Supplementary Materials for

Evaluation of snow processes over the Western United States in E3SM land model

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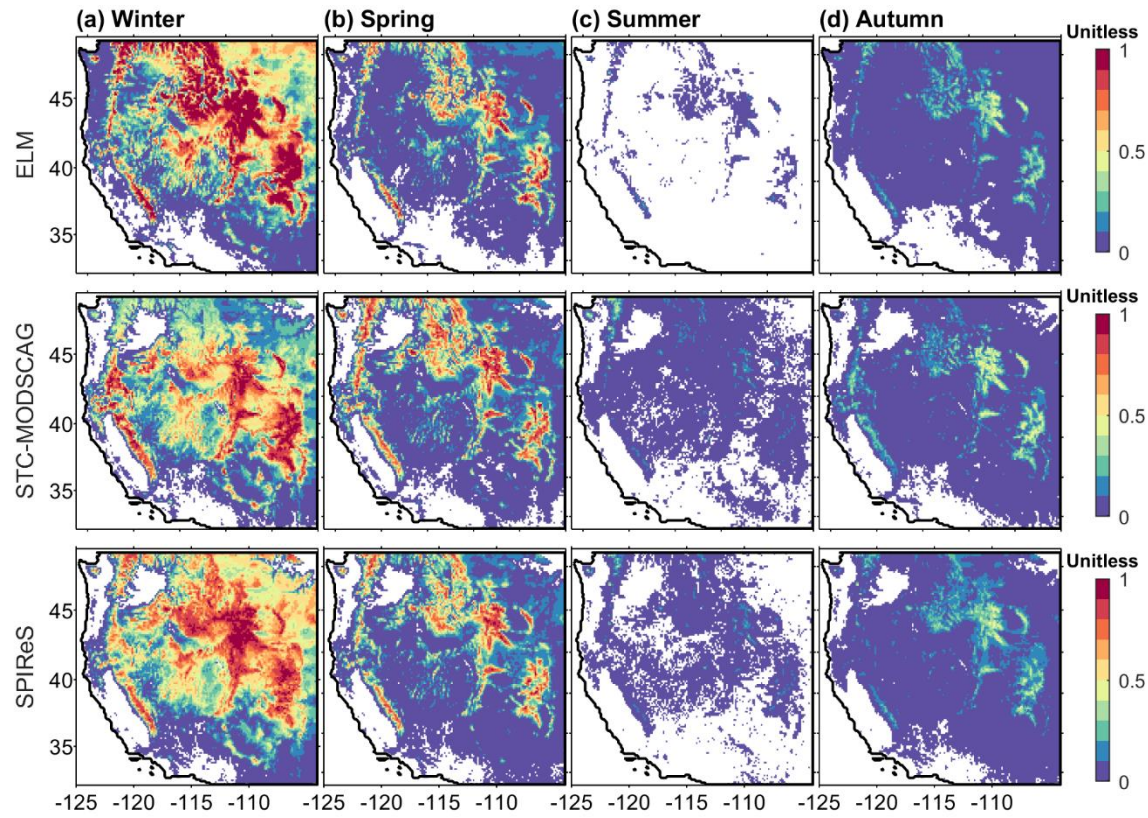
Figure S1: Spatial distributions of f_{sno} in ELM and two remote sensing products (i.e., STC-MODSCAG and SPIReS) for different seasons: (a) winter, (b) spring, (c) summer and (d) autumn. In all panels, regions with no snow cover are masked with white color.
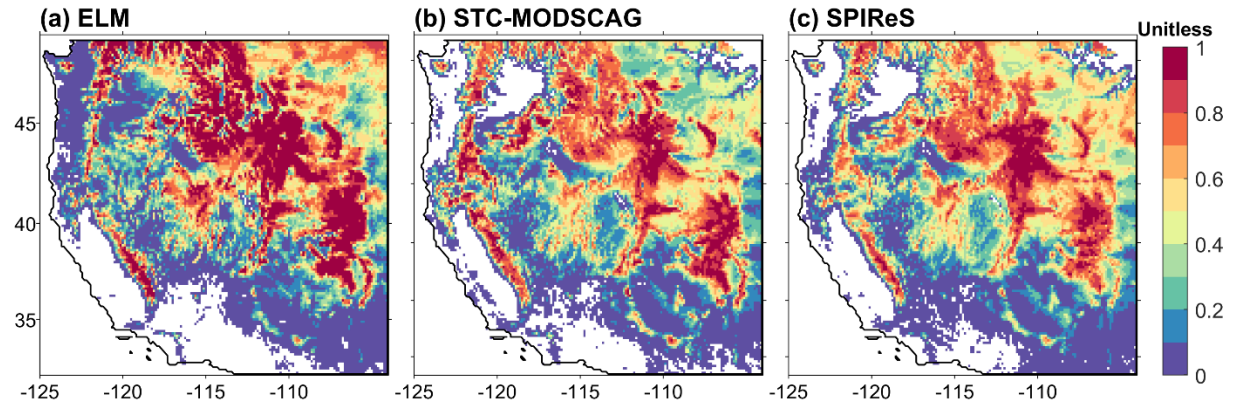
Figure S2: Spatial distributions of f_{sno} in ELM and two remote sensing products (i.e., STC-MODSCAG and SPIReS) for February.
