Supplement

In this supplement the figures according to Fig. 4, Fig. 5 and Fig. 6 are shown for all stations and time periods considered in this study.

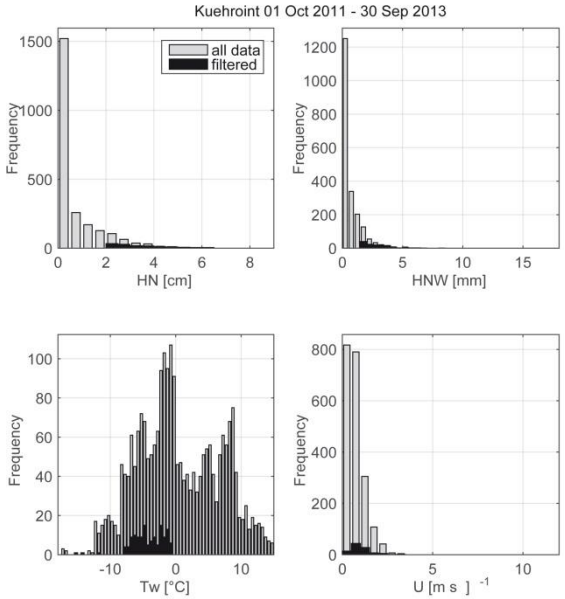

Figure S01: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5ms^{-1} (n_{th}) at Kühroint station for the period 2 (1 Oct 2011 - 30 Sep 2013).

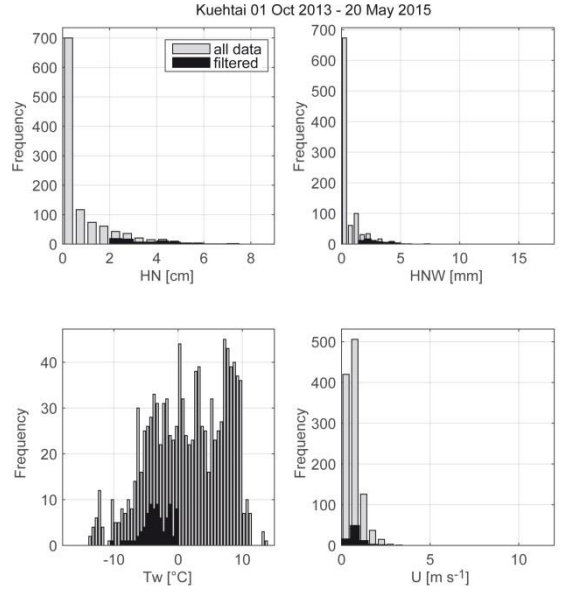

Figure S02: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Kühtai station for the period 1 (1 Oct 2013 - 20 May 2015).

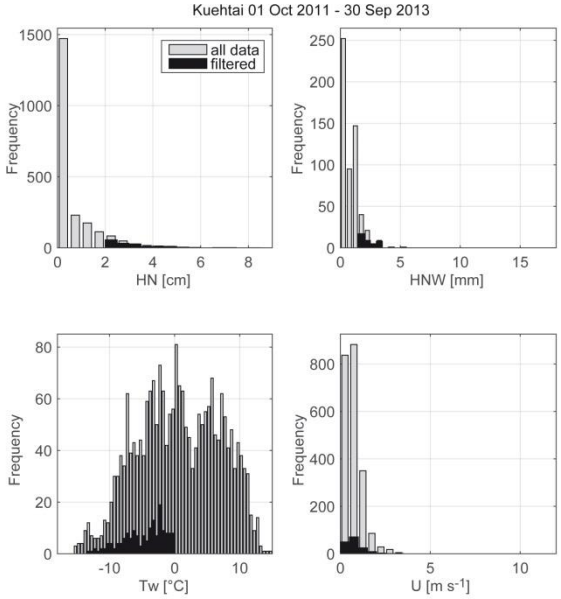

Figure S03: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Kühtai station for the period 2 (1 Oct 2011 - 30 Sep 2013).

