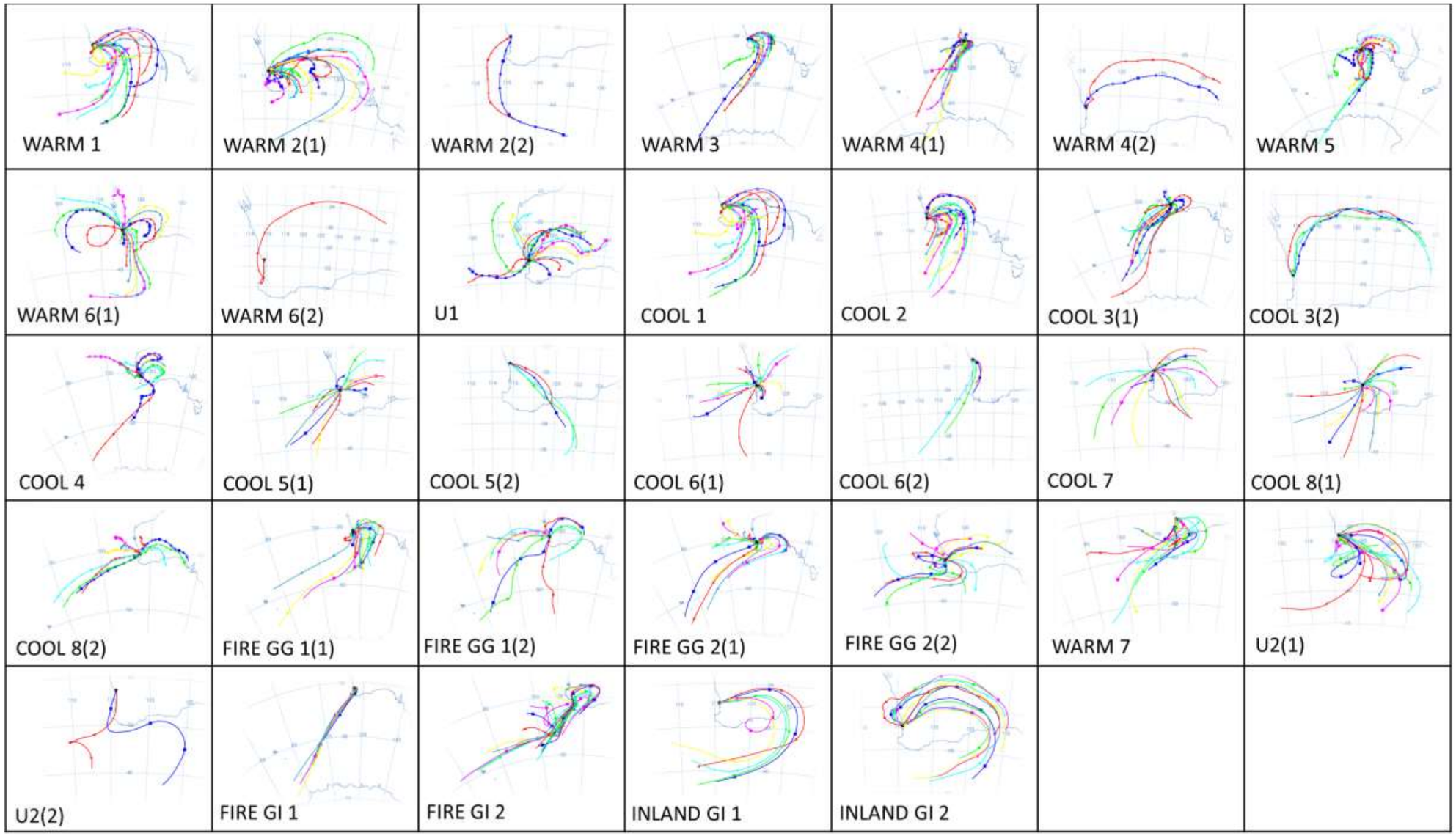

Figure S1. Air mass back trajectories of the aerosol samples collected at Gingin and Garden Island (GI) sites. Different colours indicate trajectories run at different time interval of the sampling period. Two figures per sample were present (expressed as 1 and 2 in brackets after sample code) if sampling period exceed maximum time range of back trajectory simulation.

