

Analysis of groundwater level historical data to detect climate change impact in France

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The level of groundwater bodies depends for many of them on the infiltration of meteoric water and will therefore benecessarily impacted by climate change if it causes a change in the infiltration system (intensity, period). To assess and monitor the impact of this change, a dedicatedgroundwater monitoring network isnecessary. As this impact iscurrentlyunclear, the implementation of such a network involves an analysis of existinggroundwaterlevel data series. The studywasbased on modifiedMann-Kendall and Pettitt tests fromgroundwaterlevel data and a comparison of trends betweengroundwaterlevel data and climate data (precipitation, temperature. potentialevapotranspiration). Trend detection tests werecarried out on 377 piezometers of the french national groundwater quantitative monitoring network for whichwehad a data series of at least 25 years. In the end, 70 have a significant trend, 44 down and 26 up. Piezometersshowingsignificant trend mostlyconcernaquiferswithpredominantannualhydrologic cycle. But most of aquifers in France have longer hydrologic cycles and statistical tests do not permit to distinguishbetweenclimatic and anthropogenic influence. The conclusion of thisstudyisthatwecannotdemonstrate a significant impact of climate change on groundwaterlevels but itreinforces the need to set up a monitoring network dedicated to the impact of climate change on groundwater. In order to set up that network, about 40 aquiferswereselectedwithfollowingcreteria : unconfinedaquifer, recharge likely to beimpacted by climate change, aquiferweaklyimpacted by withdrawals.For each selected aquifer, a monitoring well or a springwasselected, based ona number of riteria and in particular the fact that the wellis inside an unconfined aquifer which is not influencedbypumping. They will constitute a new groundwater monitoring metanetwork to cover monitoring of climate change