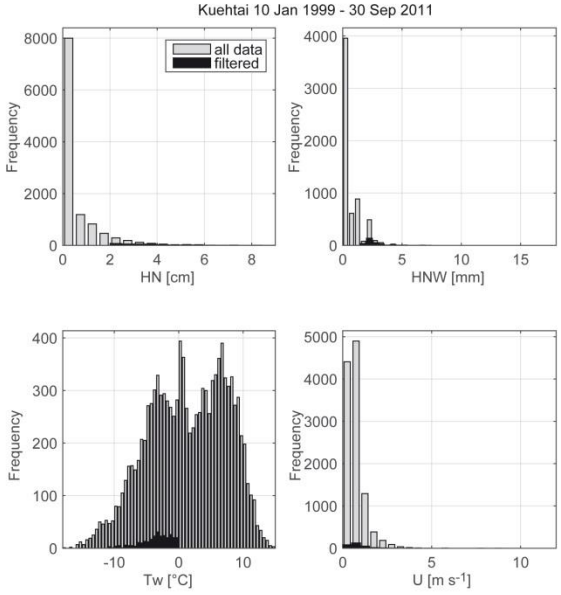

Figure S04: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Kühtai station for the period 3 (1 Oct 1999 - 30 Sep 2011).

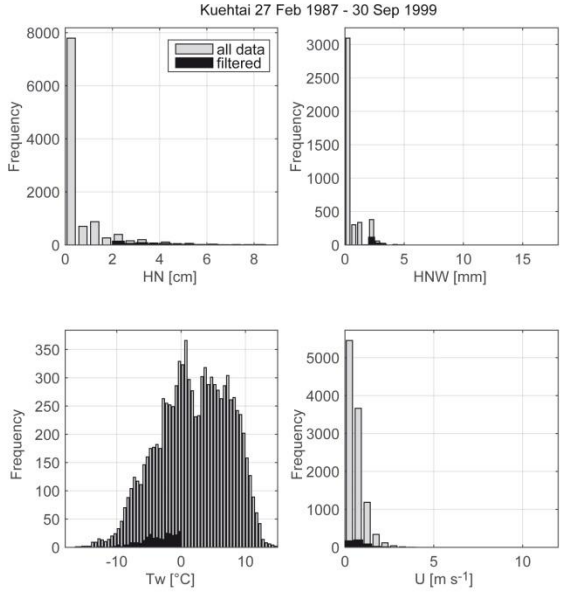

Figure S05: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Kühtai station for the period 4 (27 Feb 1987 - 30 Sep 1999).

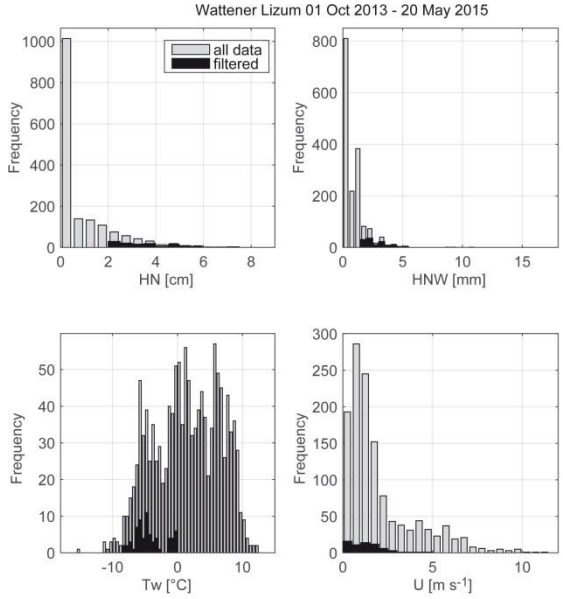

Figure S06: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Wattener Lizum for the period 1 (1 Oct 2013 - 20 May 2015).

