

Supplements for “Patterns of Solid Precipitation Particle Size and Velocity Distribution from Long-term Observations in North Japan”

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Supplement S1 Observation sites and specifications

15 VSVDs were installed at Sapporo, Asahikawa, Kitami, Obihiro, and Tokamachi, as summarized in Table S1. While the installation height (H; m) varied across sites and years, it was sufficiently high to prevent burial by snowpack. The VSVDs were enclosed by wind-breaking nets; these generally consisted of an outer net only, although inner nets were additionally installed in some cases. Since standard VSVDs fail to detect certain precipitation particles, the detection efficiency was corrected following Katsuyama and Inatsu (2021). For Sapporo after 2019 and Tokamachi after 2023, the VSVDs were
20 upgraded to a version that does not require such correction.

All sites were characterized by flat terrain and sufficient open space (Figs. S1–S7). The Asahikawa site was relocated by 800 m in 2019 (Figs. S2, S3), accompanied by a change in the installation height of the VSVD (Table S1). Similarly, the Kitami site was relocated by 500 m in 2017 (Figs. S4, S5), and the height of the VSVD was changed (Table S1).

Table S1. Installation specifications for VSVDs: height (H; m), Wind-breaking net, detection correction (C), and data period.

Sapporo				Asahikawa				Kitami				
H	Net	C	Period	H	Net	C	Period	H	Net	C	Period	
2016	1.0	inner+outer	yes	1Dec2016–31Mar2017	1.0	inner+outer	yes	8Dec2016–21Mar2017	1.5	inner+outer	yes	8Dec2016–21Mar2017
2017	1.0	inner+outer	yes	1Dec2017–31Mar2018	1.0	inner+outer	yes	1Dec2017–14Mar2018	2.0	inner+outer	yes	1Dec2017–22Mar2018
2018	1.0	inner+outer	yes	1Dec2018–31Mar2019	1.0	inner+outer	yes	1Dec2018–20Mar2019	2.0	inner+outer	yes	1Dec2018–18Mar2019
2019	1.0	inner+outer	yes	1Dec2019–24Mar2020	2.3	inner+outer	yes	1Dec2019–25Mar2020	2.3	inner+outer	yes	1Dec2019–26Mar2020
2020	1.0	inner+outer	yes	1Dec2020–16Feb2021	2.3	inner+outer	yes	2Dec2020–24Mar2021	2.3	inner+outer	yes	1Dec2020–2Mar2021
2021	1.0	inner+outer	yes	1Dec2021–31Mar2022	2.3	inner+outer	yes	1Dec2021–31Mar2022	2.3	inner+outer	yes	1Dec2021–31Mar2022
2022	1.0	inner+outer	yes	1Dec2022–14Mar2023	2.3	inner+outer	yes	1Dec2022–14Mar2023	2.3	inner+outer	yes	1Dec2022–15Mar2023
2023	1.0	outer	no	21Dec2023–28Mar2024	—	—	—	—	—	—	—	—
2024	1.0	outer	no	6Dec2024–27Mar2025	—	—	—	—	—	—	—	—

Obihiro				Tokamachi				
H	Net	C	Period	H	Net	C	Period	
2016	1.0	inner+outer	yes	7Dec2016–22Mar2017	—	—	—	
2017	1.1	inner+outer	yes	1Dec2017–23Mar2018	—	—	—	
2018	1.1	inner+outer	yes	1Dec2018–19Mar2019	—	—	—	
2019	1.3	inner+outer	yes	1Dec2019–26Mar2020	—	—	—	
2020	1.3	inner+outer	yes	1Dec2020–23Mar2021	—	—	—	
2021	1.3	inner+outer	yes	1Dec2021–31Mar2022	2.6	outer	yes	1Dec2021–31Mar2022
2022	1.3	inner+outer	yes	1Dec2022–15Mar2023	2.6	outer	yes	2Dec2022–21Mar2023
2023	—	—	—	—	2.6	outer	no	1Dec2023–31Mar2024
2024	—	—	—	—	2.6	outer	no	1Dec2024–31Mar2025



Figure S1: A photo of the Sapporo site.



Figure S2: A photo of the Asahikawa site before 2018.



30 **Figure S3: A photo of the Asahikawa site after 2019.**



Figure S4: A photo of the Kitami site in 2016.



Figure S5: A photo of the Kitami site after 2017.

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Figure S6: A photo of the Obihiro site.



Figure S7: A photo of Tokamachi site.

Supplement S2 Sensitivity tests for SOM analysis

40 Sensitivity tests were performed for the SOM analysis by sweeping several parameter configurations. Specifically, Figs. S8–S13 and Figs. S14–S19 show the resulting SOM maps for map shapes of 3×3 and 8×8 , respectively.

