Geophysical Research Abstracts, Vol. 7, 10465, 2005 SRef-ID: 1607-7962/gra/EGU05-A-10465 © European Geosciences Union 2005



Isotopic global change in the groundwater of the upper part of the Guanajuato River Basin, central Mexico

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Two data sets of isotopic pairs, (δ^{18} O, δ D), were compared. Both sets correspond to the isotopic analysis of deep-well waters randomly distributed in the sub basin of the upper part of the Guanajuato River basin, sampled at different years. One set is conformed by 41 pairs sampled during 2003; the other by 53 pairs sampled in 1998. The statistic for both isotopes in 2003 and 1998, are to Gaussians distributions. Comparison between the oxygen-18 Gaussians shows a significatively more depleted concentrations of oxygen-18 in 2003 than in 1998; in the case of the deuterium, the Gaussians practically overlap. These curves specifically in oxygen-18, shows a shift to more depleted values in 2003, in the case of deuterium the curves do practically overly. This peculiar "oxygen shift" resembles an inverse effect of a geothermal alteration of groundwaters (geotermalismo is documented in the area). Infiltrated groundwater is a binary mixture: Taking isotopically altered groundwater and contemporaneous precipitation as end members of a mixing line, an increase in the fraction of the meteoric water in the recharge would explain the documented shift. This regional process has occurred rapidly likely as a consequence of the abnormal rainy seasons repeating the last five years in central Mexico.