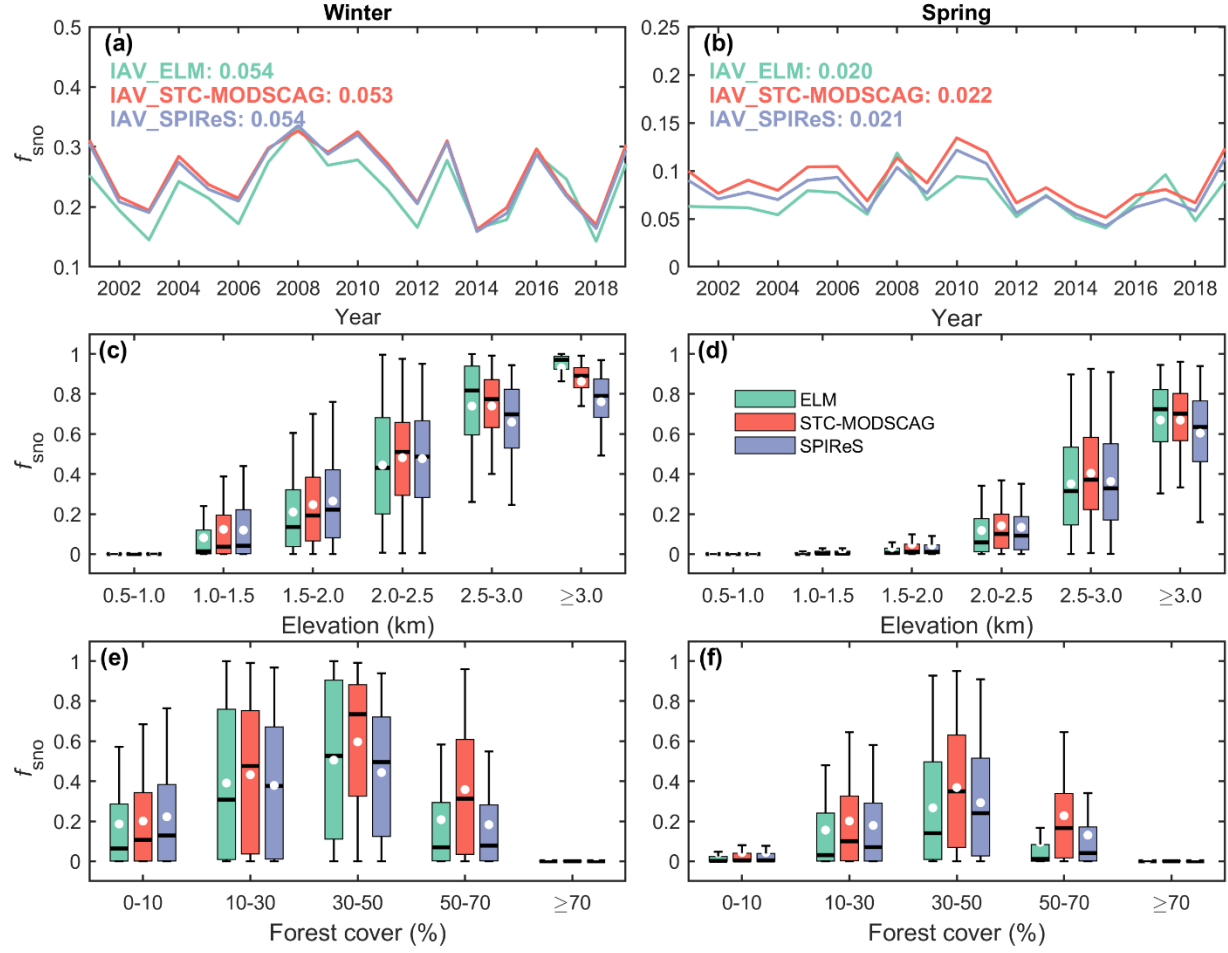
Figure S3: (a,b) Time series of regional average values, **(c,d)** elevation gradients, and **(e,f)** change with forest cover of f_{sno} in ELM (green), STC-MODSCAG (red), and SPIReS (blue) over the WUS regions below 42° in latitude. Panels (a,c,e) are for winter and panels (b,d,f) are for spring. In panels (c-f), the white dots represent the average values.
