

S1. Variability at the local domain

Variograms analogously to Figure 6 and Figure 7 in the main text are presented for the local domain, for which data has a resolution of 300 m (Figure 1 in the main text). Trends removed from the data to produce the variograms in Figure S.1 are given in Table S.1. For Figure S.2 no trends are removed and small as well as intermediate scale patterns may be hidden by the domain-wide trends.

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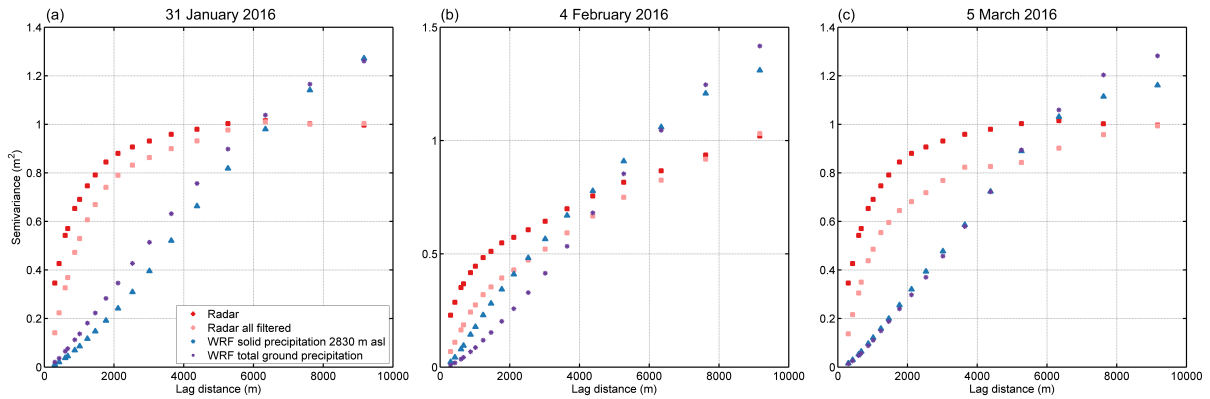


Figure S.1. Normalized variograms of detrended snow precipitation for the precipitation events on a) 31 January 2016, b) 4 February 2016 and c) 5 March 2016 for the local domain (Figure 1 in the main text). Variograms are given for partly filtered (red) and filtered (orange) radar snow precipitation, WRF snow precipitation at 2830 m above sea level (m asl, blue) and WRF total ground precipitation (violet). WRF precipitation is from simulations with weak terrain smoothing (Sect. 2.1 in the main text). All precipitation fields are masked.

Table S.1. Large-scale linear trends of radar and WRF precipitation patterns on the local domain (Figure 1 in the main text). *Orientation* gives the direction of the slope and *Intensity* the strength of inclination. 0° would indicate a slope pointing toward the East. WRF snow precipitation is from simulations with weak terrain smoothing (Sect. 2.1 in the main text).

	31 January 2016		4 February 2016		5 March 2016	
	Orientation	Intensity	Orientation	Intensity	Orientation	Intensity
Radar filtered	68.5°	0.14	150.5°	0.03	-135.4°	0.04
WRF precip. at 2830 m asl	22.6°	0.26	5.8°	0.24	-79.6°	0.19
WRF total ground precip.	30.6°	0.32	24.2°	0.24	-67.6°	0.21

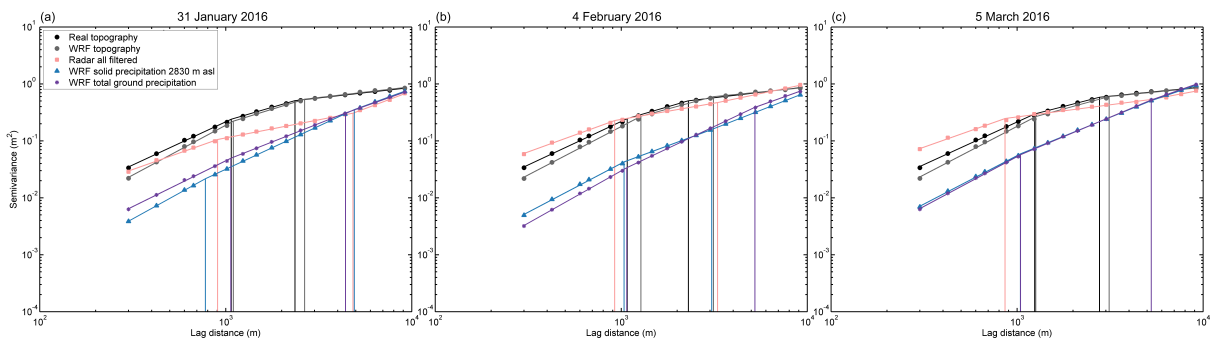


Figure S.2. Normalized variograms of the snow precipitation events on a) 31 January 2016, b) 4 February 2016 and c) 5 March 2016 for the local domain (Figure 1 in the main text). Variograms are given for filtered radar snow precipitation (orange), WRF snow precipitation at 2830 m above sea level (m asl, blue) and WRF total ground precipitation (violet). Additionally, variograms are given for real topography (based on dh25 © 2018 swisstopo (5740 000 000), black) and WRF topography (gray). WRF topography and precipitation are from simulations with weak terrain smoothing (Sect. 2.1 in the main text). All precipitation fields are masked.