Supplement of Atmos. Chem. Phys., 26, 15375–15404, 2026
https://doi.org/10.5194/acp-26-15375-2026-supplement
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Atmospheric Chemistry and Physics Open Access

Supplement of

A closed-to-open cell mixed-phase cloud transition observed over the Nordic Seas under high aerosol loading and strong surface fluxes

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Altitude (m)	SL1 Begin	SL1 End	SL3 Begin	SL3 End
400	n/a	13:59:06	15:21:12	n/a
500	13:42:52	13:59:28	15:20:51	15:53:35
600	13:42:21	13:59:53	15:20:33	15:53:54
700	13:42:04	14:00:13	15:20:11	15:54:10
800	13:41:46	14:00:34	15:19:50	15:54:25
900	13:41:30	14:00:55	15:19:28	15:54:39
1000	13:41:13	14:01:19	15:19:09	15:54:51
1100	13:40:55	14:01:39	15:18:49	15:55:02
1200	13:40:26	14:02:03	15:18:27	15:55:14
1300	13:40:05	14:02:26	15:18:08	15:55:25
1400	13:39:44	14:02:50	15:17:45	15:55:36
1500	13:39:23	14:03:10	15:17:26	15:55:47
1600	13:39:03	14:03:30	15:17:06	15:55:59
1700	n/a	n/a	15:16:46	15:56:10
1800	n/a	n/a	15:16:25	15:56:22
1900	n/a	n/a	15:16:06	15:56:33
2000	n/a	n/a	n/a	15:56:45
2100	n/a	n/a	n/a	15:56:57
2200	n/a	n/a	n/a	15:57:08
2300	n/a	n/a	n/a	15:57:20

Table S1: Times at various altitudes during vertical profiles. Time can be linearly interpolated between most reported altitudes as ascent/descent rate remained approximately constant.

Surface Leg	Fetch (km)	Time (UTC)
SL1	10	13:44:41
SL1	20	13:46:07
SL1	30	13:47:32
SL1	40	13:48:57
SL1	50	13:50:20
SL1	60	13:51:45
SL1	70	13:53:11
SL1	80	13:54:35
SL1	90	13:56:00
SL1	100	13:57:23
SL3	230	15:22:10
SL3	240	15:23:39
SL3	250	15:25:06
SL3	260	15:26:36
SL3	270	15:28:03
SL3	280	15:29:31
SL3	290	15:31:00
SL3	300	15:32:29
SL3	310	15:33:59
SL3	320	15:35:30
SL3	330	15:37:02
SL3	340	15:38:31
SL3	350	15:39:59
SL3	360	15:41:27
SL3	370	15:42:57
SL3	380	15:44:26
SL3	390	15:45:57
SL3	400	15:47:27
SL3	410	15:48:55
SL3	420	15:50:27
SL3	430	15:51:59

Table S2: Times at various fetch distances along SL1 and SL3. Time can be linearly interpolated between between reported distances as aircraft speed remained approximately constant.