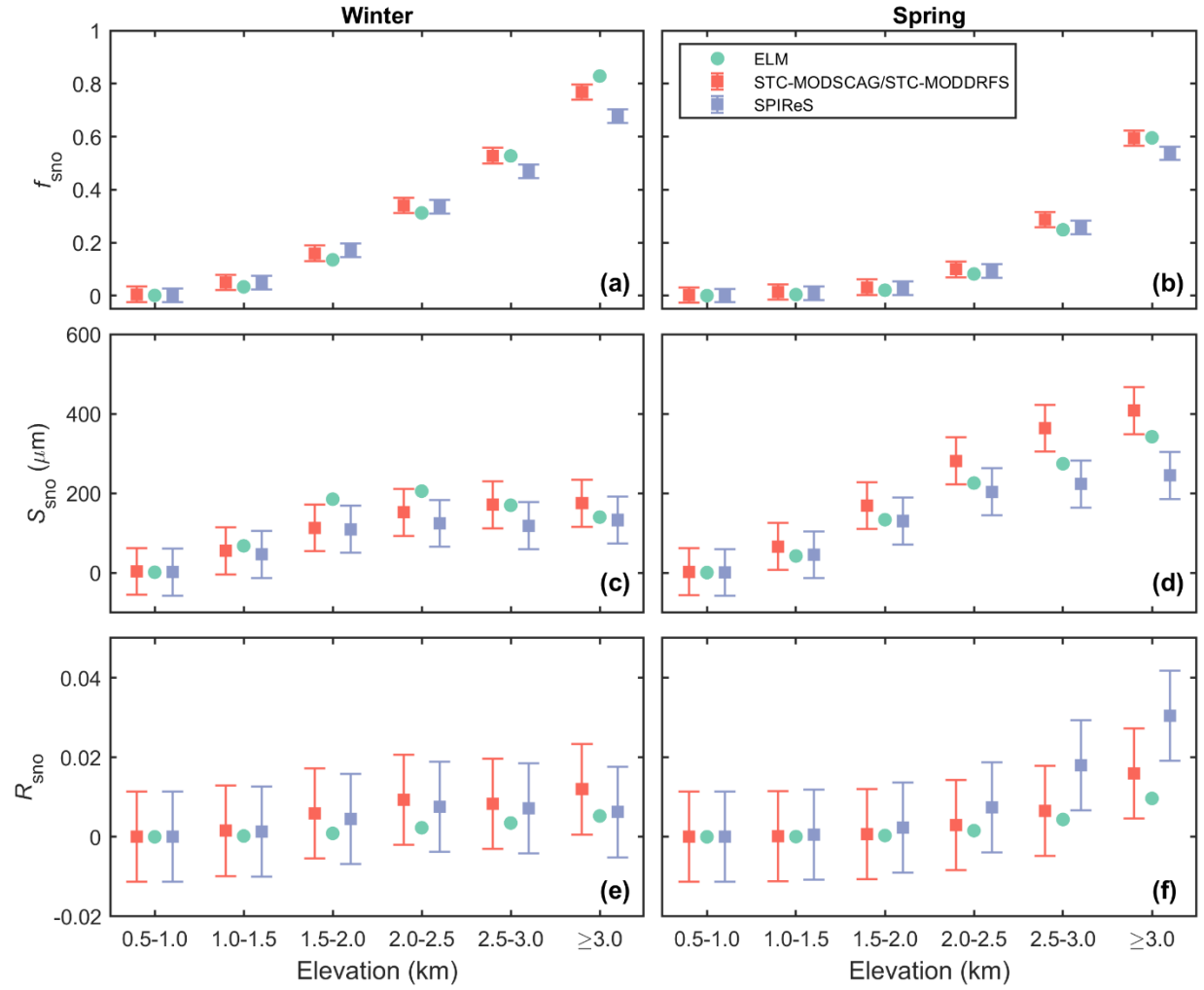
Figure S4: The area-weighted average (a,b) f_{sno}, (c,d) S_{sno} and (e,f) R_{sno} for (a,c,e) winter and (b,d,f) spring of ELM (green), STC-MODSCAG/STC-MODDRFS (red) and SPIReS (blue) over the WUS regions below 42° in latitude. The bar width represents the uncertainty bounds of STC-MODSCAG/STC-MODDRFS and SPIReS from (Bair et al., 2021a).
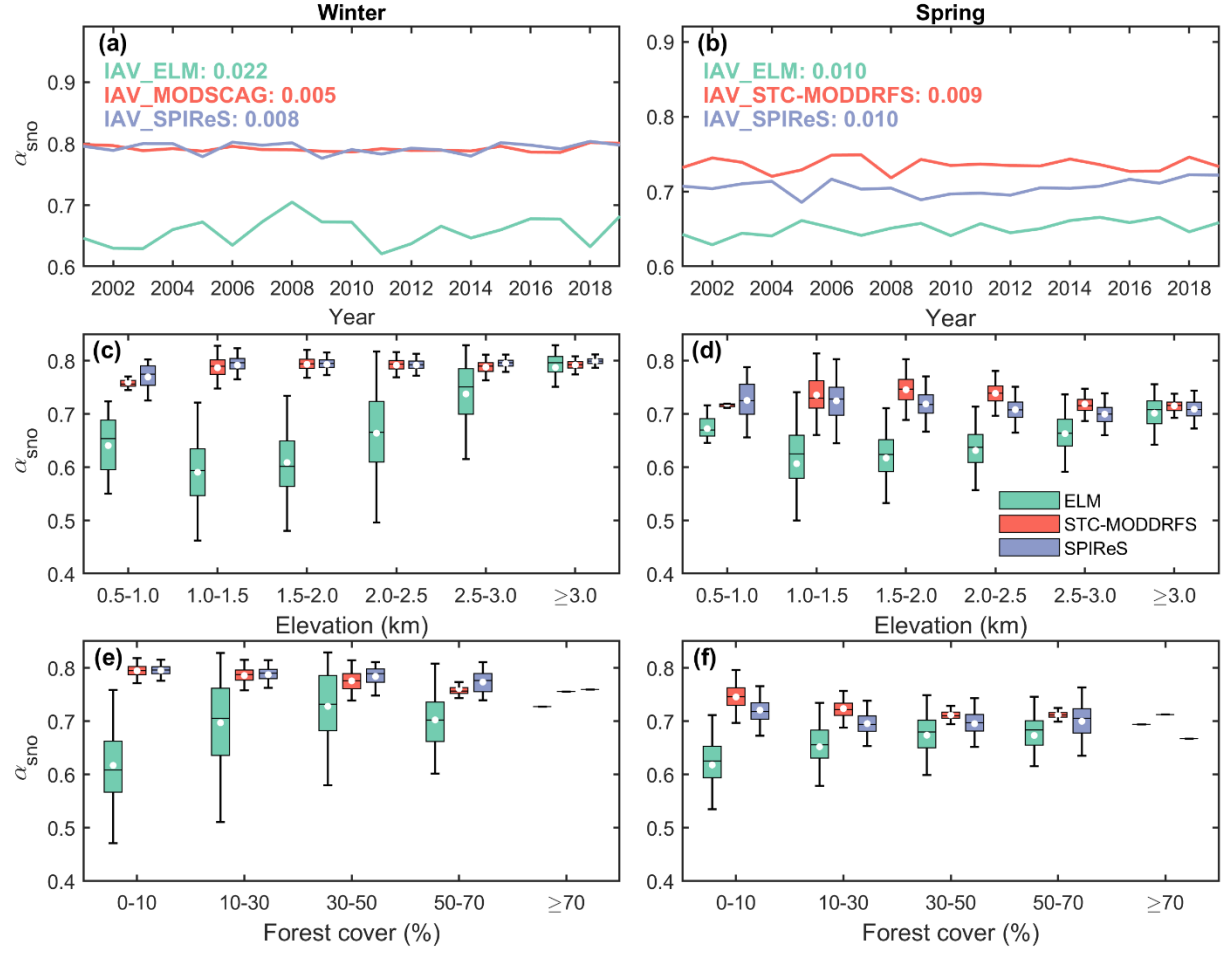
Figure S5: (a,b) Time series of regional average values, (c,d) elevation gradients, and (e,f) change with forest cover of α_{sno} in ELM (green), STC-MODSCAG (red), and SPIReS (blue) over the WUS regions below 42° in latitude. Panels (a,c,e) are for winter and panels (b,d,f) are for spring. In panels (c-f), the white dots represent the average values.
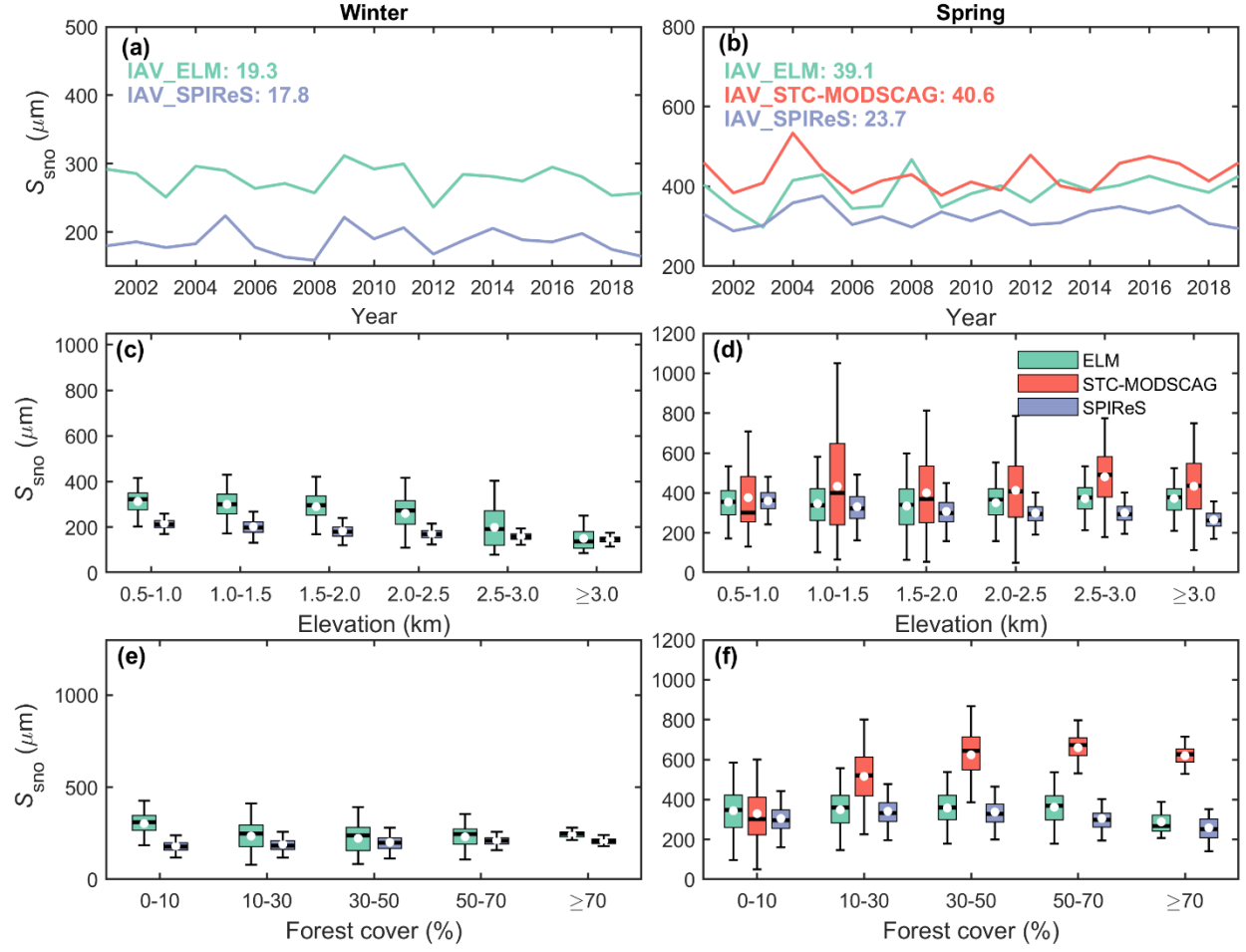
Figure S6: (a,b) Time series of regional average values, (c,d) elevation gradients, and (e,f) change with forest cover of S_{sno} in ELM (green), STC-MODSCAG (red), and SPIReS (blue) over the WUS. Panels (a,c,e) are for winter and panels (b,d,f) are for spring. In panels (c-f), the white dots represent the average values.