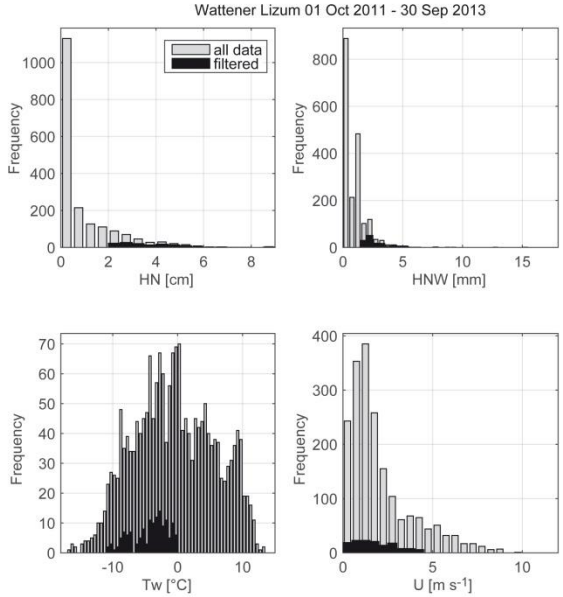

Figure S07: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Wattener Lizum station for the period 2 (1 Oct 2011 - 30 Sep 2013).

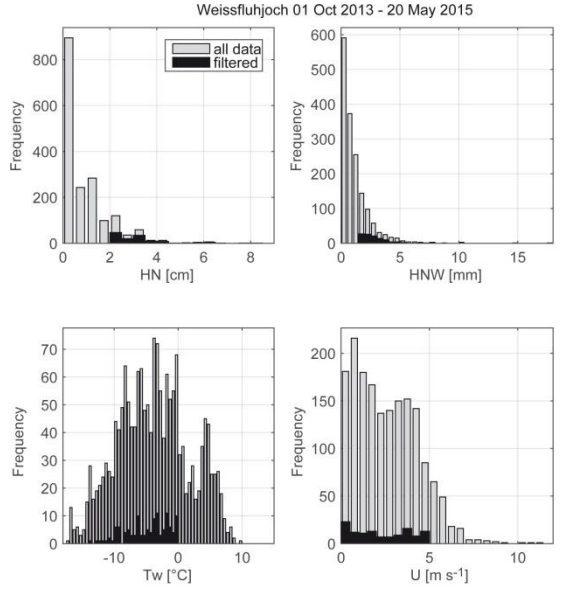

Figure S08: Histogram plots of all data consisting precipitation signal and positive HS changes (n_P, grey) and data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (n_{th}) at Weissfluhjoch station for the period 1 (1 Oct 2013 - 20 May 2015).

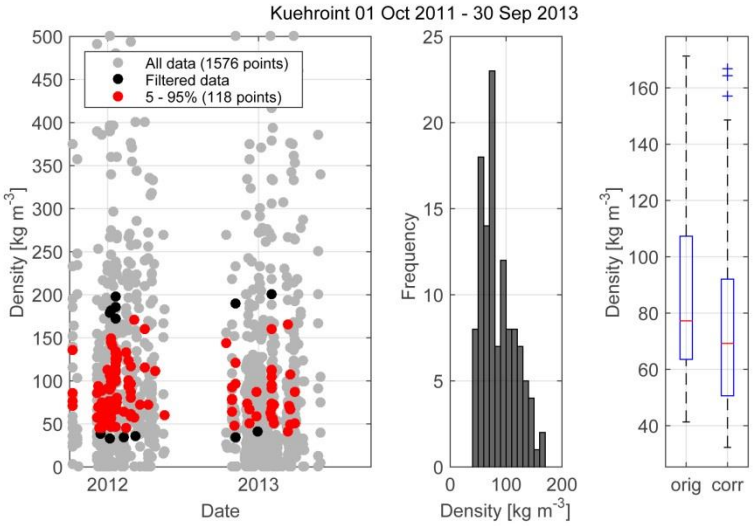

Figure S09: Distribution of calculated snow densities at Kühroint station for the period 2 (1 Oct 2011 - 30 Sep 2013): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

