

Table S1. Area in predominant significant trends from Terra for First Date of Snow by elevation class in selected rayons. **Bold entries** indicate significant ($p < 0.05$) negative trends at least twice as prevalent as significant positive trends. *Italicized underlined entries* indicate significant ($p < 0.05$) positive trends at least twice as prevalent as significant negative trends. Negative (positive) trends in FDoS correspond to earlier (later) onset of snow cover. "nd" = no data as lowest elevation in rayon is $> 1,900$ m. "--" indicates no prevalent trend.

elevation class	Naryn (km ²)	At-Bashy (km ²)	Alay (km ²)	Chong-Alay (km ²)
1,400-1,900 m	2.8	nd	13.1	nd
1,900-2,400 m	58.0	45.5	45.5	1.7
2,400-2,900 m	41.0	33.1	33.1	7.7
2,900-3,400 m	64.8	<i><u>116.6</u></i>	--	20.8
>3,400 m	--	--	109.7	--
Total earlier	166.6	78.6	201.4	30.3
Total later	--	<i><u>116.6</u></i>	--	--

Table S2. Area in predominant significant trends from Terra for Duration of Snow Season (DoSS) by elevation class in selected rayons. **Bold entries** indicate significant ($p < 0.05$) negative trends at least twice as prevalent as significant positive trends. *Italicized underlined entries* indicate significant ($p < 0.05$) positive trends at least twice as prevalent as significant negative trends. Negative (positive) trends in DoSS correspond to shorter (longer) snow season. "nd" = no data as lowest elevation in rayon is $> 1,900$ m. "--" indicates no prevalent trend.

elevation class	Naryn (km ²)	At-Bashy (km ²)	Alay (km ²)	Chong-Alay (km ²)
1,400-1,900 m	--	nd	<u>4.3</u>	nd
1,900-2,400 m	--	--	<u>15.7</u>	<u>5.4</u>
2,400-2,900 m	--	38.0	--	<u>57.1</u>
2,900-3,400 m	--	222.0	--	<u>38.6</u>
>3,400 m	23.4	331.4	<u>24.3</u>	--
Total shorter	23.4	591.4		
Total longer	--	--	<u>44.3</u>	<u>101.1</u>

Table S3. Two-stage trend analysis for LDoS and DoSS. **Bold entries** indicate at least twice the area of the significant ($p < 0.05$) pair

Trend of 1 st metric: LDoS	Area in 1 st metric (%)	Area in 1 st metric (km ²)	Trend of 2 nd metric: DoSS	Area in 2 nd metric (%)	Area in 2 nd metric (km ²)
LDoS earlier	3.2	5,514	DoSS shorter	8.2	452
			DoSS longer	0.1	8
			DoSS ns	91.7	5,054
LDoS later	0.4	778	DoSS shorter	<0.1	<1
			DoSS longer	19.9	155
			DoSS ns	80.1	623
LDoS ns	96.4	168,131	DoSS shorter	1.4	2,408
			DoSS longer	1.7	2,850
			DoSS ns	96.9	162,873

Table S4. Two-stage trend analysis for FDoS and LDoS. **Bold entries** indicate at least twice the area of the significant ($p < 0.05$) pair.

Trend of 1 st metric: FDoS	Area in 1 st metric (%)	Area in 1 st metric (km ²)	Trend of 2 nd metric: LDoS	Area in 2 nd metric (%)	Area in 2 nd metric (km ²)
FDoS earlier	4.8	8,555	LDoS earlier	2.3	196
			LDoS later	0.2	21
			LDoS ns	97.5	8,338
FDoS later	0.9	1,634	LDoS earlier	3.2	54
			LDoS later	1.0	15
			LDoS ns	95.8	1,565
FDoS ns	91.3	161,225	LDoS earlier	3.3	5,264
			LDoS later	0.5	742
			LDoS ns	96.2	155,219

Table S5. Summary of trend results from recent research studies.

	Dietz <i>et al.</i> (2013)	Dietz <i>et al.</i> (2014)	Zhou <i>et al.</i> (2013)	Tang <i>et al.</i> (2017)	Tomaszewska & Henebry (2018)	
Time	2000 – 2011	1986 – 2014	1986 – 2008	2001 – 2015	2002/03 – 2015/16	
Data	Daily snow cover Terra/Aqua MODIS at 500m	Daily snow cover Terra/Aqua MODIS at 500 m, and daily AVHRR at 1km	Daily and 8-day snow cover composites Terra MODIS at 500m, and daily AVHRR at 1km	Daily snow cover Terra MODIS at 500m	8-day snow cover composites Terra/Aqua MODIS at 500m	
Area	Central Asia	Central Asia (results for Syr Darya upstream sub-catchment)	Central Asia (Amu Darya catchment)	Tien Shan Mountains	Kyrgyzstan	
Snow Season Metrics	Snow cover duration (SCD) Snow cover start (SCS) Snow cover melt (SCM) Snow cover index (SCI)	Snow cover duration (SCD) Snow cover duration in early season (SCD _{ES}) Snow cover duration in later season (SCD _{LS})	Snow covering days (SCD) Snow cover onset date (SCOD) Snow cover melting date (SCMD)	Snow covered area (SCA) Snow covered days (SCD)	First date of snow (FDoS) Last date of snow (LDoS) Duration of snow season (DoSS)	
Results	Snow Arrival	No discernable trend recognized	Negative trend of snow arrival	Negative trend of snow arrival (>3,000 m) Slightly positive trend > 4,000 m in Central Pamirs	Did not analyze snow arrival	Negative trends of snow arrival in western and central KGZ
	Snow Departure	No discernable trend recognized.	Negative trend of snow departure	Negative trend of snow departure (> 3,000 m) No significant trend >4,000 m in Central Pamirs	Did not analyze snow departure	Negative trends of snow departure in eastern KGZ
	Snow Duration	Positive trend increases with elevation	Positive trend in early season increases with elevation Negative trends in later season in upstream sub-catchment of the Syr Darya	Did not analyze duration	Negative trend in central and eastern Tien Shan Positive trend northern and western Tien Shan	Negative trends in western and eastern KGZ Positive trends in north and southwestern KGZ