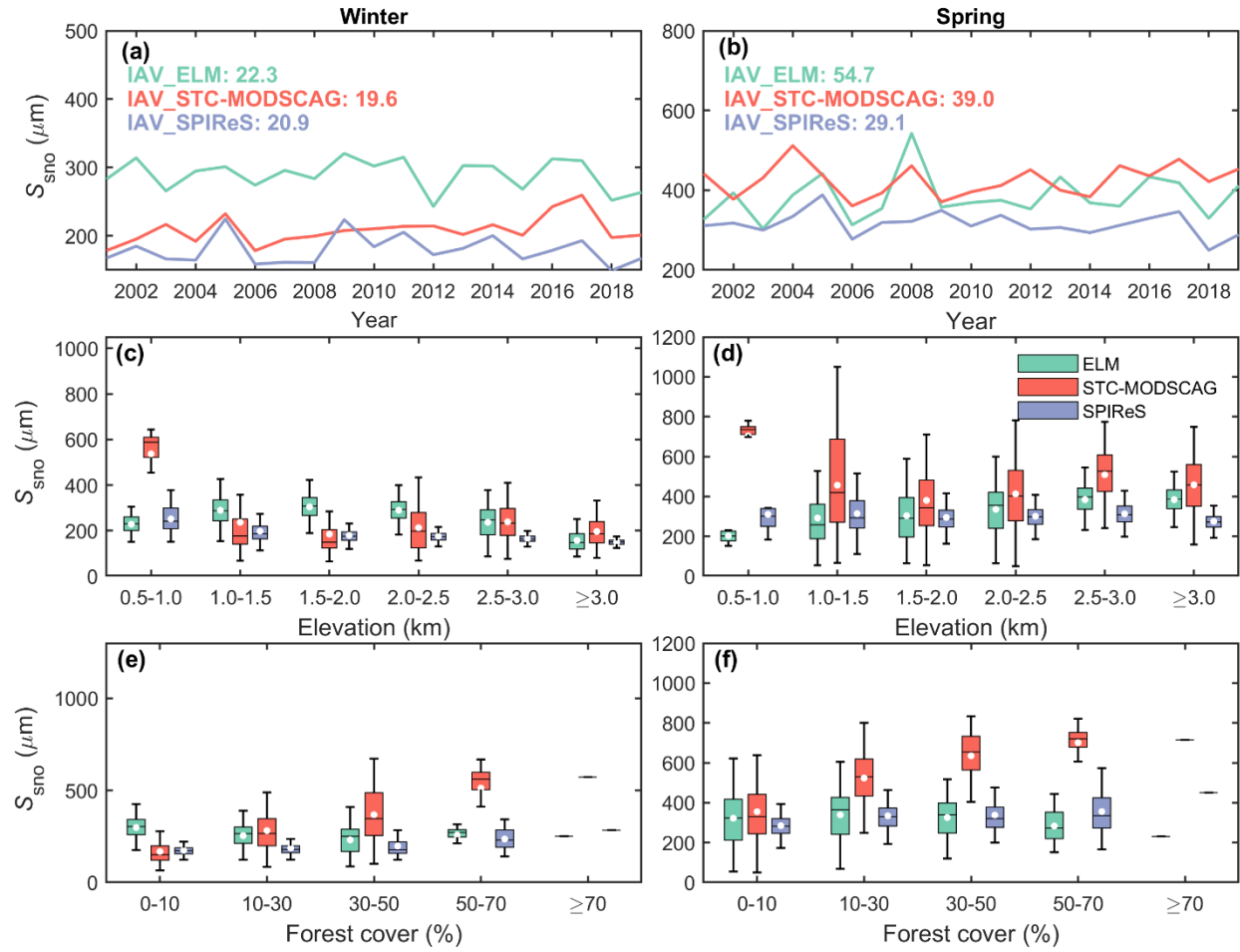
Figure S7: Same as Figure S6, except for the statistics over the WUS regions below 42° in latitude.