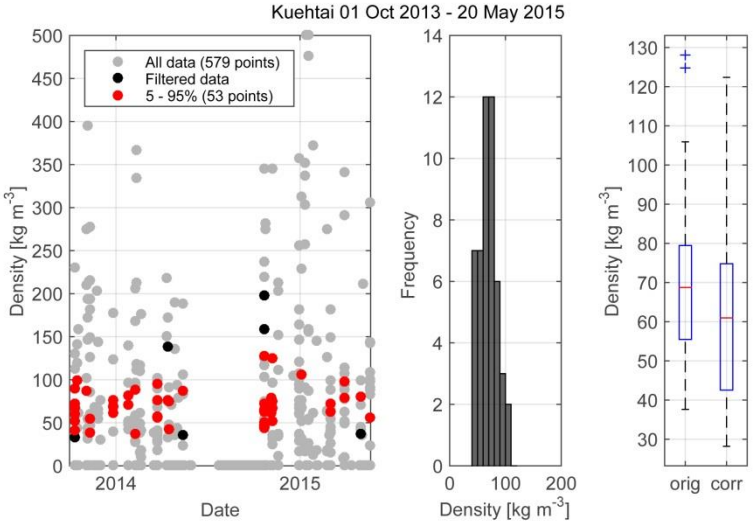

Figure S10: Distribution of calculated snow densities at Kühtai station for the period 1 (1 Oct 2013 - 20 May 2015): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

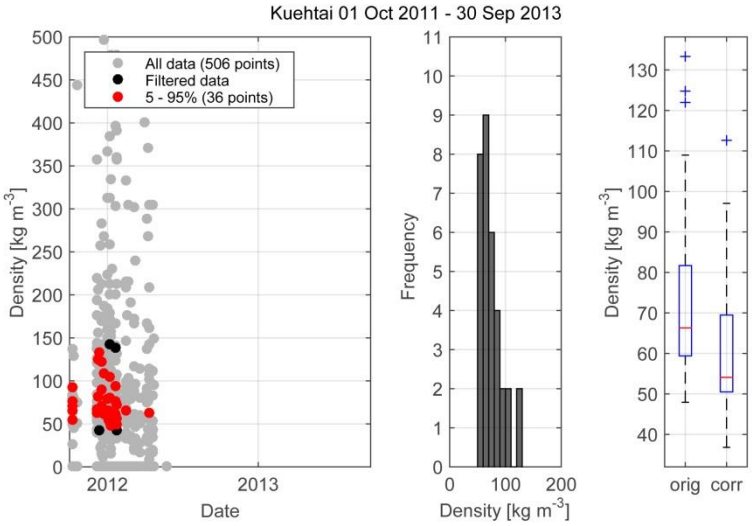

Figure S11: Distribution of calculated snow densities at Kühtai station for the period 2 (1 Oct 2011 - 30 Sep 2013): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

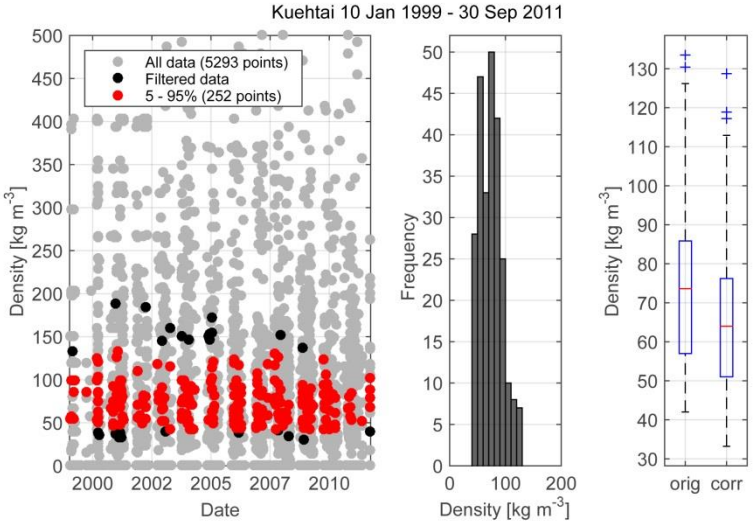

Figure S12: Distribution of calculated snow densities at Kühtai station for the period 3 (1 Oct 1999 - 30 Sep 2011): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