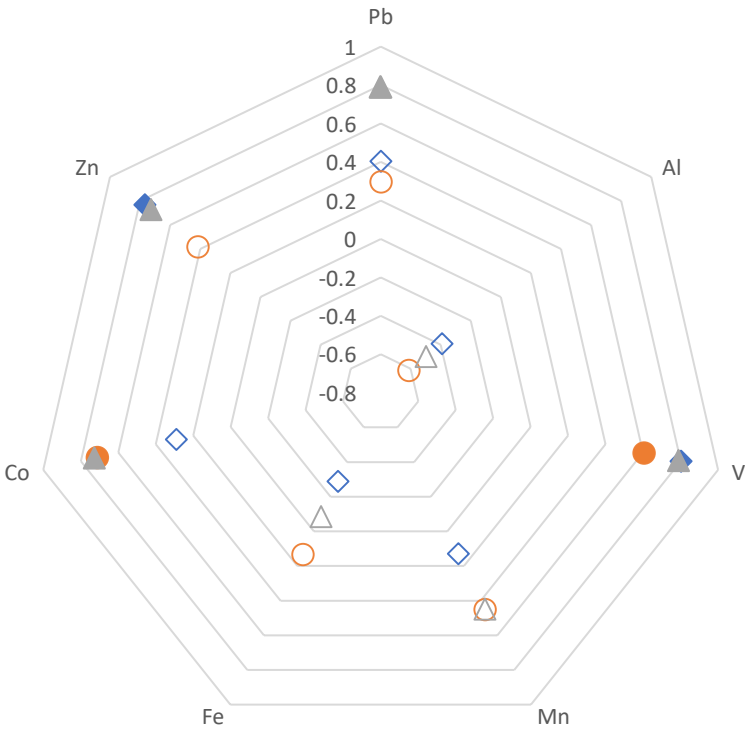

Figure S2. Pearson correlation coefficients between fractional solubility and enrichment factor (EF) of BATM. Each vertex of the heptagon represents single elements. Pearson coefficient increases from the complete negative correlation (r = -1.0) in the centre of heptagon to the complete positive correlation (r = 1.0) on the outermost edge of the heptagon. Contour lines represent specific levels of correlation for each element. Symbol shapes and colours indicate fraction from the leaching protocol: blue diamond = soluble, orange circle = leachable and grey triangle = labile form of BATM. Filled symbols indicate a significant ($p<0.05$) correlation.