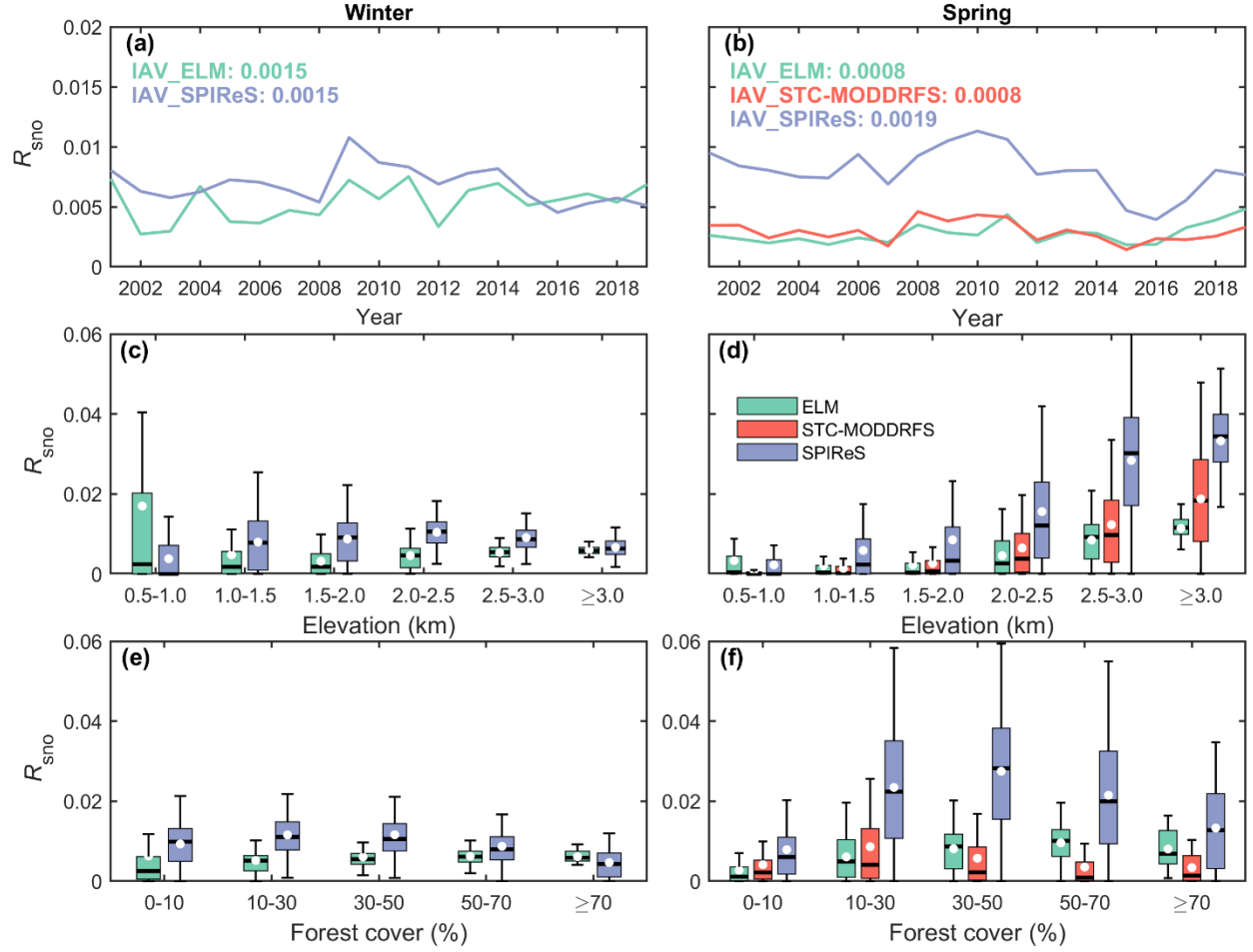
Figure S8: (a,b) Time series of regional average values, (c,d) elevation gradients, and (e,f) change with forest cover of R_{sno} in ELM (green), STC-MODSCAG (red), and SPIReS (blue) over the WUS. Panels (a,c,e) are for winter and panels (b,d,f) are for spring. In panels (c-f), the white dots represent the average values.