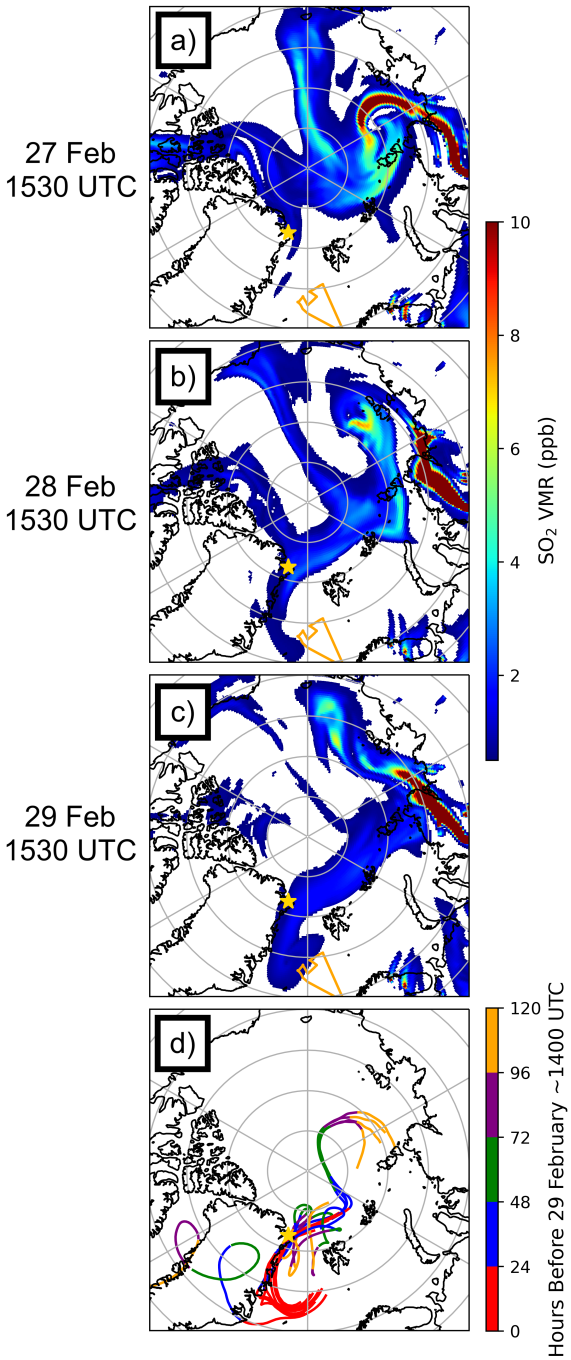


Figure S1: (a) Vertically integrated SO_2 volume mixing ratios from the GEOS-CF model run initialized on 27 February at 12:00 UTC forecasting for 27 February at 15:30 UTC. (b) Same as (a) but initialized at 12:00 UTC and forecasting for 15:30 UTC for 28 February. (c) Same as (a)-(b) but initialized at 12:00 UTC and forecasting for 15:30 UTC for 29 February. (d) Back-trajectories forced by ERA5 with receptor points along RF02 at 500 m.

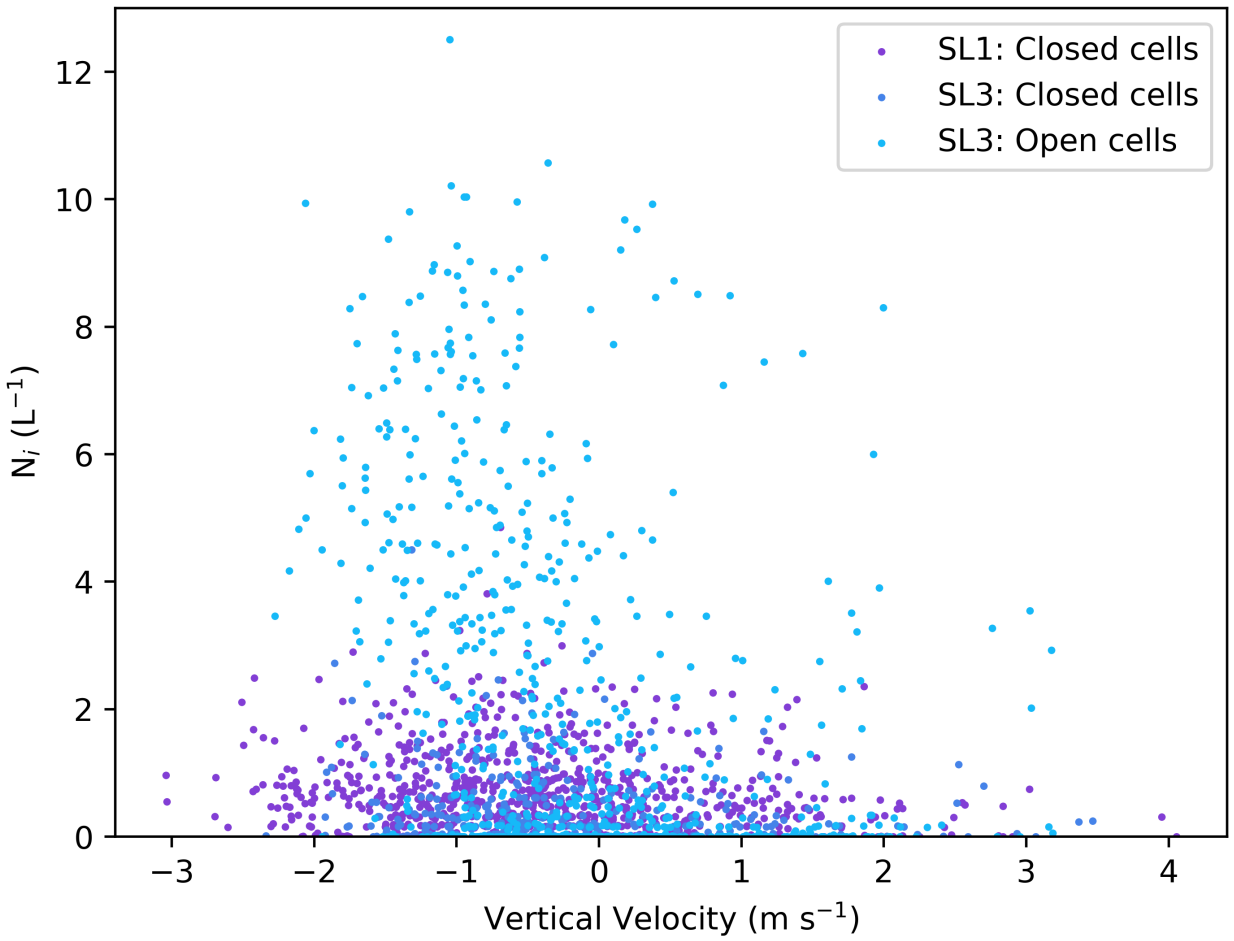


Figure S2: N_i as a function of in-situ updraft velocity during surface legs.