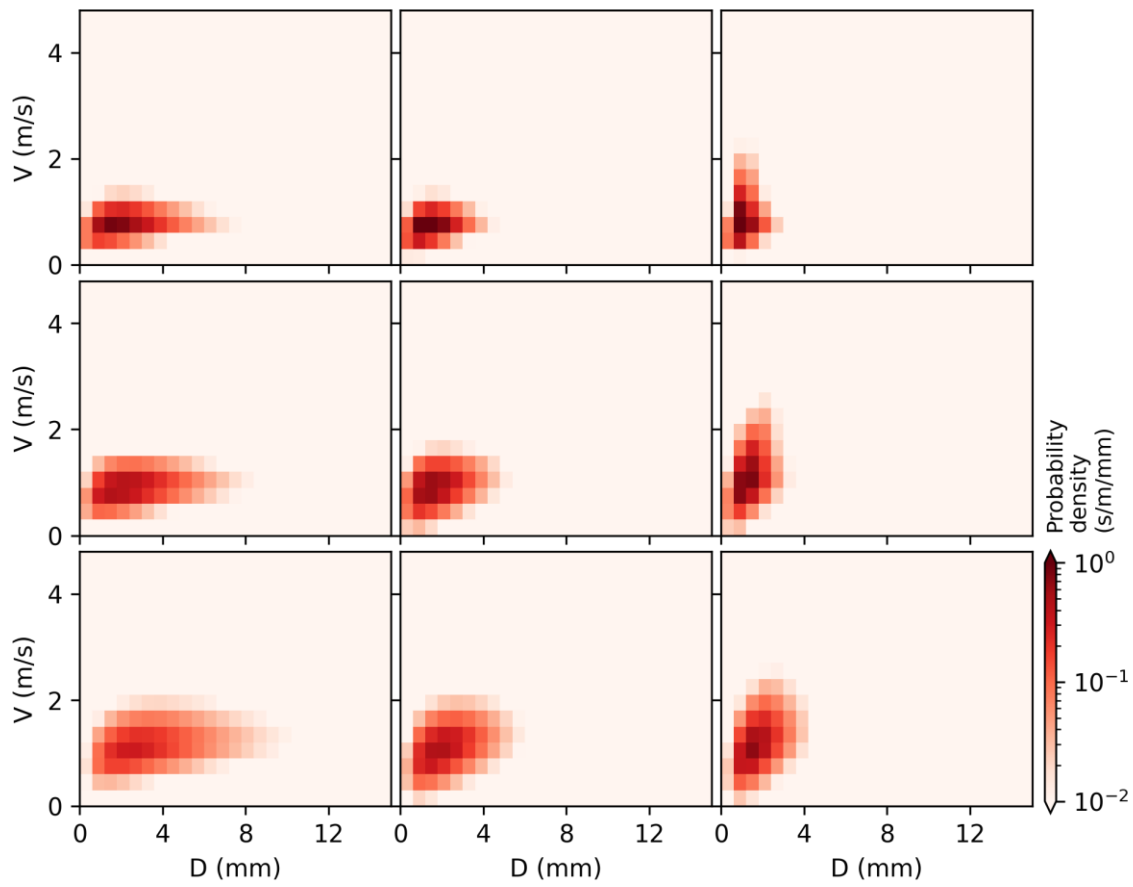
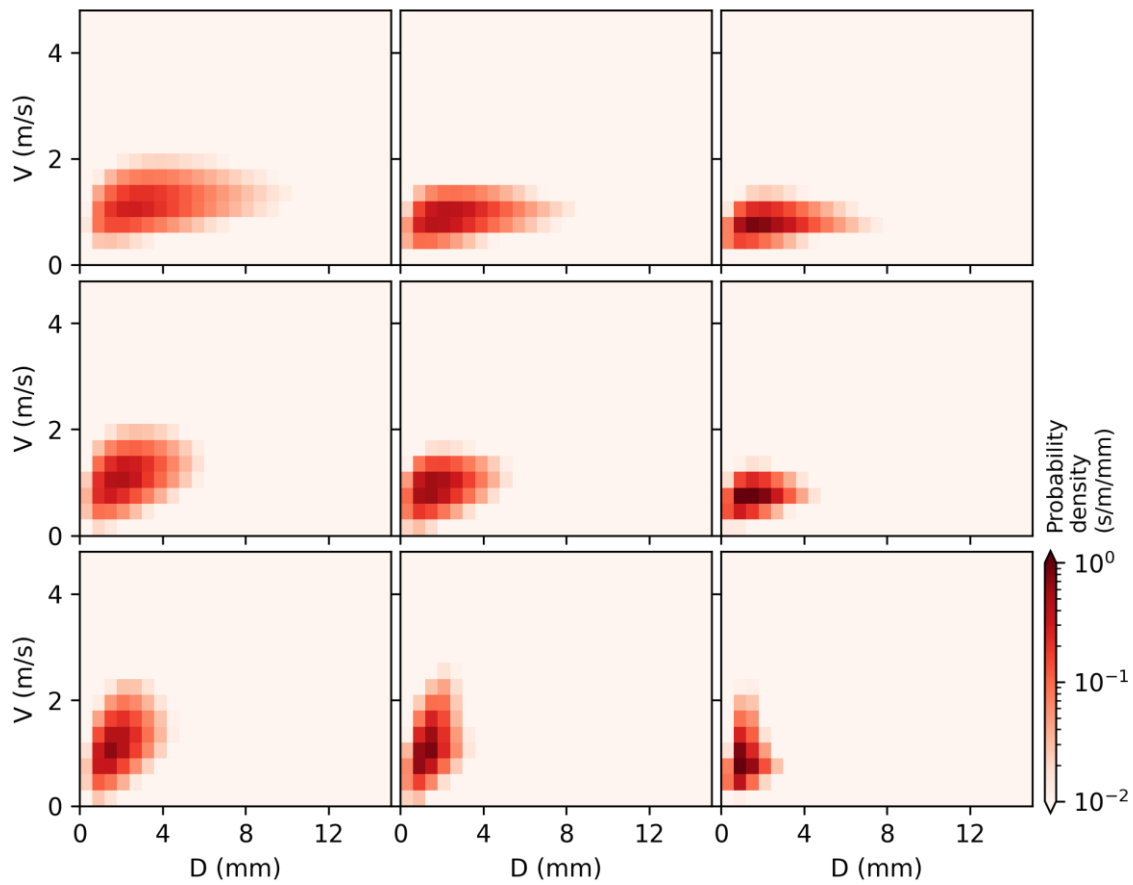


Figure S8: The SOM map with 3×3 shape, $\alpha_0 = 0.2$, and $s(0) = 2$.



