INVESTIGATION ON THE PRESENCE AND ORIGIN OF HIGH CHLORIDE WATERS IN THE SHALLOW HYDROLOGIC SYSTEM IN THE SOCORRO BASIN, NEW MEXICO

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The Rio Grande, an important water source in New Mexico, flows through the Socorro Basin, located in central New Mexico. An interesting feature in the Socorro Basin is the Socorro accommodation zone (SAZ), a 2-km-wide, topographically high zone that separates tilted half grabens of opposite dip directions. There is evidence that the SAZ has had a large influence on volcanism in the area and is a zone of groundwater movement.

This study focuses on the presence, and possible origin of high chloride waters observed in certain areas in the shallow groundwater system in the Socorro Basin. These waters seep into irrigation drains and canals and eventually make their way into the Rio Grande, impacting the water quality of the river.

Water chemistry suggests that these high chloride waters are sedimentary brines with a deep origin. Other water types in the shallow groundwater system include river water, the dominant water type, and water that is chemically similar to Socorro Springs, a warm spring on the western edge of the basin. Water that discharges at Socorro Springs is believed to come from La Jencia Basin an adjacent closed basin to the west.

Existing gravity data for the basin combined with the spatial distribution of high chloride water and Socorro Spring type water imply that upwelling of deep basin brines and regional groundwater flow paths may be structurally controlled and directly related to cross-basinal structures associated with the SAZ. The known relationship between the SAZ and past volcanic events suggests that geothermal waters may also play a part in upwelling of the high chloride waters.


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