45369	12:24:00	D	1.00
4	BAREILLY	MIRGANJ	S-NPP	79.32201	28.67032	12:24:00	D	7.00
5	BAREILLY	MIRGANJ	S-NPP	79.32684	28.67156	12:24:00	D	8.00
6	BASTI	BHANPUR	S-NPP	82.71189	26.96623	12:24:00	D	2.00
7	BULANSAHAR	KHURJA	S-NPP	78.00449	28.17545	12:24:00	D	4.00
8	BULANSAHAR	SIYANA	S-NPP	77.96220	28.62400	12:24:00	D	4.00
9	CHANDAULI	CHANDAULI	S-NPP	83.46751	25.30591	12:24:00	D	1.00
10	FATEHPUR	FATEHPUR	S-NPP	80.84351	26.00553	12:24:00	D	2.00
11	GAZIPUR	GAZIPUR	S-NPP	83.61555	25.80772	12:24:00	D	4.00
12	GAZIPUR	ZAMANIA	S-NPP	83.83790	25.47545	12:24:00	D	3.00
13	GHAZIABAD	GARHMUKTESAR	S-NPP	77.97844	28.77865	14:06:00	D	2.00
14	GHAZIABAD	HAPUR	S-NPP	77.70844	28.59653	14:06:00	D	3.00
15	JYOTIBAPHULE NAGAR	HASANPUR	S-NPP	78.32277	28.46532	14:06:00	D	2.00
16	KAUSHAMBI	MANJHANPUR	S-NPP	81.37105	25.37775	12:24:00	D	3.00
17	KHERI	GOLA	TERRA-1	80.46046	28.12689	11:00:00	D	15.00



18	KHERI	GOLA	TERRA-1	80.44341	28.18228	11:00:00	D	9.00
19	KHERI	NIGHASAN	S-NPP	80.89288	28.48178	12:24:00	D	3.00
20	KHERI	PALIA KALAN	TERRA-1	80.52015	28.31703	11:00:00	D	18.00
21	KHERI	PALIA KALAN	S-NPP	80.52929	28.32965	12:24:00	D	4.00
22	KHERI	PALIA KALAN	S-NPP	80.52759	28.33513	12:24:00	D	4.00
23	KHERI	PALIA KALAN	S-NPP	80.51143	28.50614	12:24:00	D	2.00
24	KUSHINAGAR	HATA	S-NPP	83.65775	26.78385	12:24:00	D	7.00
25	KUSHINAGAR	HATA	S-NPP	83.66357	26.78511	12:24:00	D	12.00
26	MAHARAJGANJ	MAHARAJGANJ	S-NPP	83.50671	26.91932	12:24:00	D	6.00
27	MAHARAJGANJ	MAHARAJGANJ	S-NPP	83.56171	26.94656	12:24:00	D	3.00
28	MAHARAJGANJ	MAHARAJGANJ	S-NPP	83.65804	27.03672	12:24:00	D	4.00
29	MAHARAJGANJ	MAHARAJGANJ	S-NPP	83.66018	27.03812	12:24:00	D	6.00
30	MAHARAJGANJ	MAHARAJGANJ	S-NPP	83.51151	27.05484	12:24:00	D	21.00
31	MAHARAJGANJ	MAHARAJGANJ	S-NPP	83.59731	27.10364	12:24:00	D	2.00
32	MAU	MADHUBAN	S-NPP	83.64504	26.13727	12:24:00	D	2.00
33	MEERUT	SARDHANA	S-NPP	77.72309	29.09908	14:06:00	D	3.00
34	MEERUT	SARDHANA	S-NPP	77.57922	29.16359	14:06:00	D	6.00
35	SHAHJAHANPUR	PUWANYA	TERRA-1	80.08019	28.15533	11:00:00	D	9.00
36	SHRAWASTI	IKAUNA	S-NPP	81.99584	27.51472	12:24:00	D	6.00
37	SIDDHARTHANAGAR	NAUGARH	S-NPP	83.08691	27.35716	12:24:00	D	5.00
38	SIDDHARTHANAGAR	NAUGARH	S-NPP	83.08474	27.35766	12:24:00	D	4.00
39	SIDDHARTHANAGAR	NAUGARH	S-NPP	83.13939	27.39558	12:24:00	D	4.00
40	SONBHADRA	REBUTSHGANJ	S-NPP	83.00853	24.73498	12:24:00	D	2.00
41	SULTANPUR	GAURIGANJ	S-NPP	81.64811	26.23050	12:24:00	D	2.00
42	SULTANPUR	SULTANPUR	S-NPP	82.08116	26.45378	12:24:00	D	2.00

## 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

### Study Team

ICAR – HQ	Dr K. Alagusundaram	DDG (Agril. Engg.)	<a href="mailto:ddgengg@icar.org.in">ddgengg@icar.org.in</a>
	Dr S. Bhaskar	ADG (NRM)	<a href="mailto:adgagroandaf@gmail.com">adgagroandaf@gmail.com</a>
ICAR - IARI	Dr V.K. Sehgal	Professor & Nodal Scientist	<a href="mailto:iaricreams@gmail.com">iaricreams@gmail.com</a> <a href="mailto:yk.sehgal@icar.gov.in">yk.sehgal@icar.gov.in</a>
	Dr Rajkumar Dhakar	Scientist	<a href="mailto:rajdhakar.iari@gmail.com">rajdhakar.iari@gmail.com</a>
	Shri Rakeshwar Verma	Chief Technical Officer	<a href="mailto:rakeshwar.verma@icar.gov.in">rakeshwar.verma@icar.gov.in</a>
	Mr Aakash Chhabra	SRF (NICRA)	<a href="mailto:aakash.chhabra7489@gmail.com">aakash.chhabra7489@gmail.com</a>
ICAR - ATARI	Dr Rajbir Singh	Director ATARI (Zone-1)	<a href="mailto:rajbirsingh.zpd@gmail.com">rajbirsingh.zpd@gmail.com</a>
	Dr U.S. Gautam	Director ATARI (Zone-IV)	<a href="mailto:zpdicarkanpur@gmail.com">zpdicarkanpur@gmail.com</a>
ICAR - IASRI	Dr RajenderParsad	Principal Scientist	<a href="mailto:rajender.parsad@icar.gov.in">rajender.parsad@icar.gov.in</a>

GIS Maps of fire events can be visualized online on ICAR KRISHI & CREAMS Geoportal

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

<http://creams.iari.res.in:8080/geoexplorer/composer/>

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