45 **Figure S9: The SOM map with 3×3 shape, $\alpha_0 = 0.2$, and $s(0) = 1.5$.**

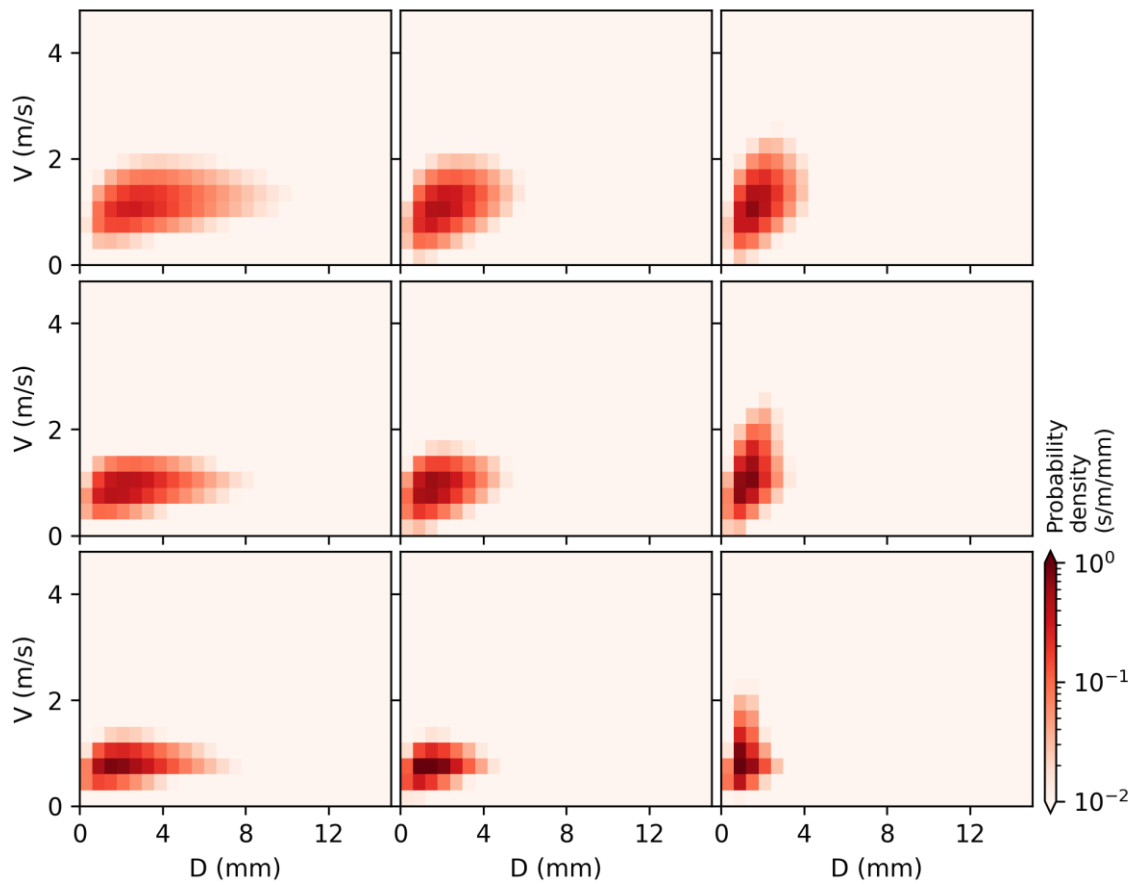


Figure S10: The SOM map with 3×3 shape, $\alpha_0 = 0.2$, and $s(0) = 1.0$.