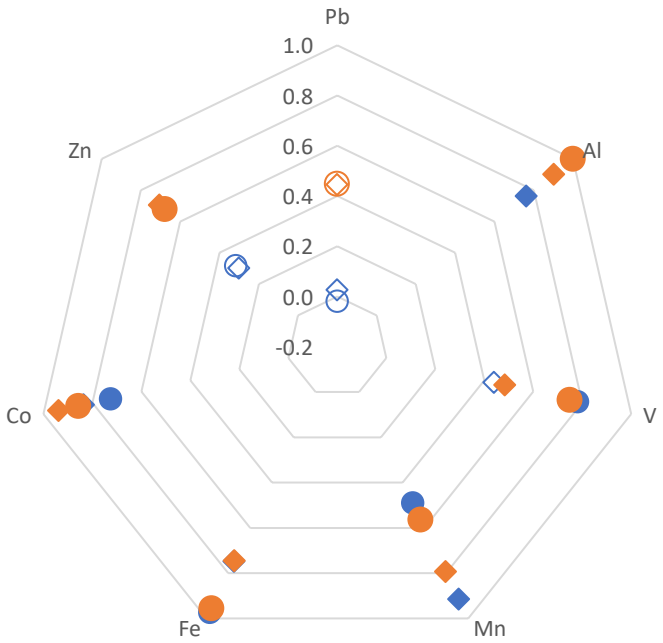

Figure S3. Pearson correlation coefficients between atmospheric concentrations of soluble and leachable forms of BATM with soluble, leachable and total Al (mineral dust marker). Each vertex of the heptagon represents a single element. The Pearson coefficient increases from the complete negative correlation (r = -1.0) in the middle of heptagon to the complete positive correlation (r = 1.0) on the outermost edge of the heptagon. Contour lines represent specific levels of correlation for each element. Symbol colours indicate the fraction of BATM from the leaching protocol (blue = soluble, orange = leachable) while symbol shapes indicate the fraction of Al (total = diamond, soluble/leachable = circle). Filled symbols indicate $p<0.05$.