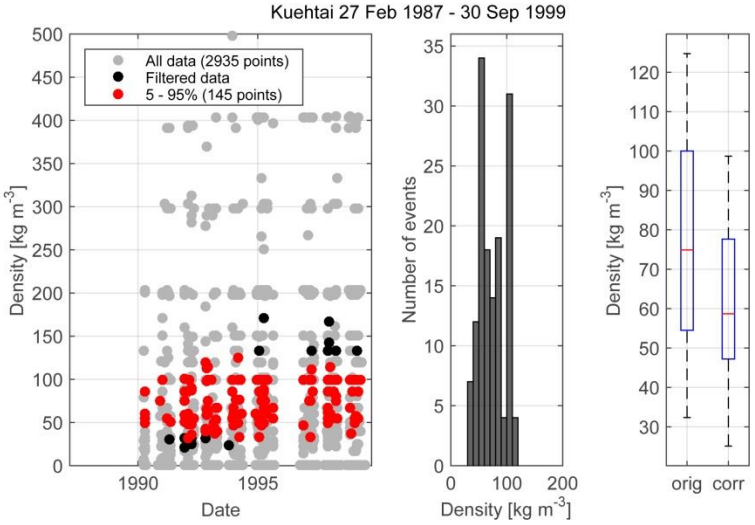

Figure S13: Distribution of calculated snow densities at Kühtai station for the period 4 (27 Feb 1987 - 30 Sep 1999): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

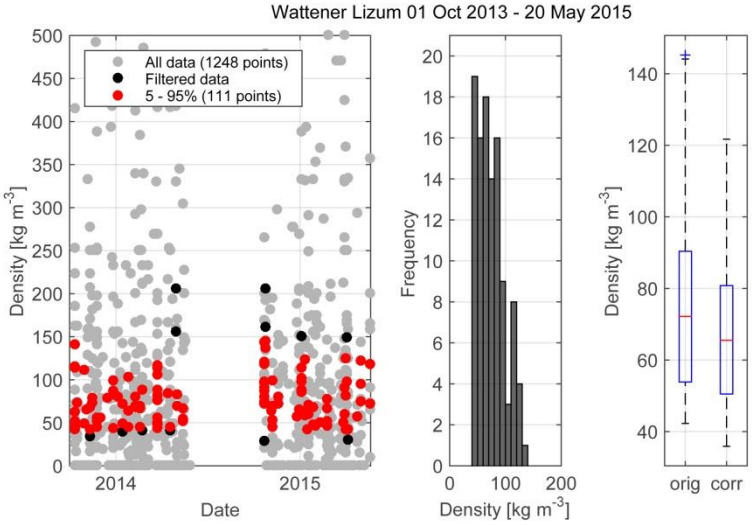

Figure S14: Distribution of calculated snow densities at Wattener Lizum station for the period 1 (1 Oct 2013 - 20 May 2015): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

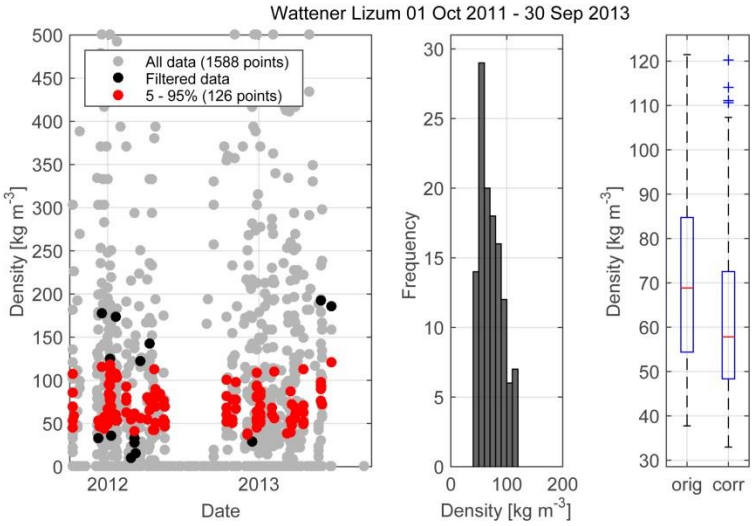

Figure S15: Distribution of calculated snow densities at Wattener Lizum station for the period 2 (1 Oct 2011 - 30 Sep 2013): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