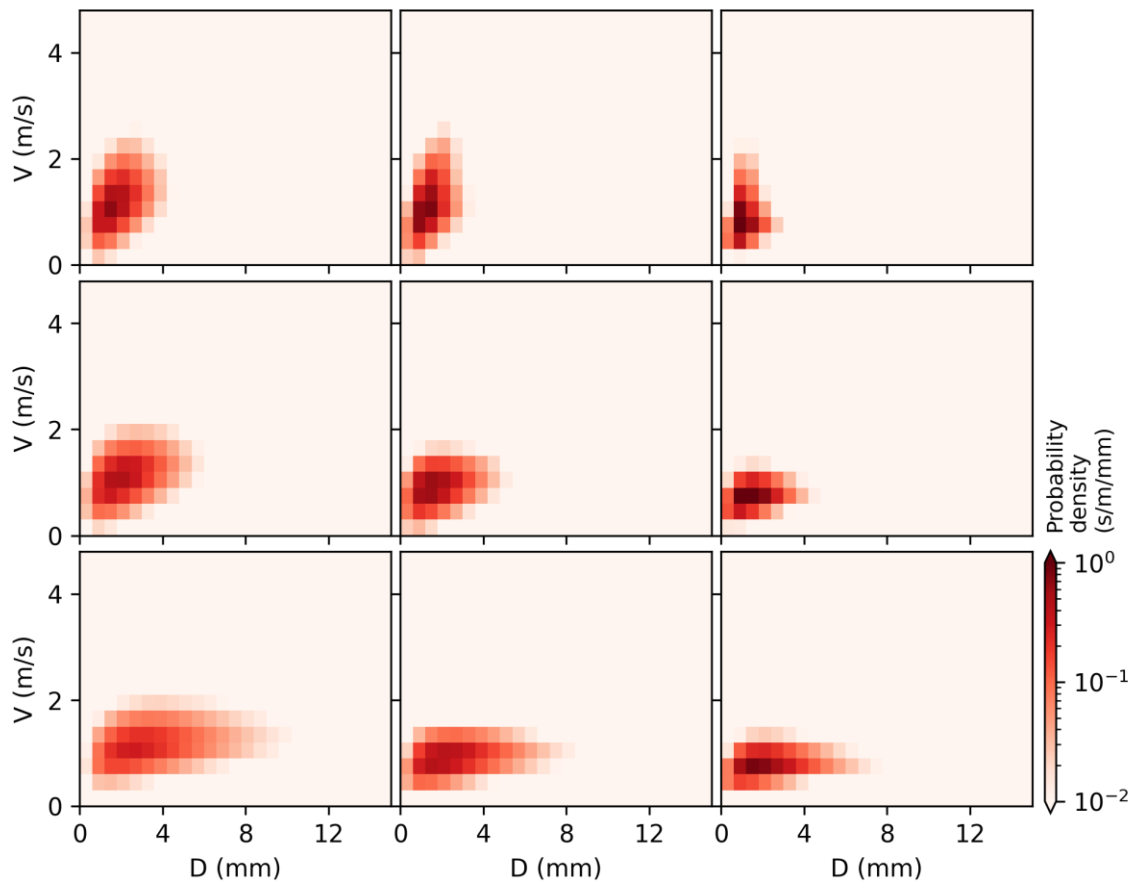


Figure S11: The SOM map with 3×3 shape, $\alpha_0 = 0.1$, and $s(0) = 2$.

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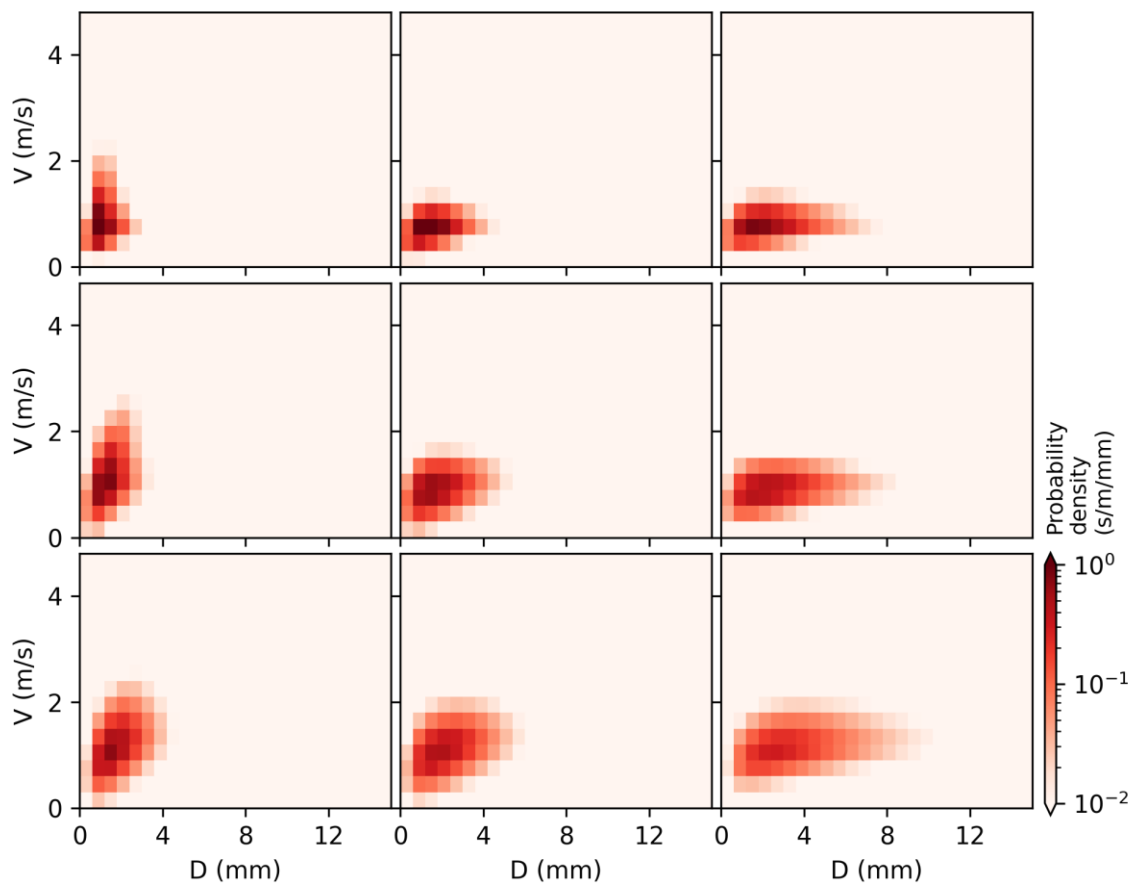


Figure S12: The SOM map with 3×3 shape, $\alpha_0 = 0.1$, and $s(0) = 1.5$.