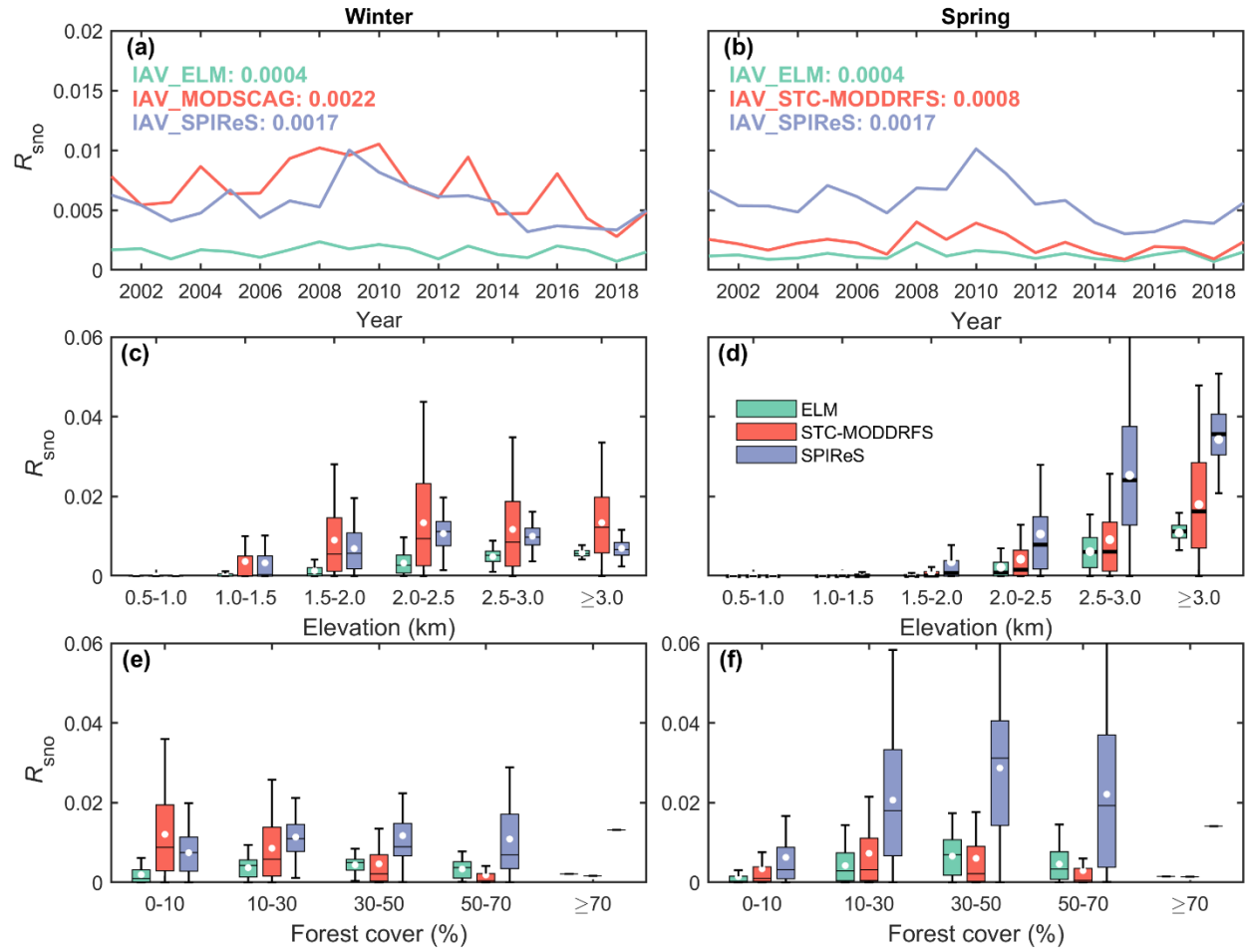
Figure S9: Same as Figure S8, except for the statistics over the WUS regions below 42° in latitude.
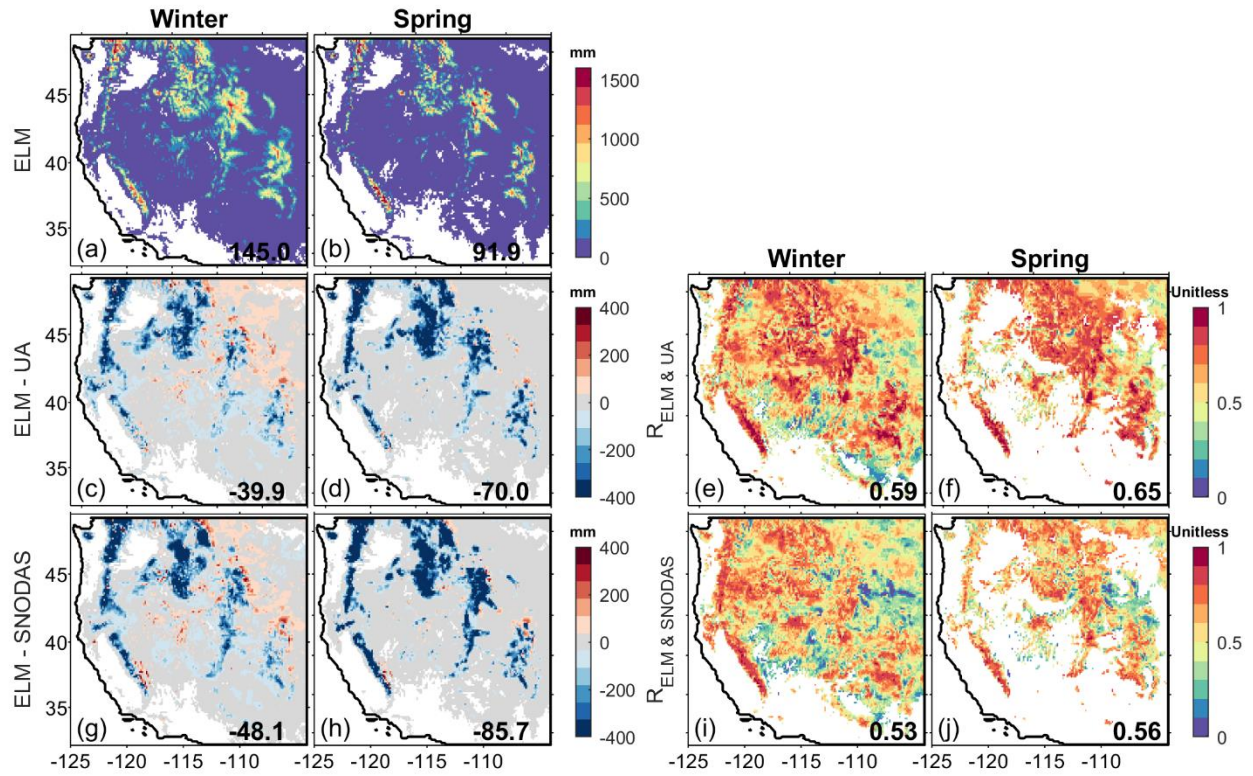
Figure S10: Spatial distributions of (a,b) D_{sno} in ELM and (c,d,g,h) the D_{sno} difference between ELM and two remote sensing products (i.e., MODSCAG and SPIReS) and (e,f,i,j) their temporal correlations (Rs) for different seasons: (a,c,e,g,i) winter and (b,d,f,h,j) spring. In all panels, regions with no snow cover are masked with white color. The area-weighted average values are labelled in each panel.