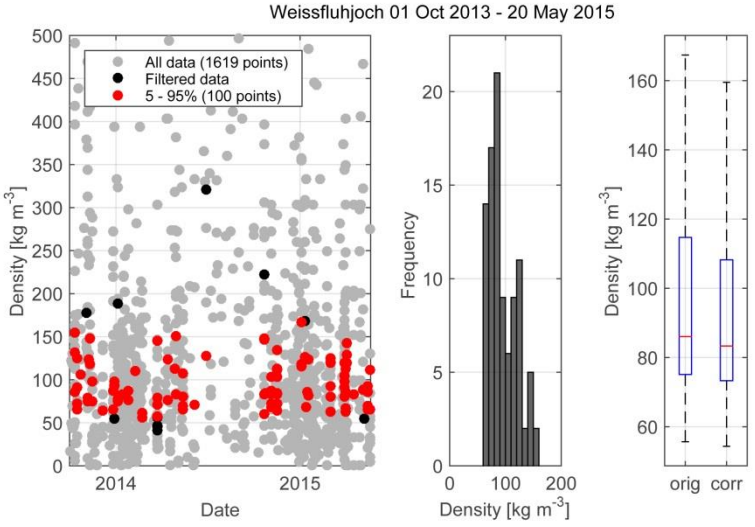

Figure S16: Distribution of calculated snow densities at Weissfluhjoch station for the period 1 (1 Oct 2013 - 20 May 2015): Left: All data with precipitation signal and positive HS change (n_P, grey dots), of all data filtered with the thresholds HN > 2 cm, HNW > 1.5 mm, Tw < 0° C and U < 5 ms^{-1} (black dots) and filtered data reduced by cutting off at 5 % and 95 % percentiles (n_{th}, red dots). Middle: Histogram of all filtered densities (ρ_{th}). Right: The boxplot showing median, 25 % and 75 % interquartile range of uncorrected densities and densities corrected for settling of the snowpack.

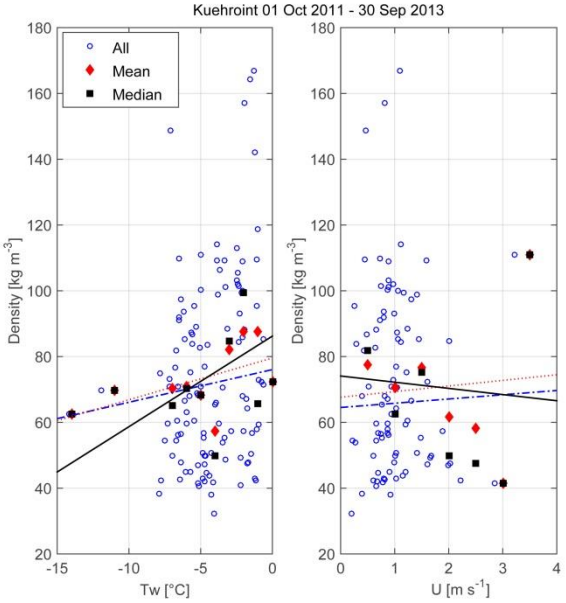

Figure S17: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Kühroint station for the period 2 (1 Oct 2011 - 30 Sep 2013), and for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

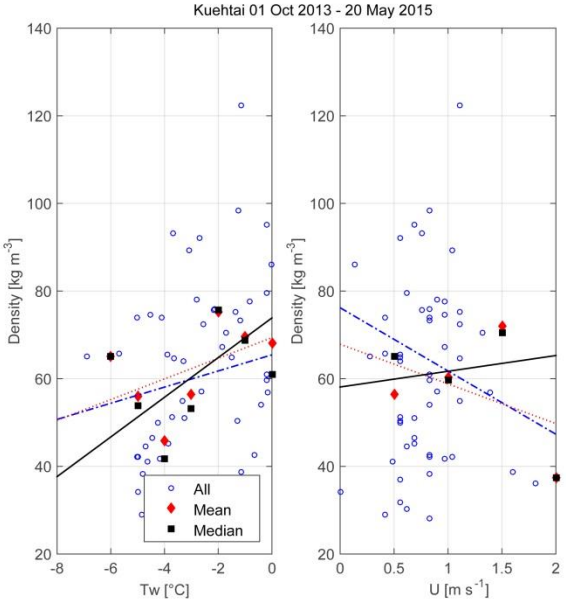

Figure S18: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Kühtai station for the period 1 (Oct 2013 - 20 May 2015), and for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

