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Heavy snowfall event over the Swiss Alps: did wind shear impact secondary ice production?

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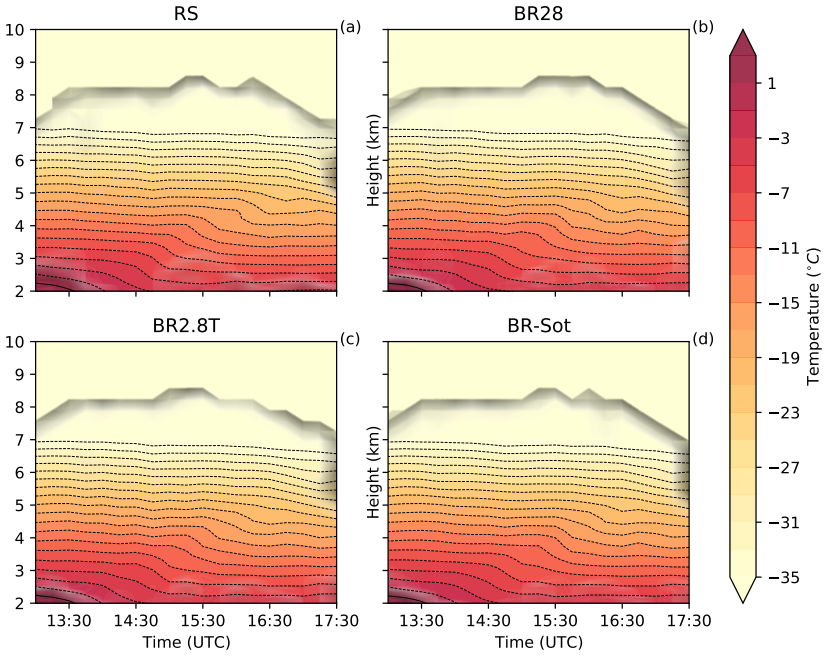

Figure S1. Hovmöller diagrams of temperature for panels a) RS , b) BR28, c) BR2.8T and d) BR-Sot between 13:00 and 17:30 UTC.

