OKLAHOMA ROCKS! GROUNDWATER

Lesson 6: Climate versus Human Impact

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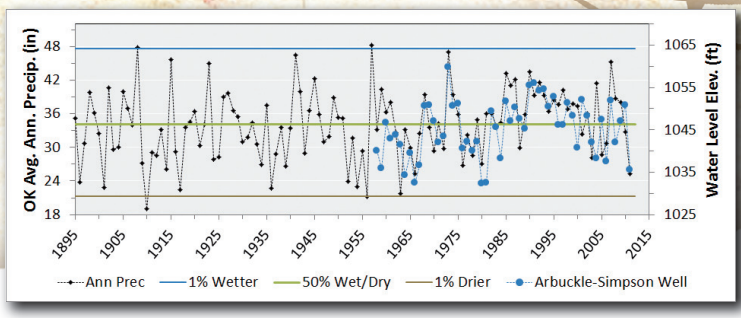
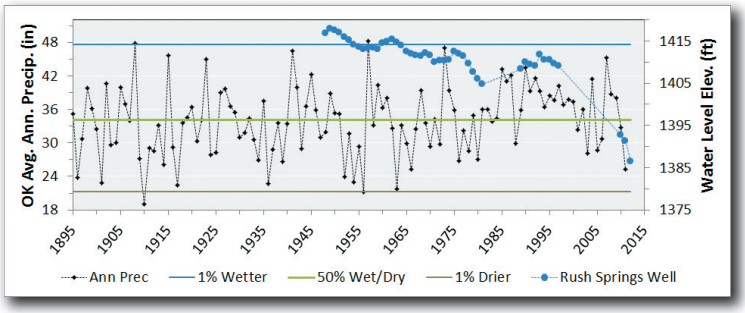


Oklahoma, like all other parts of the world, is subject to natural variability in precipitation. The statewide average (aka median) annual precipitation from 1895 to present was about 34 inches, so the state was wetter for 50% of the years and drier than 34 inches the other 50%. The driest year on record was 1910, when the average precipitation was only 19 inches. Conversely, the wettest year on record was 1957 when the average was slightly more than 48 inches. These "extreme" wet or dry years were in the highest or lowest 1%, respectively. Streams are directly and nearly immediately affected by fluctuations in precipitation, so in dry years streams that are comprised primarily of runoff will quickly run dry. Streams that persist through a dry year may be spring-fed or be maintained by baseflow (i.e., groundwater discharge in the stream channel). We know that volumes of water stored in the aquifers of Oklahoma far exceed the volumes of water maintained in our surface water reservoirs, but are aquifers affected more by climatic variability or anthropogenic use?



The charts above show the average annual precipitation for the state of Oklahoma and average annual water levels in wells from two different aquifers (Arbuckle-Simpson and Rush Springs).

Questions:

1. Water levels in which of the two aquifers (depicted in the charts above) seem to fluctuate in a pattern that mimics precipitation? The data that you are analyzing are only from a single well in the aquifer, but what would you conclude about recharge versus discharge based on these data?
2. What is the rate of decline (feet per year) of the water level in the Rush Springs Aquifer based on the well data above?

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