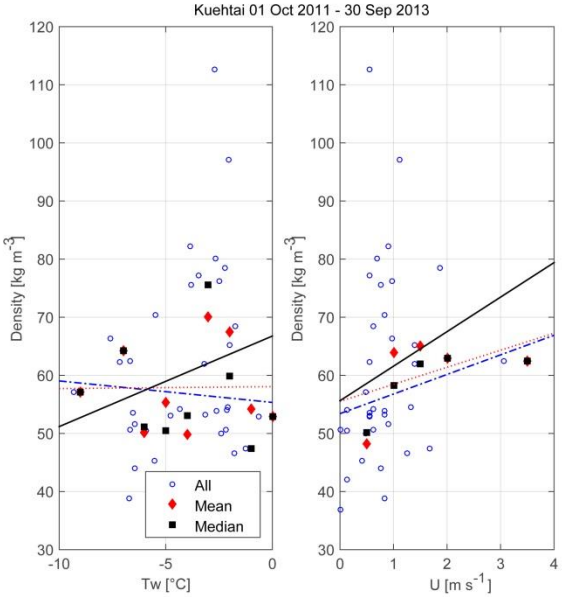

Figure S19: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Kühtai station for the period 2 (1 Oct 2011 - 30 Sep 2013), for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

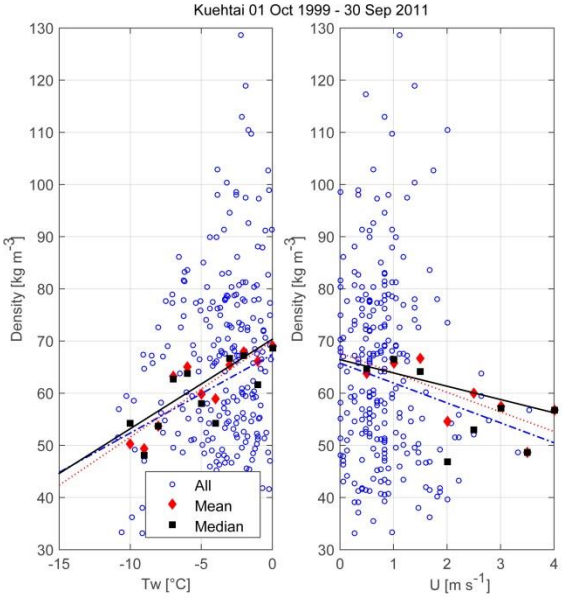

Figure S20: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Kühtai station for the period 3 (1 Oct 1999 - 30 Sep 2011), and for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

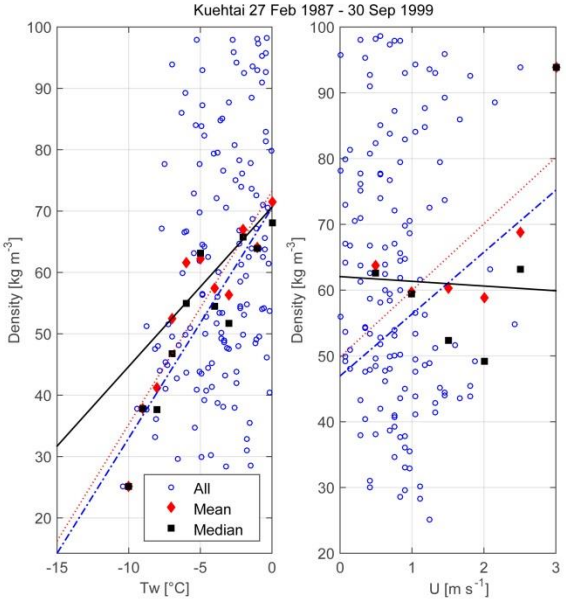

Figure S21: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Kühtai station for the period 4 (27 Feb 1987 - 30 Sep 1999), and for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