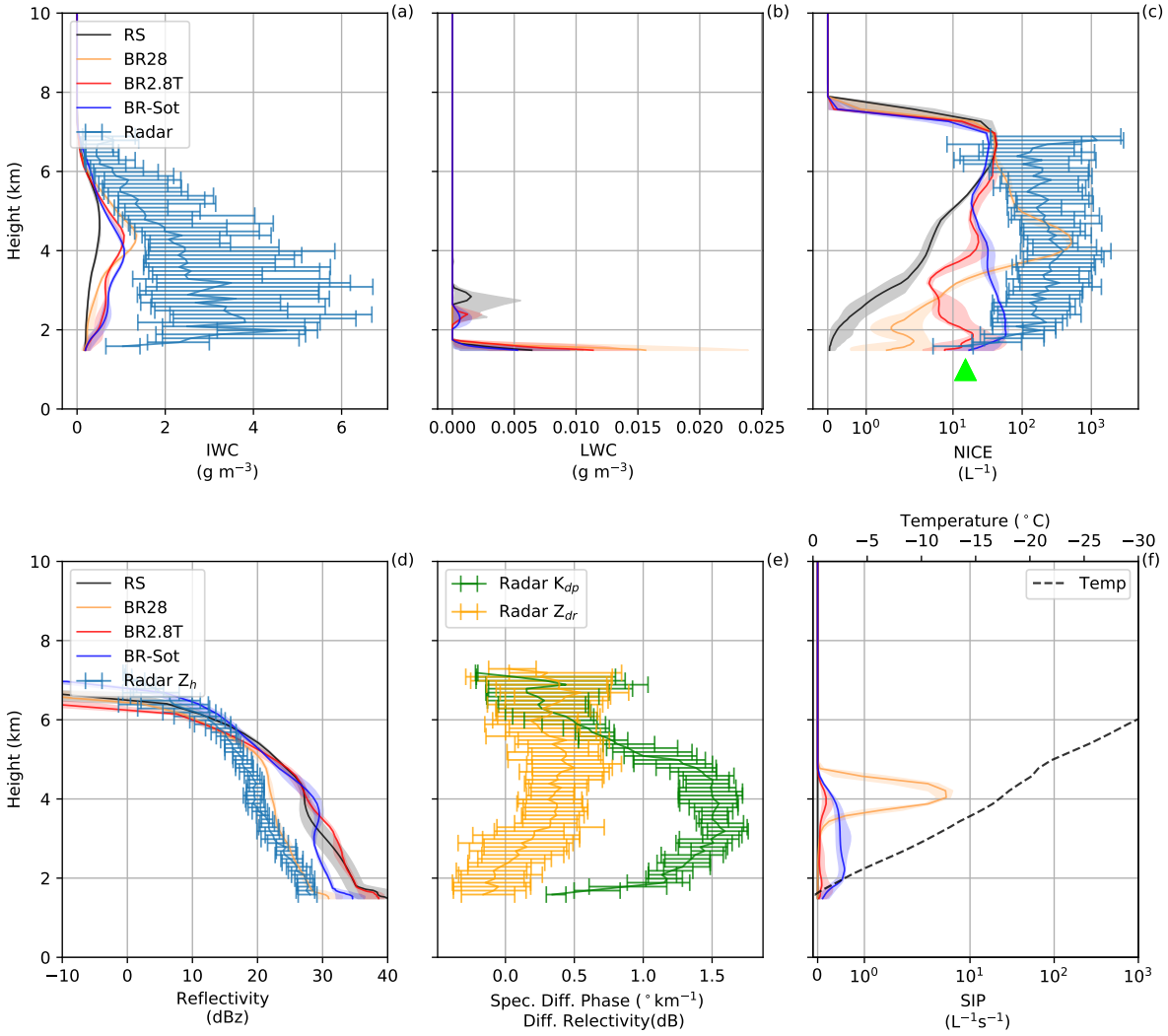

Figure S2. a) Ice water content (IWC), b) liquid water content (LWC), c) ice number concentration (NICE), d) model and radar reflectivity, e) Specific differential phase (K_{dp}), differential reflectivity (Z_{DR}), and f) secondary ice production (SIP). The solid lines are the mean with shaded areas and errorbars showing the 10th and 90th percentiles for the model simulations and doppler radar respectively at 17:00 UTC. The green triangle is the 2DVD surface observations for hydrometeors $D > 0.2$ mm.