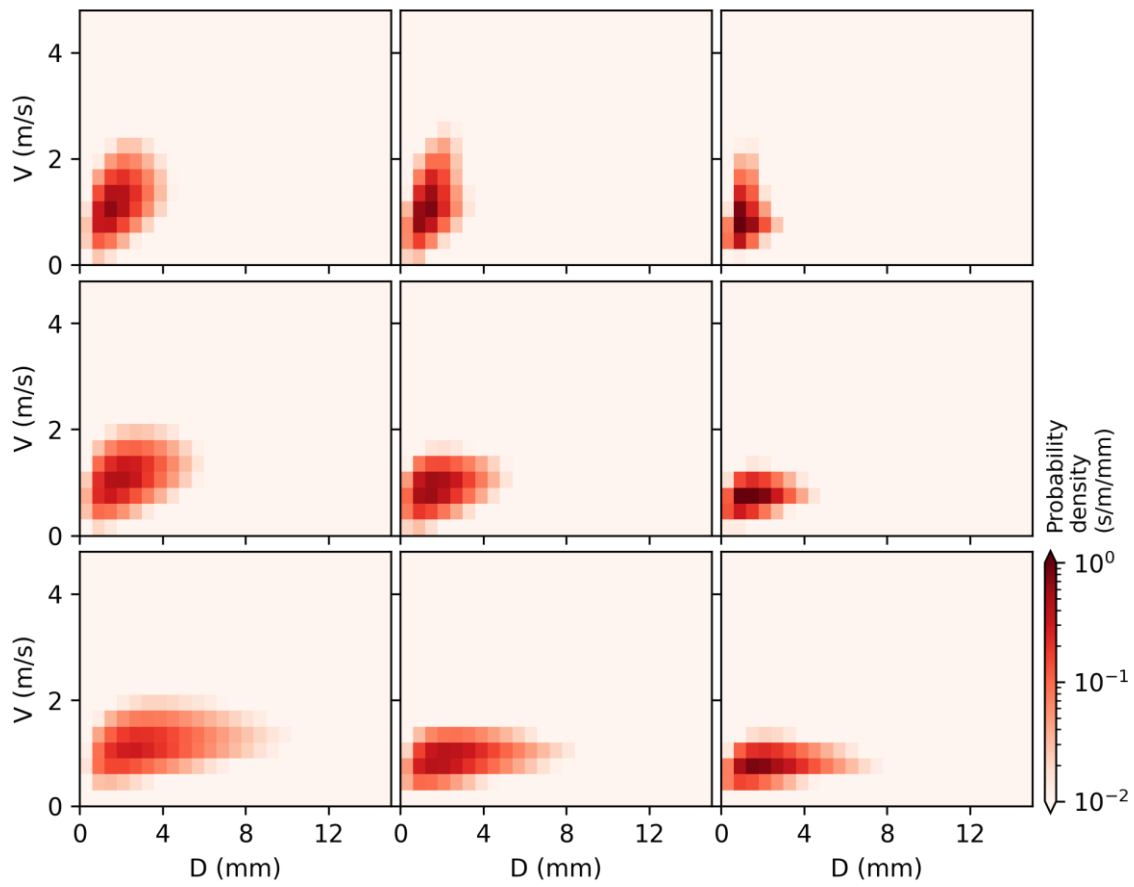
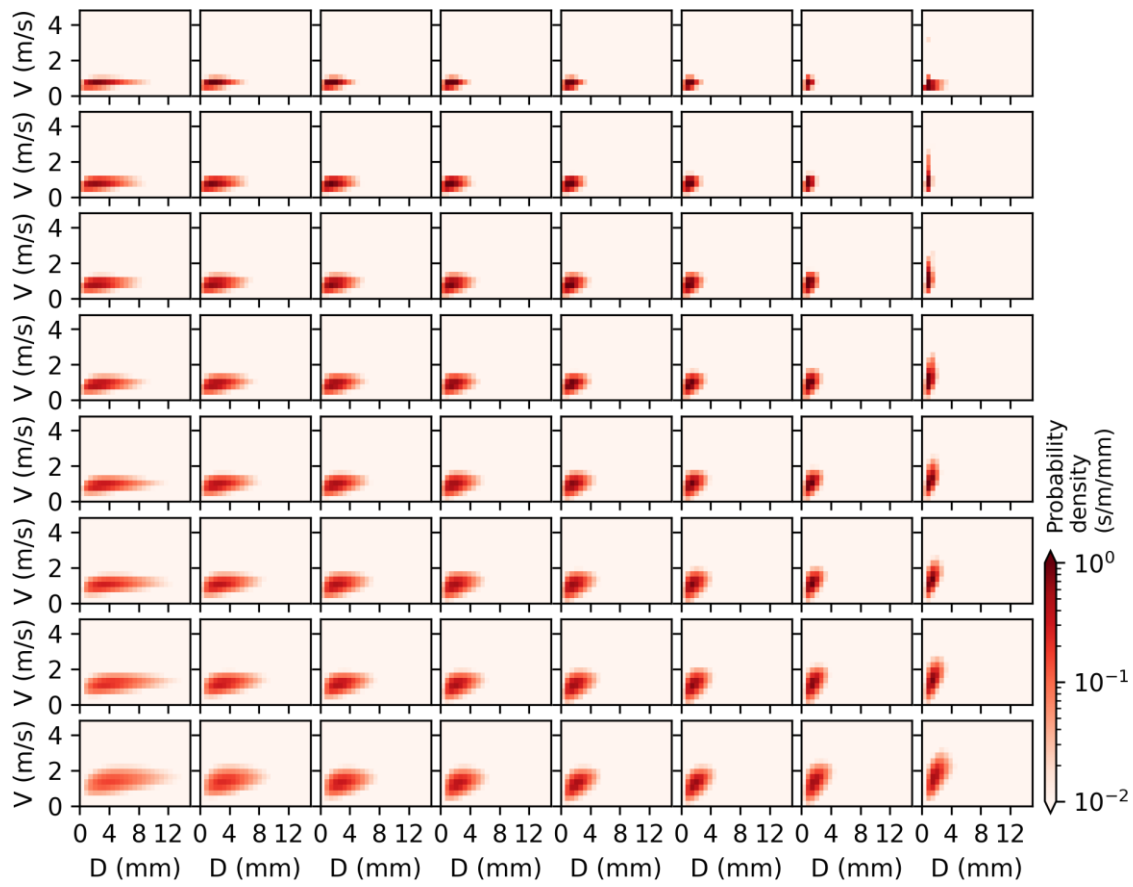


Figure S13: The SOM map with 3×3 shape, $\alpha_0 = 0.1$, and $s(0) = 1.0$.