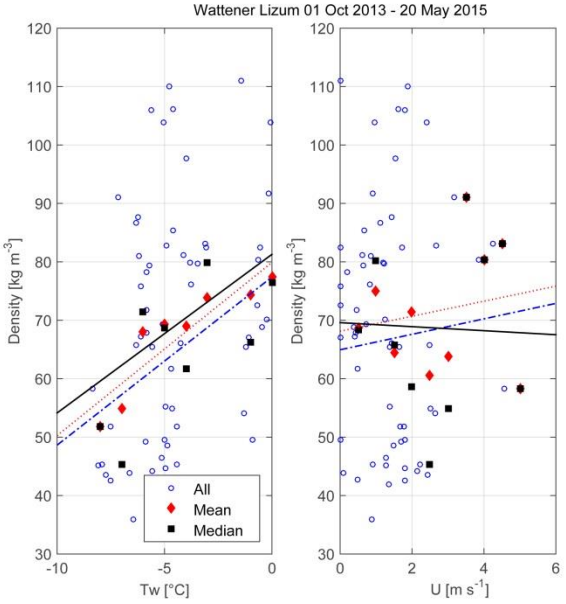

Figure S22: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Wattener Lizum station for the period 1 (Oct 2013 - 20 May 2015), and for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

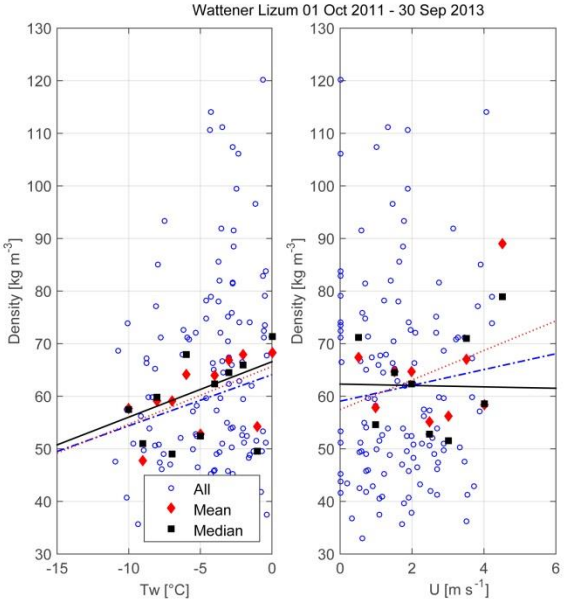

Figure S23: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Wattener Lizum station for the period 2 (1 Oct 2011 - 30 Sep 2013), and for the class mean (red diamonds, dotted red line) and median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.

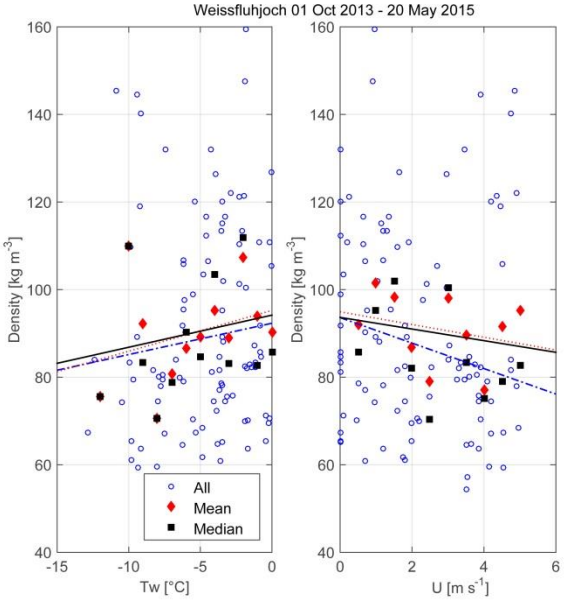

Figure S24: Linear regression between the corrected densities (ρ_{corr}) as dependent variable and wet bulb temperature (T_w, left) as well as wind speed (U, right) as explanatory variables for all filtered value pairs (nth, blues dots, dashed blue line) at Weissfluhjoch station for the period 1 (01 Oct 2013 - 20 May 2015), and for the class mean (red diamonds, dotted red line) and

median (black squares, solid black line) of binned 0.5° K classes and of binned 0.5 ms^{-1} classes, respectively. Numbers are given in Tab. 3 and 4.