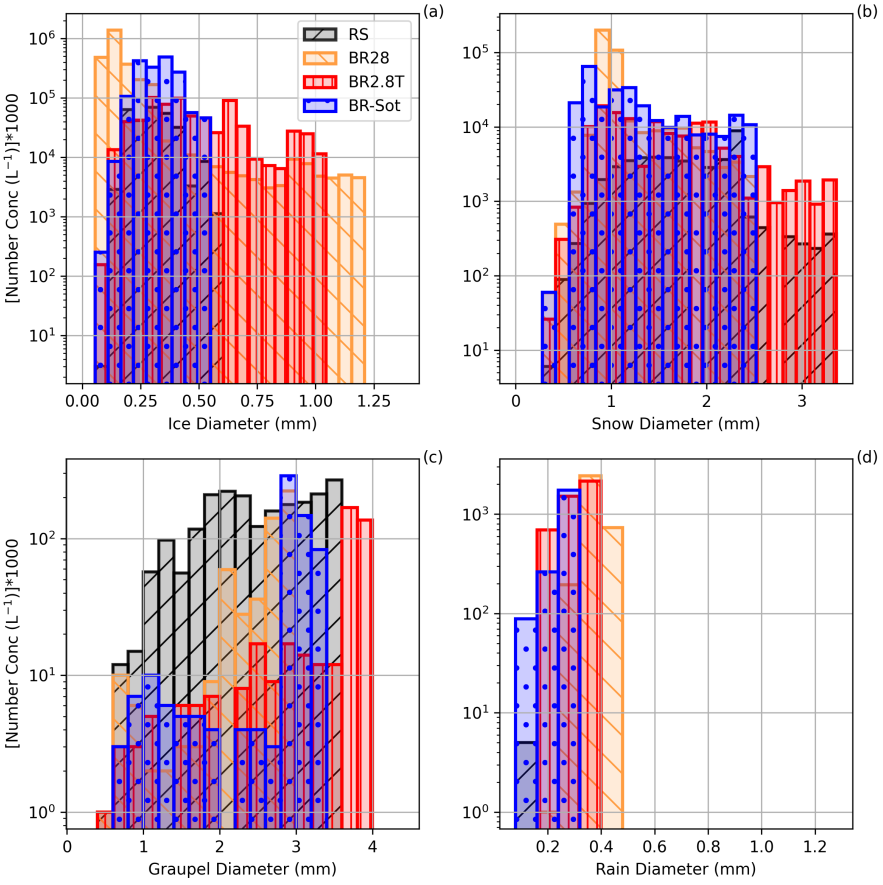

Figure S3. Particle size distribution over the number concentrations for panels a) ice, b) snow, c) graupel, d) cloud droplets and e) raindrops for all the simulations at 17:00 UTC.

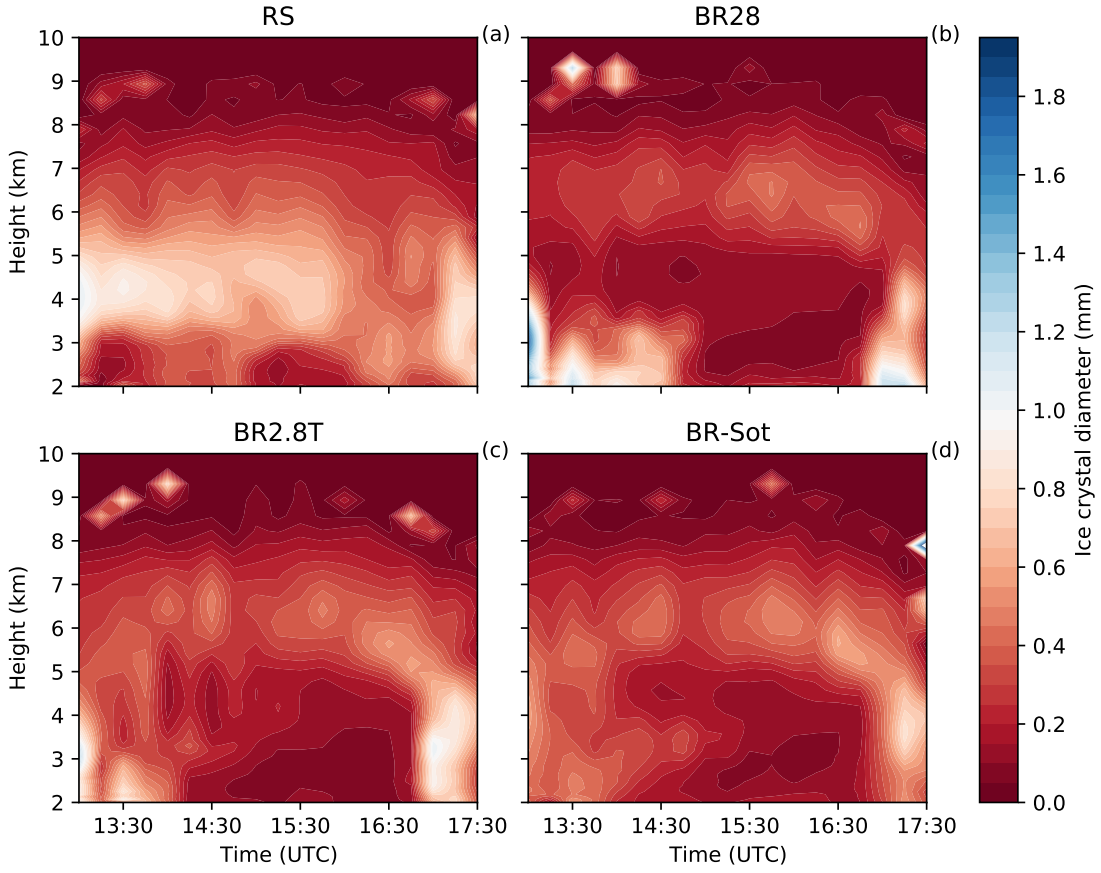

Figure S4. Hovmöller diagrams of ice crystal diameters for panels **(a)** RS , **(b)** BR28, **(c)** BR2.8T and **(d)** BR-Sot between 13:00 and 17:30 UTC.

