



Supplement of

A method for assessing model extensions: application to modelling winter precipitation with a microscale obstacle-resolving meteorological model (MITRAS v3.3)

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Table S1 : Initialisation profiles for cases Winit and Wwr_noprecip

z	u [ms^{-1}]	v [ms^{-1}]	θ [K]	p_0 [hPa]	ρ_0 [kgm^3]	q_1^1 [kgkg^{-1}]	q_1^{2c} [kgkg^{-1}]
1.5	0.6294	0.3303	280.81	989.82	1.2288	0.0037377	0.0
4.5	0.8676	0.4366	280.81	989.46	1.2285	0.0037314	0.0
7.5	1.0135	0.4924	280.81	989.1	1.2282	0.0037251	0.0
10.5	1.1195	0.527	280.81	988.73	1.2278	0.0037187	0.0
13.5	1.2045	0.5504	280.82	988.37	1.2275	0.0037124	0.0
16.5	1.277	0.5669	280.82	988.01	1.2272	0.0037061	0.0
19.5	1.3415	0.5785	280.82	987.65	1.2269	0.0036998	0.0
22.5	1.4003	0.5863	280.83	987.29	1.2265	0.0036936	0.0
25.5	1.4549	0.5912	280.83	986.93	1.2262	0.0036873	0.0
28.5	1.5065	0.5934	280.83	986.57	1.2259	0.003681	0.0
31.5	1.5545	0.5933	280.83	986.21	1.2255	0.0036748	0.0
34.75	1.6042	0.591	280.84	985.82	1.2252	0.003668	0.0
38.55	1.6606	0.5852	280.84	985.36	1.2248	0.0036601	0.0
43.0	1.7232	0.5747	280.85	984.83	1.2243	0.0036509	0.0
48.2	1.7924	0.5575	280.85	984.2	1.2237	0.0036401	0.0
54.3	1.868	0.5308	280.86	983.47	1.223	0.0036275	0.0
61.5	1.9504	0.4904	280.86	982.61	1.2223	0.0036127	0.0
70.0	2.0361	0.4312	280.87	981.59	1.2213	0.0035953	0.0
80.0	2.1204	0.3454	280.88	980.39	1.2202	0.0035749	0.0
91.75	2.1875	0.2289	280.89	978.98	1.219	0.0035511	0.0
105.55	2.2093	0.0692	280.91	977.33	1.2174	0.0035232	0.0
121.75	2.0164	-0.0467	280.92	975.4	1.2157	0.0034908	0.0
140.8	1.9989	-0.0007	280.94	973.13	1.2136	0.003453	0.0
163.2	2.0	-0.0	280.96	970.47	1.2112	0.003409	0.0
189.5	2.0	-0.0	280.99	967.35	1.2083	0.0033579	0.0
220.4	2.0	-0.0	281.02	963.69	1.205	0.0032987	0.0
256.7	2.0	-0.0	281.06	959.4	1.201	0.0032303	0.0
299.35	2.0	-0.0	281.1	954.39	1.1964	0.0031515	0.0
349.5	2.0	0.0	281.15	948.52	1.191	0.0030609	0.0
408.45	2.0	0.0	281.2	941.65	1.1847	0.0029573	0.0
477.7	2.0	0.0	281.27	933.62	1.1772	0.0028393	0.0
559.05	2.0	0.0	281.35	924.26	1.1686	0.002706	0.0
654.65	2.0	0.0	281.45	913.35	1.1584	0.002556	0.0
767.0	2.0	-0.0	281.56	900.65	1.1465	0.0023889	0.0
899.0	2.0	-0.0	281.69	885.89	1.1327	0.0022046	0.0
1054.1	2.0	-0.0	281.84	868.78	1.1165	0.0020037	0.0
1236.35	2.0	-0.0	282.02	848.99	1.0977	0.0017877	0.0
1450.5	2.0	-0.0	282.24	826.16	1.0759	0.0015597	0.0
1702.15	2.0	-0.0	282.49	799.91	1.0506	0.0013241	0.0
1997.85	2.0	-0.0	282.78	769.86	1.0213	0.0010868	0.0
2345.3	2.0	-0.0	283.13	735.63	0.98754	0.00085568	0.0
2753.55	2.0	-0.0	283.54	696.86	0.94881	0.00063942	0.0
3224.1	2.0	-0.0	284.01	654.07	0.90539	0.00045035	0.0
3724.1	2.0	-0.0	284.51	610.76	0.86068	0.00030461	0.0
4224.1	2.0	-0.0	285.02	569.61	0.81743	0.00020182	0.0
4724.1	2.0	-0.0	285.52	530.55	0.77562	0.00013077	0.0
5224.1	2.0	-0.0	286.03	493.5	0.73524	8.2699e-05	0.0

