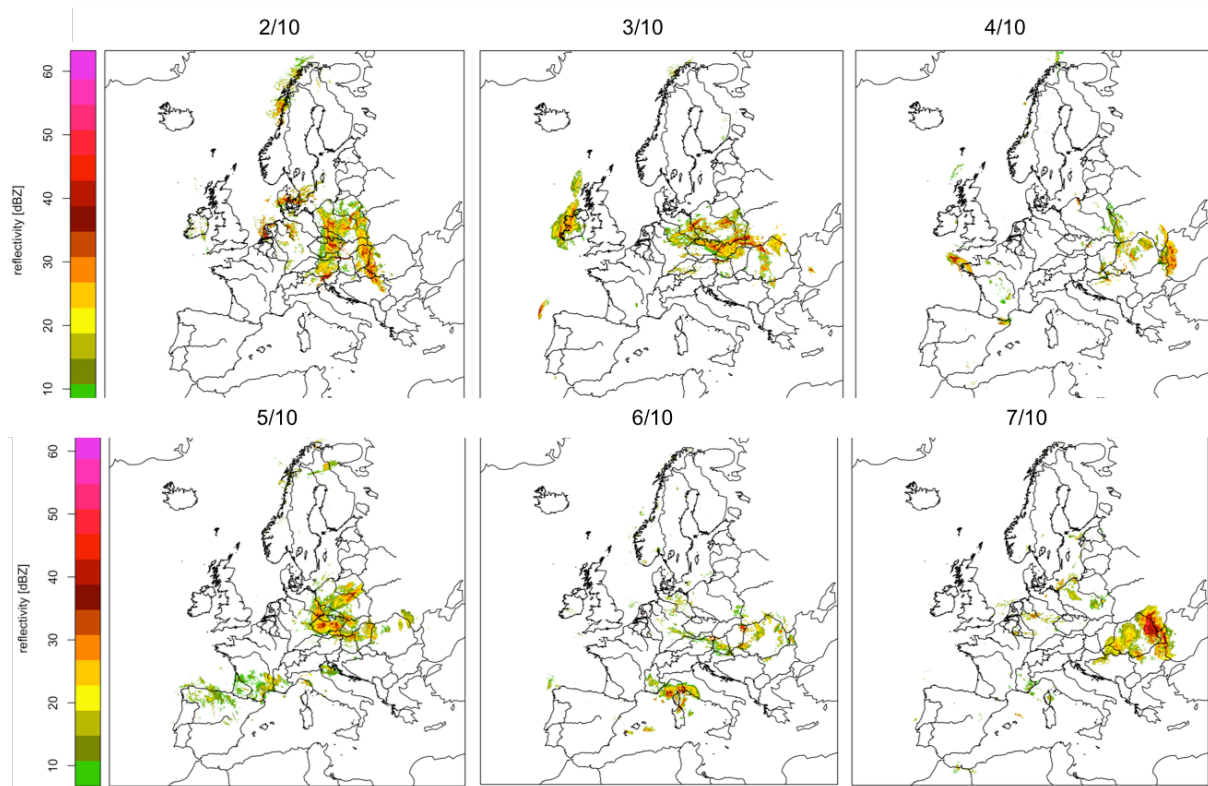


**ECOG-04003**

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**Supplementary material**

## Appendix 1



**Figure A1.** OPERA composites showing maximum reflectivity at 23:45 UTC on each individual night (2016). The higher the reflectivity, the more precipitation.

**Table A1.** All 70 weather radar sites with radar id, location, mean direction and standard deviation (SD), the length of the resultant mean direction vector (r, where 0 is a uniform distribution of directions and 1 is a perfectly directed distribution), and mean MTR.

<b>Radar id</b>	<b>Location</b>	<b>Meteorological agency</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Average direction, degrees</b>	<b>Average direction SD</b>	<b>r</b>	<b>Mean MTR</b>
<b>bejab</b>	Jabbeke	Belgian	51.1917	3.0642	240	63	0.55	219
<b>bewid</b>	Wideumont	Belgian	49.9143	5.5056	217	33	0.85	1113
<b>bezav</b>	Zaventem	Belgian	50.9055	4.4550	231	37	0.81	256
<b>bgvar</b>	Varna	Bulgarian	43.2769	27.7975	161	57	0.61	337
<b>ctcdv</b>	Creu del Vent	Catalonian	41.6019	1.4028	207	57	0.61	70
<b>ctpda</b>	Puig d'Arques	Catalonian	41.8888	2.9972	192	21	0.93	58
<b>czbrd</b>	Brdy-Praha	Czech	49.6583	13.8178	230	23	0.92	46
<b>czska</b>	Skalky	Czech	49.5011	16.7885	215	25	0.91	91
<b>deboo</b>	Boostedt	German	54.0044	10.0468	215	31	0.86	198
<b>dedrs</b>	Dresden	German	51.1246	13.7686	209	48	0.70	807
<b>deeis</b>	Eisberg	German	49.5407	12.4028	224	38	0.81	655
<b>deess</b>	Essen	German	51.4056	6.9669	225	36	0.82	589
<b>defbg</b>	Feldberg	German	47.8736	8.0039	221	42	0.76	227
<b>defld</b>	Flechtingen	German	51.3112	8.8021	221	46	0.73	799
<b>dehnr</b>	Hannover	German	52.4601	9.6945	209	51	0.67	716
<b>deisn</b>	Isen/Munchen	German	48.1747	12.1018	218	43	0.75	575
<b>demem</b>	Memmingen	German	48.0431	10.2204	225	36	0.82	558
<b>deneu</b>	Neuhaus	German	50.5001	11.1350	220	50	0.68	595
<b>denhb</b>	Neuheilenbach	German	50.1097	6.5485	230	39	0.80	589
<b>deoft</b>	Offethal	German	49.9859	8.7140	233	29	0.88	347
<b>depro</b>	Pritzel/Berlin	German	52.6486	13.8578	224	32	0.85	480
<b>detur</b>	Tuerkheim	German	48.5853	9.7828	233	48	0.71	538
<b>deumd</b>	Ummendorf	German	52.1601	11.1761	218	49	0.69	387
<b>fianj</b>	Anjalankoski	Finnish	60.9039	27.1081	237	52	0.66	210
<b>fiika</b>	Ikaalinen	Finnish	61.7673	23.0764	224	49	0.70	183
<b>fikes</b>	Kesälahti	Finnish	61.9070	29.7977	239	60	0.58	197
<b>fikor</b>	Korpo	Finnish	60.1285	21.6434	223	72	0.45	252
<b>fikuo</b>	Kuopio	Finnish	62.8626	27.3815	229	51	0.67	170
<b>filuo</b>	Lousto	Finnish	67.1391	26.8969	192	48	0.70	59