55 **Figure S14: The SOM map with 8×8 shape, $\alpha_0 = 0.2$, and $s(0) = 1.5$.**

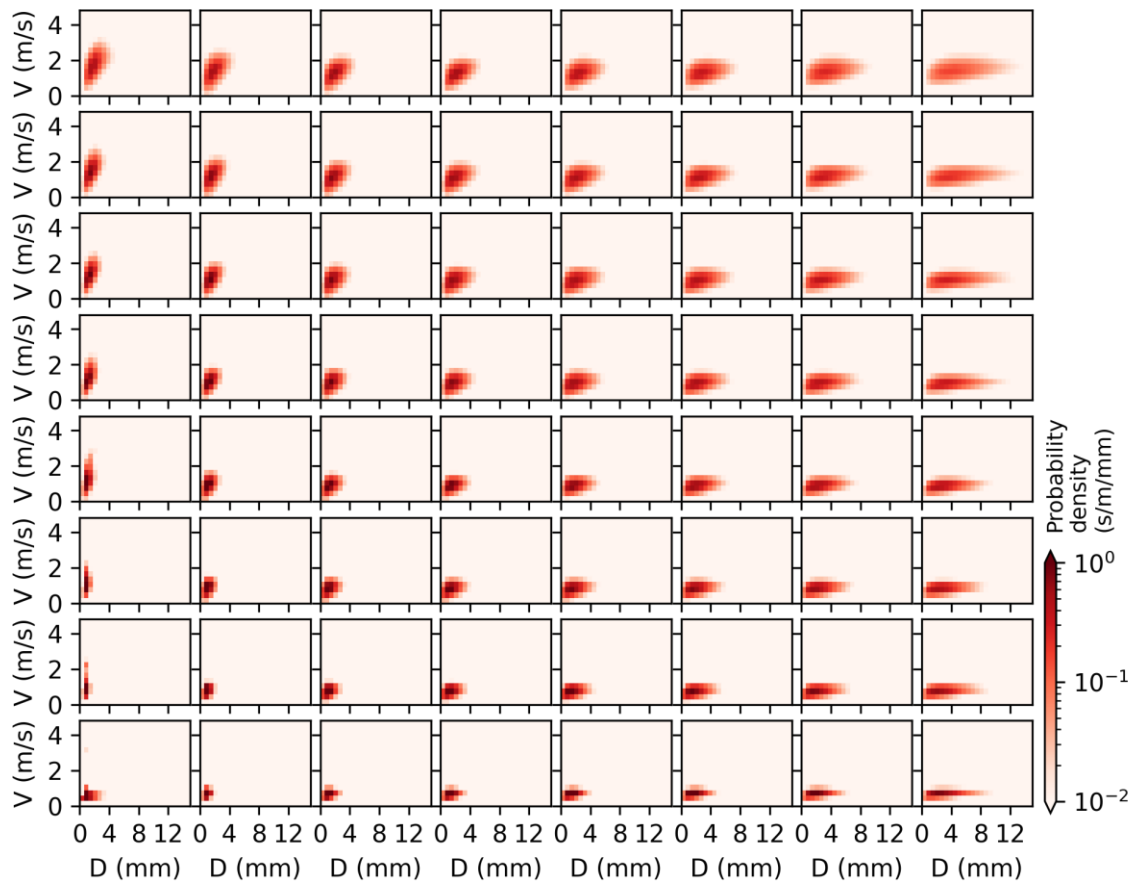


Figure S15: The SOM map with 8×8 shape, $\alpha_0 = 0.2$, and $s(0) = 4.0$.

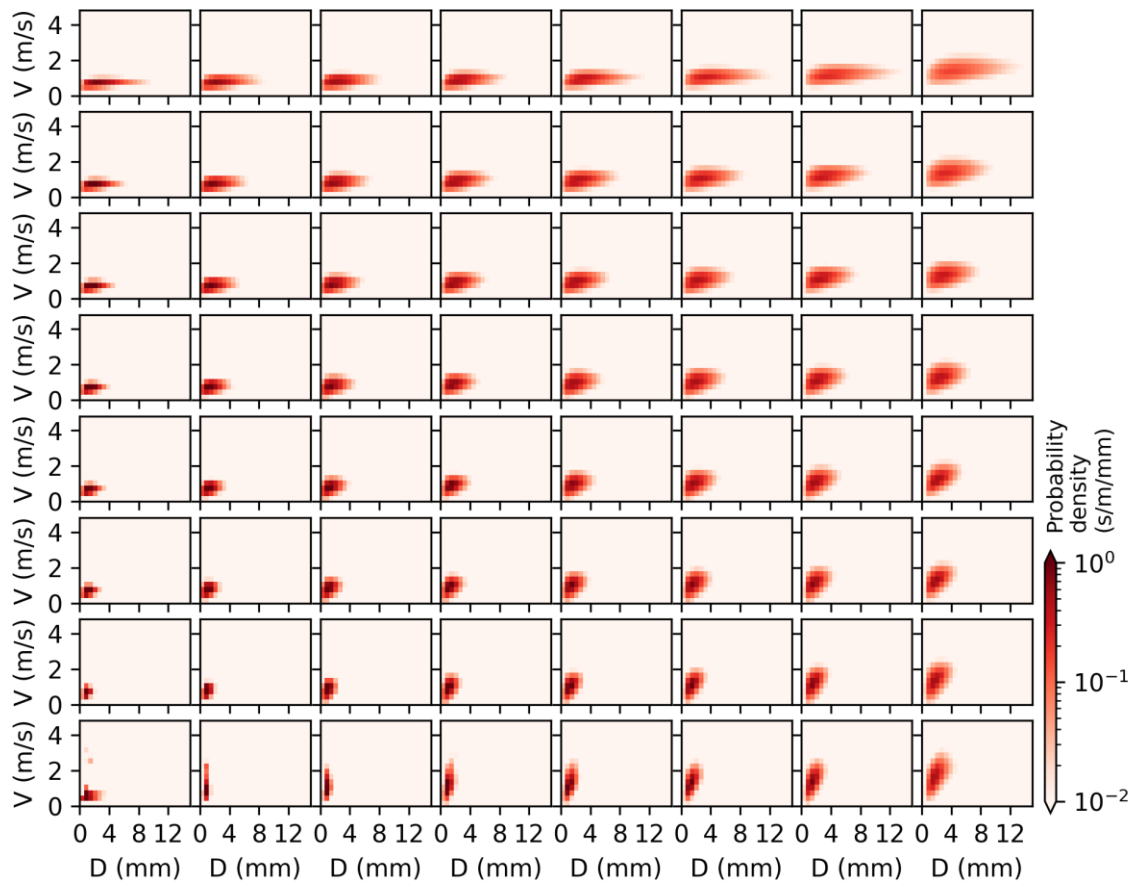


Figure S16: The SOM map with 8×8 shape, $\alpha_0 = 0.2$, and $s(0) = 6.5$.