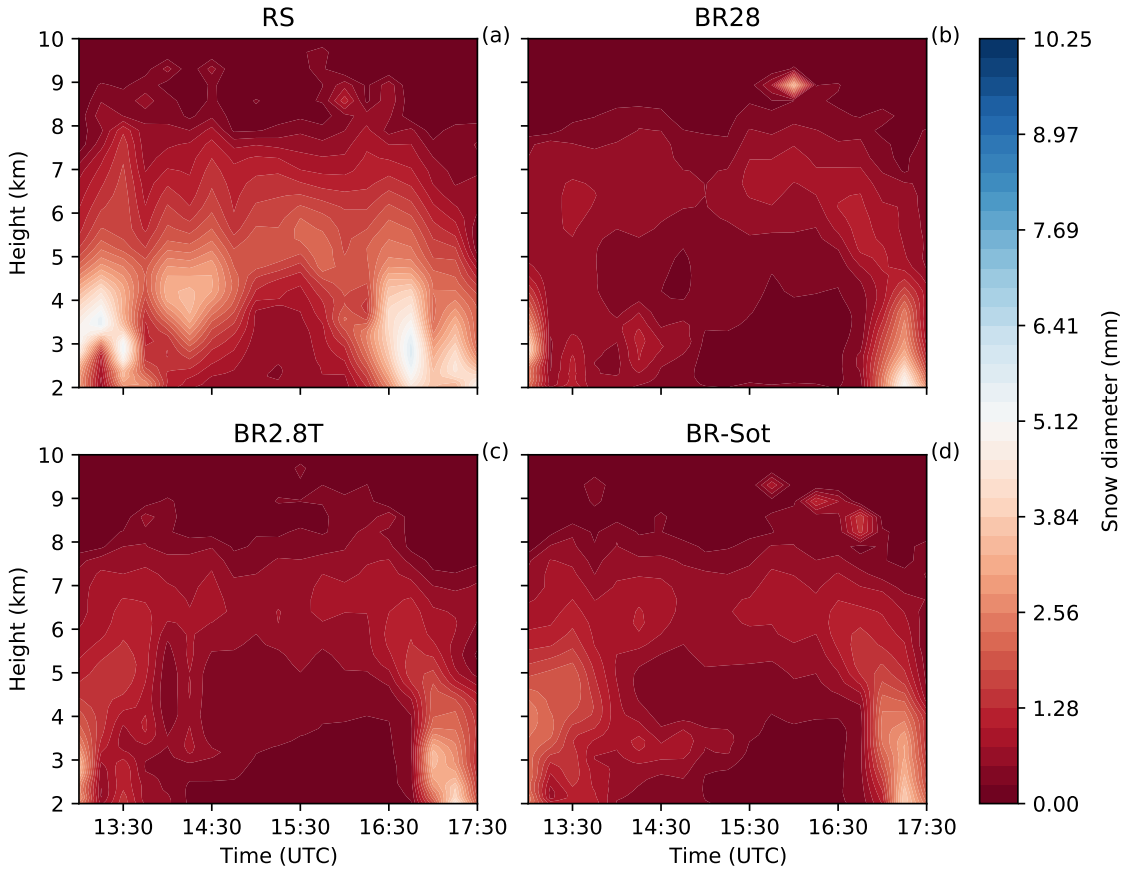

Figure S5. The same as Figure S4, but for snow.