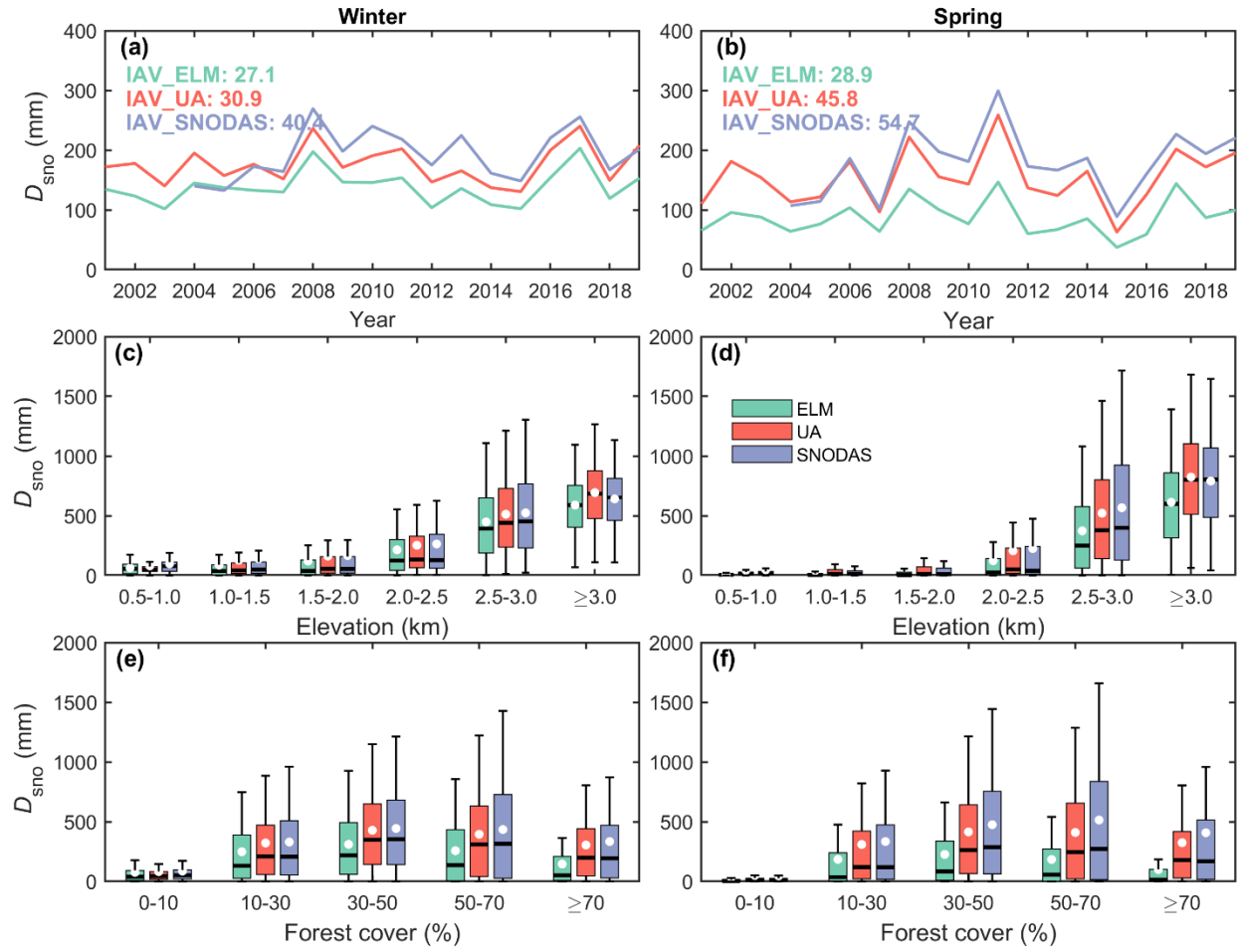
Figure S11: (a,b) Time series of regional average values, **(c,d)** elevation gradients, and **(e,f)** change with forest cover of D_{sno} in ELM (green), UA (red), and SNODAS (blue) over the WUS. Panels (a,c,e) are for winter and panels (b,d,f) are for spring. In panels (c-f), the white dots represent the average values.