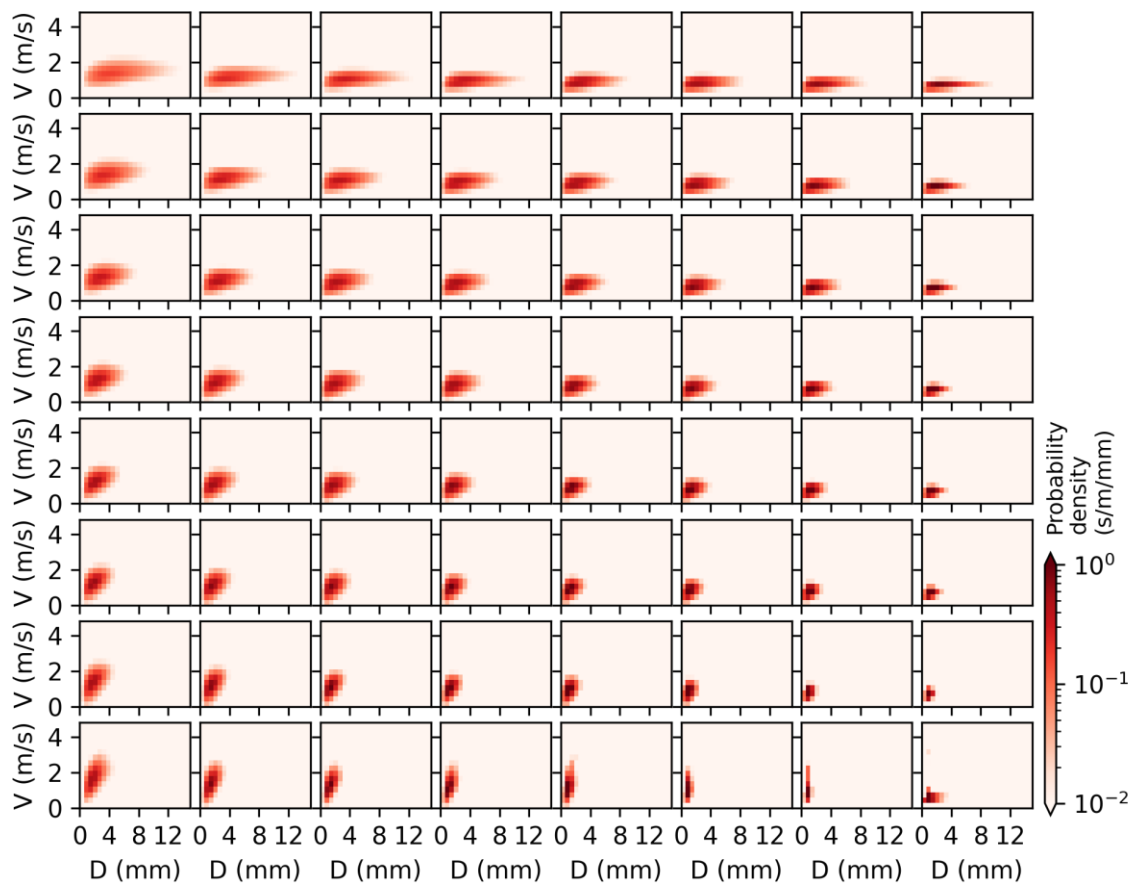


Figure S17: The SOM map with 8×8 shape, $\alpha_0 = 0.1$, and $s(0) = 1.5$.