Table S2 : Initialisation profiles for case Wwr, Wwr_np, and Wice

z	u [ms ⁻¹]	v [ms ⁻¹]	θ [K]	p_0 [hPa]	ρ_0 [kgm ³]	q_1^1 [kgkg ⁻¹]	q_1^{2c} [kgkg ⁻¹]
1.5	0.6165	0.338	280.81	989.82	1.2538	0.0037377	0.02
4.5	0.8516	0.4476	280.81	989.45	1.2535	0.0037314	0.02
7.5	0.9973	0.5059	280.81	989.08	1.2532	0.0037251	0.02
10.5	1.1044	0.5425	280.82	988.71	1.2528	0.0037188	0.02
13.5	1.1913	0.5675	280.82	988.34	1.2525	0.0037126	0.02
16.5	1.2663	0.5852	280.82	987.97	1.2521	0.0037063	0.02
19.5	1.3338	0.5978	280.83	987.6	1.2518	0.0037	0.02
22.5	1.3959	0.6063	280.83	987.23	1.2514	0.0036938	0.02
25.5	1.454	0.6115	280.83	986.87	1.2511	0.0036875	0.02
28.5	1.5094	0.6137	280.84	986.5	1.2507	0.0036813	0.02
31.5	1.5611	0.6133	280.84	986.13	1.2504	0.0036751	0.02
34.75	1.6148	0.6101	280.84	985.73	1.25	0.0036683	0.02
38.55	1.6761	0.6028	280.85	985.27	1.2496	0.0036605	0.02
43.0	1.7442	0.5897	280.85	984.72	1.2491	0.0036513	0.02
48.2	1.8196	0.5682	280.86	984.08	1.2485	0.0036406	0.02
54.3	1.9015	0.5349	280.87	983.34	1.2478	0.003628	0.02
61.5	1.99	0.4841	280.88	982.46	1.247	0.0036133	0.02
70.0	2.0786	0.4101	280.89	981.42	1.246	0.0035959	0.02
80.0	2.1601	0.3012	280.9	980.19	1.2448	0.0035756	0.02
91.75	2.2086	0.1596	280.91	978.76	1.2435	0.0035519	0.02
105.55	2.1846	-0.0259	280.93	977.08	1.2419	0.0035242	0.02
121.75	2.0027	-0.0122	280.95	975.11	1.2401	0.0034919	0.02
140.8	2.0	-0.0002	280.97	972.79	1.2379	0.0034542	0.02
163.2	2.0	-0.0	281.0	970.07	1.2353	0.0034103	0.02
189.5	2.0	-0.0	281.03	966.89	1.2323	0.0033595	0.02
220.4	2.0	-0.0	281.06	963.16	1.2288	0.0033005	0.02
256.7	2.0	-0.0	281.11	958.79	1.2247	0.0032324	0.02
299.35	2.0	0.0	281.16	953.68	1.2199	0.0031538	0.02
349.5	2.0	0.0	281.22	947.69	1.2142	0.0030636	0.02
408.45	2.0	0.0	281.29	940.69	1.2076	0.0029603	0.02
477.7	2.0	0.0	281.37	932.51	1.1998	0.0028427	0.02
559.05	2.0	-0.0	281.47	922.97	1.1907	0.0027097	0.02
654.65	2.0	-0.0	281.58	911.85	1.1801	0.0025602	0.02
767.0	2.0	-0.0	281.71	898.92	1.1676	0.0023936	0.02
899.0	2.0	-0.0	281.87	883.89	1.1531	0.0022096	0.02
1054.1	2.0	-0.0	282.06	866.48	1.1356	0.002009	0.019459
1236.35	2.0	-0.0	282.27	846.37	1.114	0.0017933	0.017636
1450.5	2.0	-0.0	282.52	823.23	1.0889	0.0015653	0.015495
1702.15	2.0	-0.0	282.81	796.71	1.0601	0.0013294	0.012978
1997.85	2.0	-0.0	283.14	766.44	1.027	0.0010917	0.010021
2345.3	2.0	-0.0	283.52	732.06	0.99036	0.00085986	0.007698
2753.55	2.0	-0.0	283.96	693.24	0.94859	0.00064276	0.0049763
3224.1	2.0	-0.0	284.45	650.53	0.90214	0.00045281	0.0018393
3724.1	2.0	-0.0	284.96	607.42	0.85596	0.00030628	0.0
4224.1	2.0	-0.0	285.47	566.49	0.81295	0.00020293	0.0
4724.1	2.0	-0.0	285.97	527.64	0.77137	0.00013149	0.0
5224.1	2.0	-0.0	286.48	490.8	0.73121	8.3154e-05	0.0