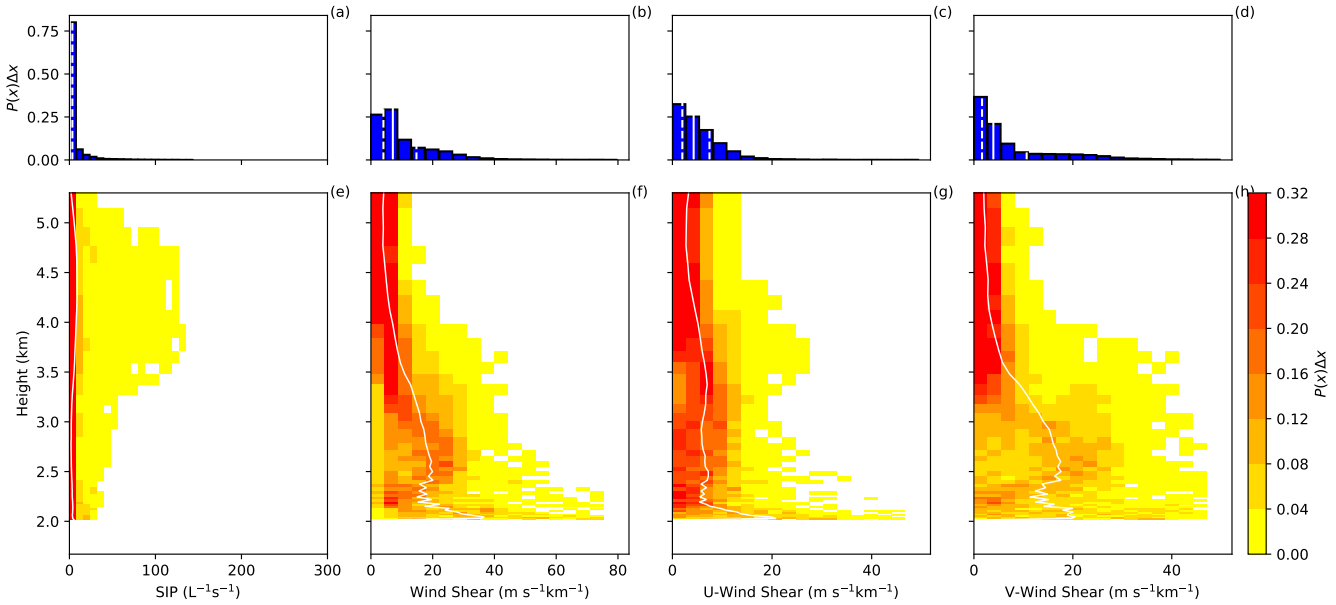

Figure S6. Probability density functions of different variables ($P(x)$) over all model levels (top row) and at each model level (bottom row) for (a, e) Secondary Ice Production (SIP) rate, (b, f) Wind shear, (c, g) U-wind shear and (d, h) V-wind shear between 13:00-14:15 UTC . The solid and dashed white lines are the horizontal 50^{th} percentile and the 25^{th} and 75^{th} percentiles respectively of each variable over the 10 km$\times$10 km domain.