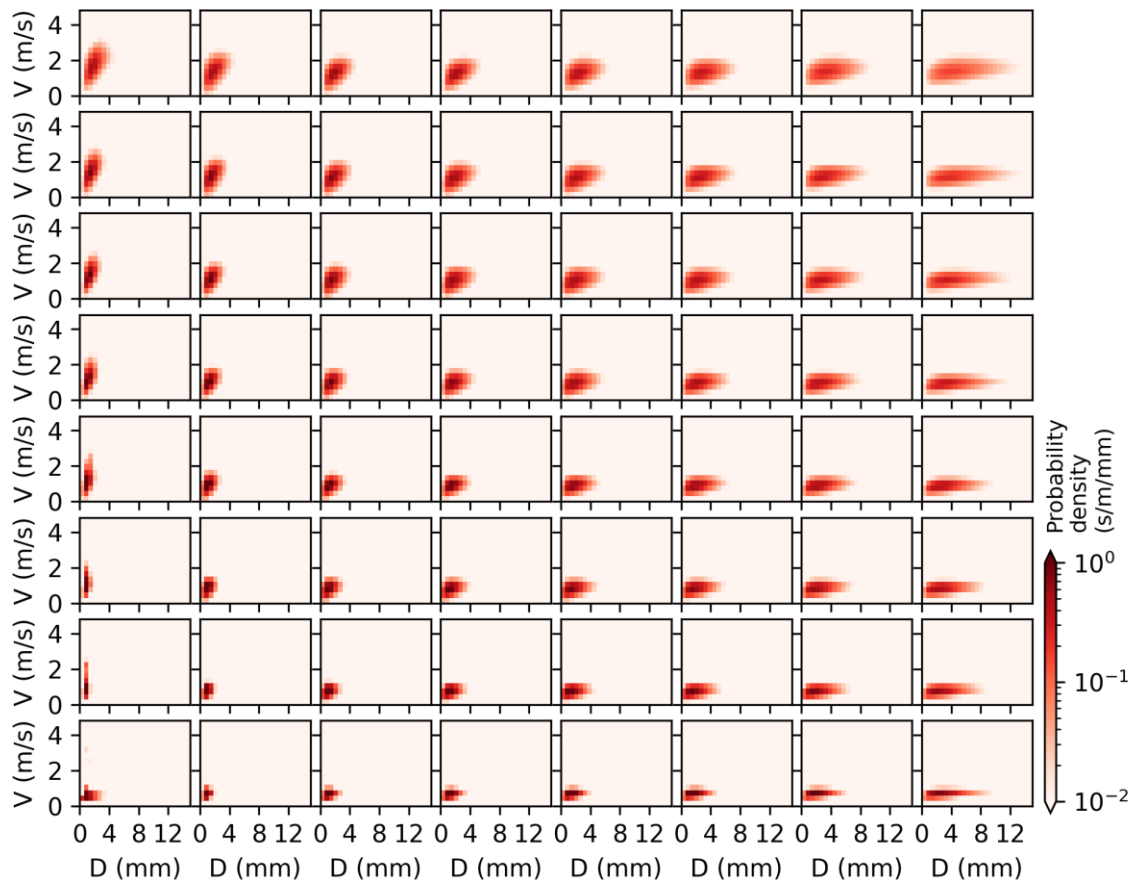
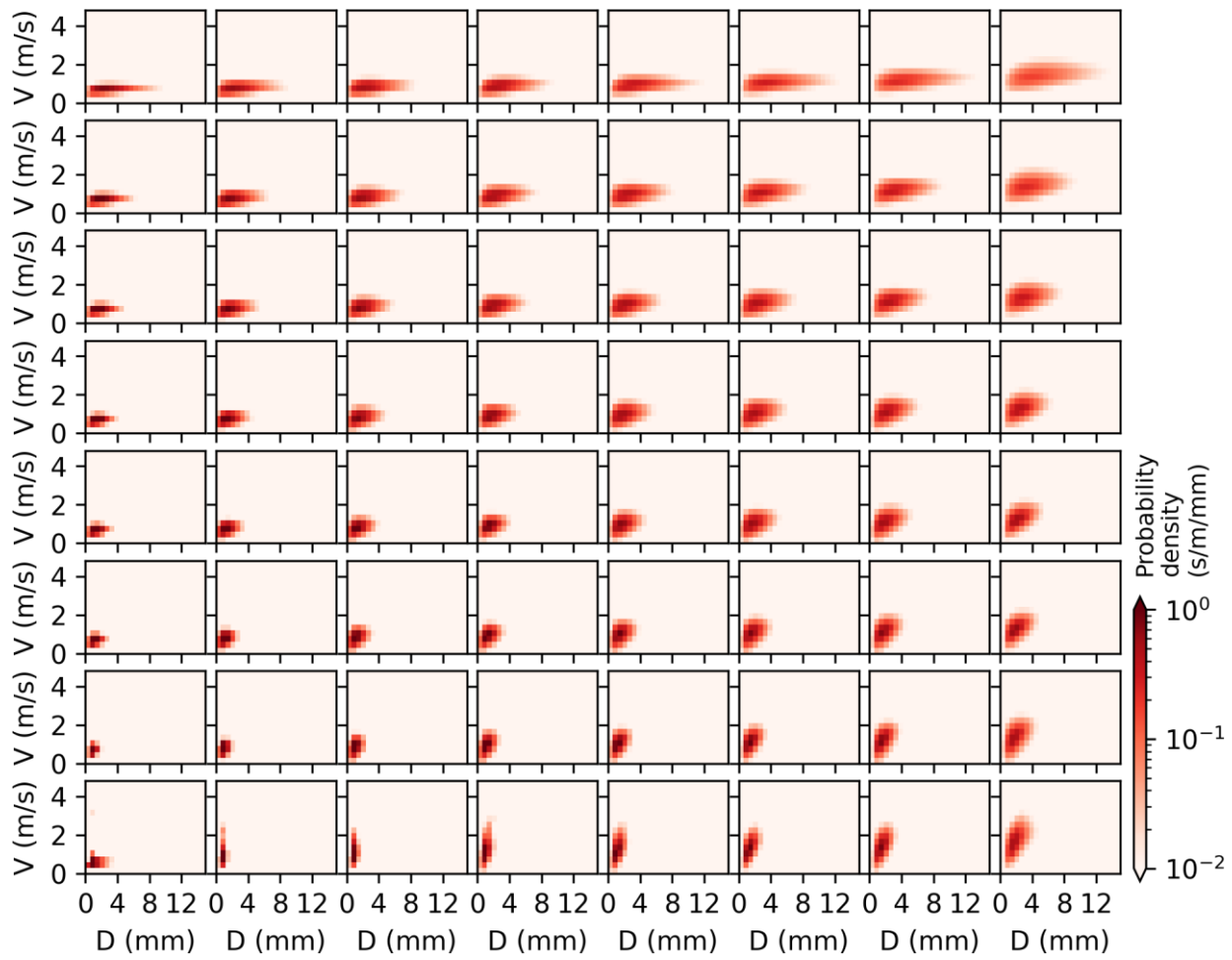


Figure S18: The SOM map with 8×8 shape, $\alpha_0 = 0.1$, and $s(0) = 4.0$.



65 **Figure S19:** The SOM map with 8×8 shape, $\alpha_0 = 0.1$, and $s(0) = 6.5$.

References

Katsuyama, Y. and Inatsu, M.: Advantage of Volume Scanning Video Disdrometer in Solid-Precipitation Observation, SOLA, 17, 35–40, <https://doi.org/10.2151/sola.2021-006>, 2021.