<b>fipt</b>	Petäjavesi	Finnish	62.3045	25.4401	224	52	0.66	221
<b>fiuta</b>	Utajärvi	Finnish	64.7749	26.3189	236	61	0.57	143
<b>fivan</b>	Vantaa	Finnish	60.2706	24.8690	217	62	0.56	257
<b>fivim</b>	Vimpeli	Finnish	63.1048	23.8209	222	48	0.70	199
<b>frabb</b>	Abbeville	French	50.1358	1.8347	211	36	0.82	505
<b>frave</b>	Avesnes	French	50.1283	3.8119	226	18	0.95	782
<b>frbla</b>	Blaisy-haut	French	47.3553	4.7758	224	31	0.86	1058
<b>frbor</b>	Bordeaux	French	44.8314	-0.6917	190	36	0.82	1292
<b>frbou</b>	Bourges	French	47.0586	2.3594	222	32	0.86	1160
<b>frcae</b>	Falaise	French	48.9272	-0.1494	218	39	0.79	399
<b>frche</b>	Cherves	French	46.6986	0.0656	211	30	0.87	518
<b>frlep</b>	Sembadel	French	45.2900	3.7094	207	22	0.93	803
<b>frmom</b>	Momuy	French	43.6247	-0.6092	200	28	0.89	992
<b>frmtc</b>	Montancy	French	47.3686	7.0192	233	20	0.94	544
<b>frniz</b>	Saint Nizier	French	46.0678	4.4453	219	19	0.95	394
<b>frpla</b>	Plabennec	French	48.4608	-4.4300	263	51	0.67	62
<b>frtou</b>	Toulouse	French	43.5744	1.3761	198	29	0.88	659
<b>frtra</b>	Trappes	French	48.7739	2.0075	226	32	0.85	696
<b>frtro</b>	Arcis-sur-aube	French	48.4622	4.3094	221	20	0.94	1273
<b>nldbl</b>	De bilt	Dutch	52.1017	5.1783	230	51	0.67	357
<b>nldhl</b>	Den helder	Dutch	52.9533	4.7900	248	71	0.47	209
<b>plbrz</b>	Brzuchania	Polish	50.3942	20.0797	210	41	0.77	409
<b>plgda</b>	Gdansk	Polish	54.3843	18.4563	234	33	0.85	377
<b>plleg</b>	Legionowo	Polish	52.4052	20.9609	218	41	0.77	427
<b>plpoz</b>	Poznan	Polish	52.4133	16.7971	228	30	0.87	333
<b>plram</b>	Ramza	Polish	50.1517	18.7267	224	25	0.91	190
<b>plrze</b>	Rzeszów	Polish	50.1141	22.0370	202	49	0.69	910
<b>plswi</b>	Swidwin	Polish	53.7903	15.8311	235	27	0.90	229
<b>ptfar</b>	Loule/Cavalos do Caldeirao	Portugese	37.3053	-7.9517	219	20	0.94	10
<b>ptlis</b>	Coruche/Cruz do Leao	Portugese	39.0714	-8.3989	192	22	0.93	132
<b>ptprt</b>	Arouca/Pico do Galheiro	Portugese	40.8450	-8.2797	208	44	0.75	41
<b>seang</b>	Ängelholm	Swedish	56.3675	12.8517	195	34	0.84	136

<b>searl</b>	Arlanda	Swedish	59.6544	17.9463	231	38	0.80	55
<b>sease</b>	Ase	Swedish	57.3035	18.4001	192	22	0.93	14
<b>sehud</b>	Hudiksvall	Swedish	61.5771	16.7144	229	24	0.92	29
<b>sekir</b>	Kiruna	Swedish	67.7088	20.6178	224	29	0.88	7
<b>sekkkr</b>	Karlskrona	Swedish	56.2955	15.6103	214	10	0.98	27
<b>selek</b>	Leksand	Swedish	60.7230	14.8776	236	19	0.95	25
<b>selul</b>	Luleå	Swedish	65.4309	21.8650	230	41	0.77	67
<b>seovi</b>	Örnsköldsvik	Swedish	63.6395	18.4019	227	13	0.97	17
<b>sevar</b>	Vara	Swedish	58.2556	12.8260	206	51	0.67	32