Table S3 : Initialisation profiles for case Cwr and Cice

z	u [ms^{-1}]	v [ms^{-1}]	θ [K]	p_0 [hPa]	ρ_0 [kgm^3]	q_1^1 [kgkg^{-1}]	q_1^{2c} [kgkg^{-1}]
1.5	0.6036	0.342	272.78	989.81	1.292	0.0021123	0.02
4.5	0.8359	0.4538	272.79	989.43	1.2916	0.0021085	0.02
7.5	0.9813	0.5139	272.79	989.05	1.2913	0.0021047	0.02
10.5	1.0893	0.5519	272.79	988.67	1.2909	0.0021009	0.02
13.5	1.1779	0.578	272.8	988.29	1.2905	0.0020971	0.02
16.5	1.2551	0.5967	272.8	987.91	1.2902	0.0020934	0.02
19.5	1.3251	0.6099	272.8	987.53	1.2898	0.0020896	0.02
22.5	1.39	0.6189	272.81	987.15	1.2894	0.0020858	0.02
25.5	1.451	0.6242	272.81	986.77	1.2891	0.002082	0.02
28.5	1.5095	0.6263	272.81	986.39	1.2887	0.0020783	0.02
31.5	1.5642	0.6254	272.82	986.01	1.2883	0.0020745	0.02
34.75	1.6211	0.6215	272.82	985.6	1.2879	0.0020705	0.02
38.55	1.6864	0.6128	272.83	985.12	1.2875	0.0020657	0.02
43.0	1.759	0.5975	272.83	984.56	1.2869	0.0020602	0.02
48.2	1.8391	0.5725	272.84	983.9	1.2863	0.0020537	0.02
54.3	1.9261	0.5338	272.85	983.13	1.2855	0.0020462	0.02
61.5	2.0186	0.4751	272.85	982.23	1.2847	0.0020373	0.02
70.0	2.1101	0.3885	272.86	981.16	1.2836	0.0020269	0.02
80.0	2.1854	0.2642	272.88	979.9	1.2824	0.0020146	0.02
91.75	2.2083	0.0974	272.89	978.42	1.281	0.0020003	0.02
105.55	2.0603	-0.0648	272.91	976.69	1.2793	0.0019837	0.02
121.75	1.9988	-0.0014	272.93	974.66	1.2773	0.0019643	0.02
140.8	2.0	-0.0	272.95	972.27	1.275	0.0019416	0.02
163.2	2.0	-0.0	272.98	969.47	1.2722	0.0019153	0.02
189.5	2.0	-0.0	273.01	966.19	1.269	0.0018848	0.02
220.4	2.0	-0.0	273.04	962.35	1.2653	0.0018495	0.02
256.7	2.0	-0.0	273.09	957.85	1.2609	0.0018087	0.02
299.35	2.0	0.0	273.14	952.59	1.2557	0.0017618	0.02
349.5	2.0	0.0	273.2	946.43	1.2497	0.0017079	0.02
408.45	2.0	0.0	273.27	939.22	1.2426	0.0016465	0.02
477.7	2.0	0.0	273.35	930.81	1.2343	0.0015767	0.02
559.05	2.0	-0.0	273.45	920.99	1.2246	0.0014979	0.02
654.65	2.0	-0.0	273.56	909.56	1.2133	0.0014097	0.02
767.0	2.0	-0.0	273.7	896.26	1.2001	0.0013118	0.02
899.0	2.0	-0.0	273.85	880.82	1.1847	0.0012042	0.02
1054.1	2.0	-0.0	274.04	862.94	1.1661	0.0010875	0.019459
1236.35	2.0	-0.0	274.26	842.3	1.1431	0.00096297	0.017636
1450.5	2.0	-0.0	274.51	818.56	1.1167	0.00083243	0.015495
1702.15	2.0	-0.0	274.8	791.37	1.0862	0.00069873	0.012978
1997.85	2.0	-0.0	275.13	760.37	1.0513	0.00056565	0.010021
2345.3	2.0	-0.0	275.51	725.2	1.0126	0.00043778	0.007698
2753.55	2.0	-0.0	275.95	685.54	0.96855	0.00032024	0.0049763
3224.1	2.0	-0.0	276.45	641.96	0.91965	0.0002197	0.0018393
3724.1	2.0	-0.0	276.96	598.05	0.87107	0.0001442	0.0
4224.1	2.0	-0.0	277.46	556.44	0.82583	$9.2503e - 05$	0.0
4724.1	2.0	-0.0	277.97	517.01	0.78216	$5.7892e - 05$	0.0
5224.1	2.0	-0.0	278.47	479.69	0.74004	$3.5269e - 05$	0.0

