ABSTRACT

USING STABLE ISOTOPES TO CHARACTERIZE THE GROUNDWATER RECHARGE IN THE SIERRA NEVADA FOOTHILLS, CALIFORNIA

The hydrology of the Sierra Nevada is controlled by fractures' ability to store limited amounts of water. Not much is known about the role these fractures play in the transport of waters from the recharge area to the lower parts of the foothills. To better understand this process, two dominant sets of fractures were characterized in the Big Sandy Watershed based on structural data and the spatial distribution of oxygen-18 and deuterium isotope ratios.

The isotopic signatures of 121 samples, including ground and surface waters, rain and snow, indicate that the main recharge is at high elevations (1,400 m). The isotopic data were correlated with the local distribution of joint systems based on analyzing 271 structural attitude points. The most dominant fracture system has a trend ENE dipping from 60 to 70 degrees to the SW. Elongated isotopic anomalies run parallel to this main trend, suggesting that this fracture system controls the groundwater flow in the watershed.

Nelson Ferney Bernal
December 2007