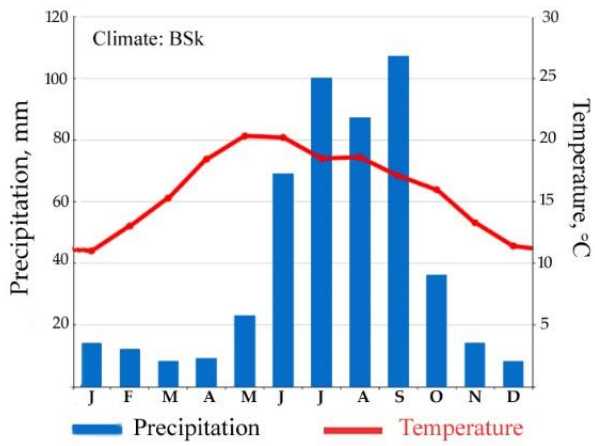
S4. Seasonality in the trend analyses

The database of our study contained yearly data of groundwater quality; however, the samples were not collected on the same date every year, but at seemingly random days. Besides, not every sample contained all four parameters of interest (NO_3-N, TDS, As, F). The seasonality effect was addressed by removing from the calculations the samples taken during the month of September (reasons explained below), after which the trends for the 11 wells with a remaining 10 or more data were recalculated, as shown in Table S3. Next, the origin4l Z and recalculated Z (Z -Sep) were compared. According to Table S4, the removal of the September data resulted in none of the wells changing the direction of the trend, and only xx measurements (out of 29) varied the significance of the trend, one of each xx, xxx, and xx.



Why September?

The climate of Zacatecas can be divided into two main climates, dry (Köppen classification: C), or arid/semiarid dry (Köppen classification: B). Climate C occupies 21% of the surface area of Zacatecas, climate B 78%, and other climates ~1% [35].

The rainy season extends from June to September, as shown in the figure at left. The figure is the climagraph of Fresnillo, a city in central Zacatecas, which is a representative pattern to other places within the state of Zacatecas. As seen in the figure, and considering that the effect of surface water requires days or weeks to be reflected in groundwater, the groundwater quality is expected to experience the largest effect by the end of the rainy season; that is, in September. September is the one month of the rainy season that would have the largest effect in water quality as it is the last month of the rainy season.

Table S4. Variation of Z (statistics Mann-Kendal trend analysis) of wells containing ten or more data (Z) and with the September samples removed (Z -Sep.). Measurements whose trends switched from significant (Z > 1.98) to not significant, or *vice versa,* are shown in bold, n.a. = not available because the number of data did not amount to the necessary minimum of ten measurements.

Well	NO_3-N		TDS		As		F	
	Z	Z -Sep.	Z	Z -Sep.	Z	Z -Sep.	Z	Z -Sep.
ZAC2586	0.78	0.78	n.a.	n.a.	0.00	0.00	1.09	1.09
ZAC2589M1	0.31	0.54	0.00	0.00	**2.13**	**1.90**	-1.25	1.17
ZAC2593	0.16	0.16	n.a.	n.a.	0.08	0.08	0.18	0.18
ZAC2595M1	1.43	1.43	n.a.	n.a.	0.56	0.56	1.60	1.60
ZAC2598	-0.16	-0.18	0.16	0.54	n.a.	n.a.	-1.40	-1.25
ZAC2606	1.40	1.61	0.62	1.07	0.17	0.10	n.a.	n.a.
ZAC2611	0.47	0.54	-0.78	1.07	n.a.	n.a.	1.87	1.97
ZAC2612	-1.71	-1.79	-0.23	-0.18	n.a.	n.a.	0.93	0.90
ZAC2623M1	0.62	0.89	-0.70	-0.63	**2.73**	**2.60**	n.a.	n.a.
ZAC2632	-1.09	-1.07	-0.62	-0.54	0.86	0.63	-0.62	-0.27
ZAC2633	n.a.	n.a.	-0.16	0.00	n.a.	n.a.	**2.18**	**2.16**

Table S4 shows that three wells changed trend statistics, one for As and two for F. In all these three cases, the Z value decreased for a small margin after removing the September data, with one instance where the Z became lower than 1.98 and not significant. That is, none of the data experienced a change in trend direction and only 3 out of 34 measurements resulted in a small decrease in Z after September data were removed. Since removing the September data seemed to have a minor to no effect on the trends seen in Table 1 below, we safely assumed that seasons did not substantially affect the trends in the study area. However, the number of data was limited to only 34, therefore more studies and larger data sets (more years) are needed to verify the validity of this finding.