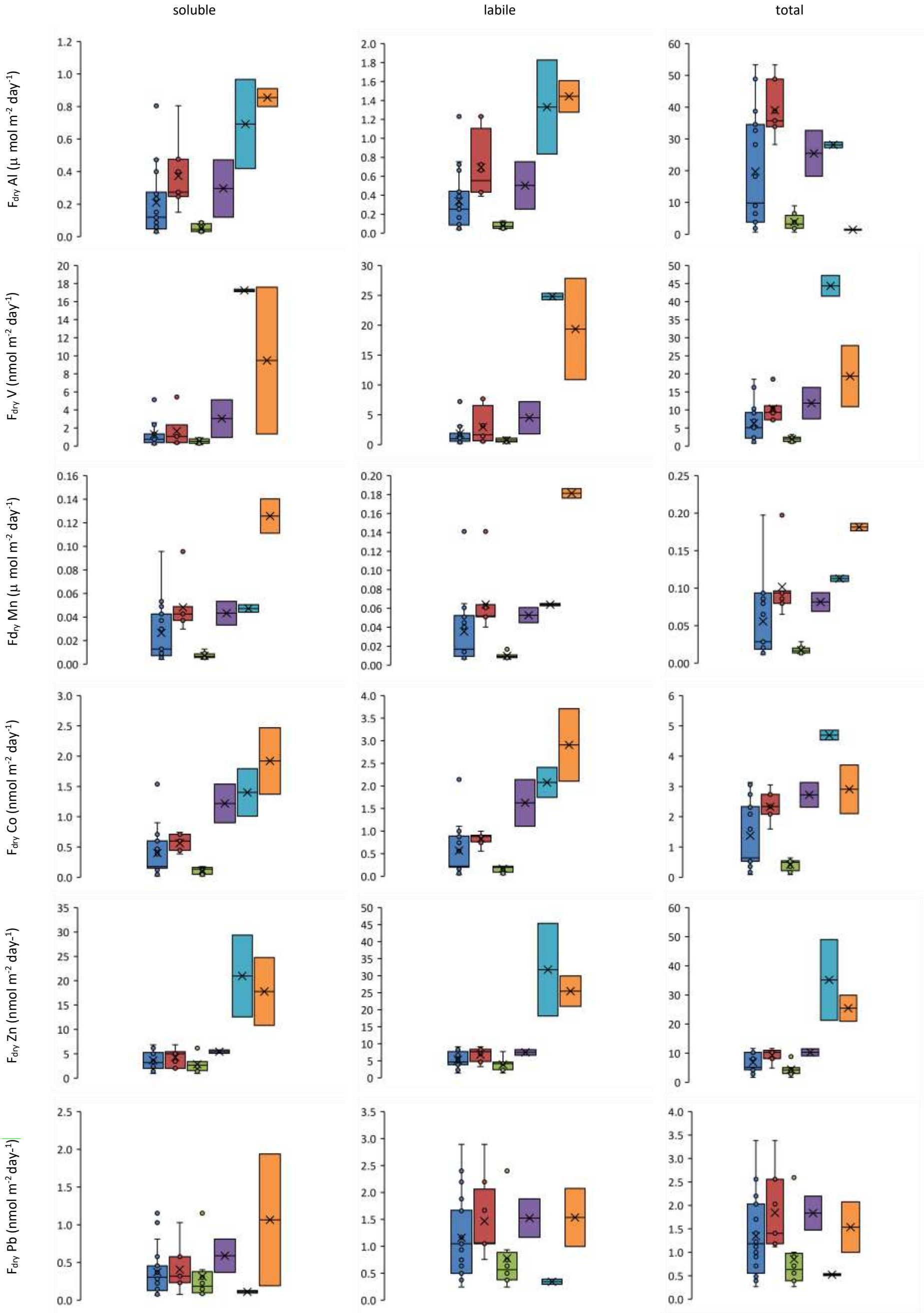

Figure S4. Dry deposition fluxes (F_{dry}) of soluble, labile and total forms of total Al, Mn, Co, V, Pb and Zn (from top to bottom). Gingin samples in blue, WARM samples in red, COOL samples in green, FIRE GG samples in purple, FIRE GI in marine blue, INLAND GI samples in orange.

Table S1. Summary of aerosol samples collected at Gingin and Garden Island (GI). Aerosols collected in Gingin were grouped according to mineral dust (MD) concentrations and bushfires occurrence: high MD-remote bushfires (WARM), low MD-no bushfires (COOL), fresh bushfires (FIRE GG), with two samples not classified into any group (U1, U2). The last four samples are from GI: fresh bushfires (FIRE GI) and aerosols from inland (INLAND GI).

Seasonal ID	Start (UTC)	End (UTC)	Time (min)	Volume (m^3)
WARM 1	1/04/2015 5:09	7/04/2015 1:31	8416	8991
WARM 2	14/04/2015 7:05	23/04/2015 3:34	12117	12631
WARM 3	23/04/2015 3:36	28/04/2015 4:53	7273	7581
WARM 4	28/04/2015 5:04	7/05/2015 6:58	12356	12880
WARM 5	14/05/2015 6:34	21/05/2015 6:18	8631	8997
WARM 6	12/06/2015 7:18	20/06/2015 6:47	11488	11976
U 1	27/06/2015 7:28	4/07/2015 6:33	10025	10487
COOL 1	04/07/2015 6:40	11/07/15 1:53	6597	7047
COOL 2	11/07/2015 1:59	18/07/2015 2:06	10088	10858
COOL 3	18/07/2015 2:14	27/07/2015 7:43	13288	14195
COOL 4	27/07/2015 7:48	1/08/2015 7:41	7194	7612
COOL 5	01/08/2015 7:47	11/08/2015 7:02	14335	15377
COOL 6	11/08/2015 7:07	20/08/2015 5:18	12851	13760
COOL 7	20/08/2015 5:23	26/08/2015 5:22	8640	9253
COOL 8	26/08/2015 5:33	8/09/2015 6:46	18795	20001
FIRE GG 1	8/09/2015 7:16	22/09/2015 7:04	16596	17635
FIRE GG 2	22/09/2015 7:15	9/10/2015 8:26	15725	17769
WARM 7	13/01/2017 2:13	19/01/2017 7:00	6567	7420,4
U 2	7/02/2017 2:46	16/02/2017 6:04	14407	13541
FIRE GI 1	03/05/2018 5:16	04/05/18 4:20	1383	1490.3
FIRE GI 2	04/05/2018 4:34	08/05/2018	5549	5902.3
INLAND GI 1	10/05/2018 4:48	11/05.2018 0:32	1184	1254.8
INLAND GI 2	11/05/2018 0:50	13/05/2018 0:41	2245	2373.8