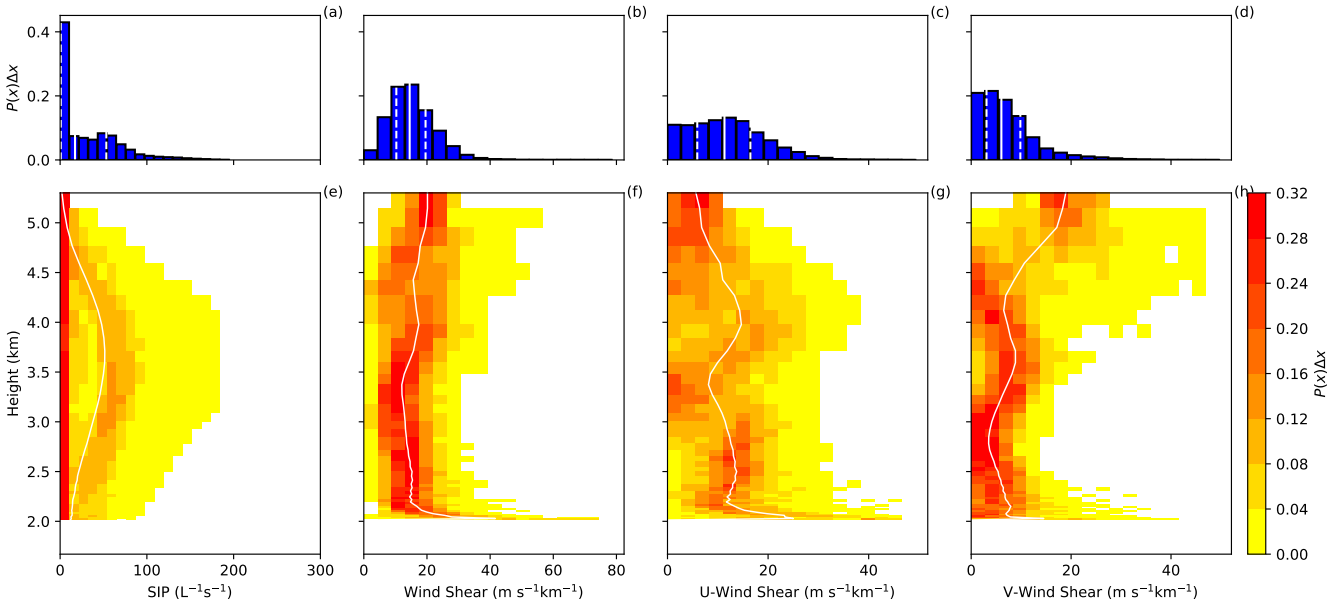

Figure S7. Probability density functions of different variables ($P(x)$) over all model levels (top row) and at each model level (bottom row) for (a, e) Secondary Ice Production (SIP) rate, (b, f) Wind shear, (c, g) U-wind shear and (d, h) V-wind shear between 16:00-17:15 UTC . The solid and dashed white lines are the horizontal 50^{th} percentile and the 25^{th} and 75^{th} percentiles respectively of each variable over the 10 km$\times$10 km domain.

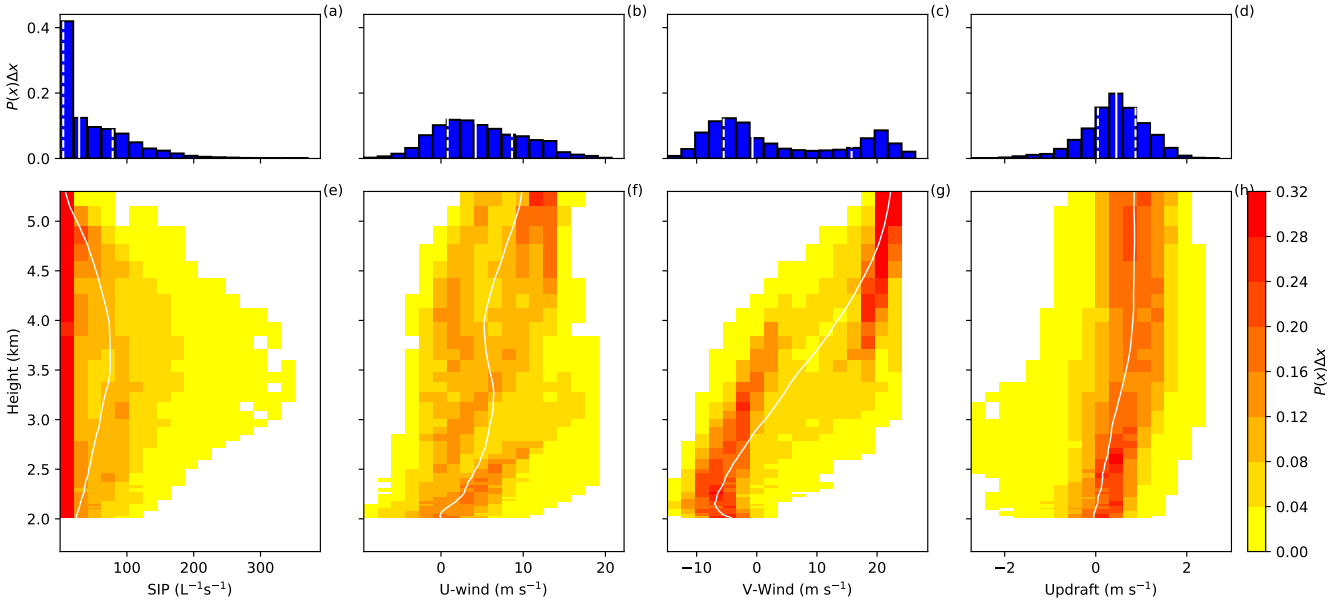

Figure S8. Probability density functions of different variables ($P(x)$) over all model levels (top row) and at each model level (bottom row) for (a, e) Secondary Ice Production (SIP) rate, (b, f) U-Wind, (c, g) V-wind and (d, h) Updraft between 14:30-15:45 UTC . The solid and dashed white lines are the horizontal 50^{th} percentile and the 25^{th} and 75^{th} percentiles respectively of each variable over the 10 km$\times$10 km domain.