Table S4 : Initialisation profiles for cases Hwr and Hice

z	u [ms ⁻¹]	v [ms ⁻¹]	θ [K]	p_0 [hPa]	ρ_0 [kgm ³]	q_1^1 [kgkg ⁻¹]	q_1^{2c} [kgkg ⁻¹]
1.5	0.6332	0.3299	288.83	989.82	1.217	0.0063763	0.02
4.5	0.8721	0.4359	288.83	989.46	1.2167	0.0063662	0.02
7.5	1.0181	0.4914	288.84	989.1	1.2164	0.0063561	0.02
10.5	1.1238	0.5258	288.84	988.75	1.2161	0.006346	0.02
13.5	1.2081	0.5491	288.84	988.39	1.2157	0.006336	0.02
16.5	1.2799	0.5654	288.85	988.03	1.2154	0.0063259	0.02
19.5	1.3435	0.5769	288.85	987.67	1.2151	0.0063159	0.02
22.5	1.4013	0.5848	288.85	987.32	1.2148	0.0063059	0.02
25.5	1.4549	0.5897	288.86	986.96	1.2145	0.0062959	0.02
28.5	1.5053	0.5921	288.86	986.6	1.2141	0.0062859	0.02
31.5	1.5523	0.5923	288.86	986.24	1.2138	0.0062759	0.02
34.75	1.6008	0.5902	288.87	985.86	1.2135	0.0062651	0.02
38.55	1.6558	0.585	288.87	985.4	1.2131	0.0062525	0.02
43.0	1.7167	0.5752	288.88	984.88	1.2126	0.0062378	0.02
48.2	1.7839	0.5591	288.88	984.26	1.212	0.0062206	0.02
54.3	1.8575	0.5339	288.89	983.53	1.2114	0.0062005	0.02
61.5	1.9373	0.4957	288.9	982.68	1.2106	0.0061768	0.02
70.0	2.0212	0.4387	288.91	981.67	1.2097	0.006149	0.02
80.0	2.1016	0.3573	288.92	980.48	1.2086	0.0061164	0.02
91.75	2.1667	0.2414	288.93	979.09	1.2074	0.0060782	0.02
105.55	2.1845	0.0924	288.95	977.46	1.2059	0.0060337	0.02
121.75	2.0839	-0.067	288.97	975.54	1.2042	0.0059818	0.02
140.8	1.9989	-0.0011	288.99	973.29	1.2021	0.0059212	0.02
163.2	2.0	-0.0	289.02	970.65	1.1997	0.0058506	0.02
189.5	2.0	-0.0	289.05	967.56	1.197	0.0057687	0.02
220.4	2.0	-0.0	289.08	963.94	1.1937	0.0056736	0.02
256.7	2.0	-0.0	289.13	959.69	1.1898	0.0055636	0.02
299.35	2.0	-0.0	289.18	954.73	1.1853	0.0054367	0.02
349.5	2.0	0.0	289.23	948.91	1.18	0.0052906	0.02
408.45	2.0	0.0	289.3	942.1	1.1738	0.0051231	0.02
477.7	2.0	0.0	289.38	934.15	1.1665	0.0049321	0.02
559.05	2.0	0.0	289.48	924.88	1.158	0.0047153	0.02
654.65	2.0	0.0	289.59	914.06	1.148	0.004471	0.02
767.0	2.0	-0.0	289.73	901.47	1.1364	0.0041976	0.02
899.0	2.0	-0.0	289.88	886.85	1.1228	0.0038945	0.02
1054.1	2.0	-0.0	290.06	869.89	1.1063	0.0035623	0.019459
1236.35	2.0	-0.0	290.28	850.29	1.0859	0.0032028	0.017636
1450.5	2.0	-0.0	290.53	827.73	1.0622	0.00282	0.015495
1702.15	2.0	-0.0	290.81	801.85	1.035	0.0024203	0.012978
1997.85	2.0	-0.0	291.14	772.28	1.0037	0.0020132	0.010021
2345.3	2.0	-0.0	291.52	738.66	0.96894	0.0016107	0.007698
2753.55	2.0	-0.0	291.96	700.66	0.92932	0.0012275	0.0049763
3224.1	2.0	-0.0	292.45	658.78	0.88519	0.00088539	0.0018393
3724.1	2.0	-0.0	292.95	616.45	0.84128	0.00061512	0.0
4224.1	2.0	-0.0	293.46	576.19	0.80036	0.00041939	0.0
4724.1	2.0	-0.0	293.96	537.91	0.76074	0.0002802	0.0
5224.1	2.0	-0.0	294.47	501.54	0.72242	0.00018313	0.0