GEOCHEMICAL GROUNDWATER-SOIL INTERACTIONS IN A SMALL RESERVOIR CATCHMENT OF CENTRAL TUNISIA. PRELIMINARY RESULTS.

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INTRODUCTION

Numerous hill reservoirs have been constructed in central Tunisia for the beginning of nineties, up to now about 450. The Direction of Water and Soil Conservation from Agriculture Ministery have assigned different aims to these lakes: the decreasing of soil losses, the reducing of dam sedimentation and the refilling of groundwater tables (ALBERGEL and REJEB, 1997). Water lakes should give an opportunity for the nomad population to be fixed and to find water supplies for agriculture and domestic uses (TALINEAU, et al., 1994; SELMI, 1996).

Thirty lakes are monitored and allow the calculation of the water budget and the modeling of catchment water flows. Most lakes gain more water and lose more water to atinospheric water and/or surface water. From a chemical-transport perspectiva, however, subsurface flows can be important as mechanism of transport for chemicals to and from lakes (WINTER, 1995).

In this communication, we present the results of a field study carried out in the catchment and the neighbourhood of a hill reservoir. The main objectives of our work are (i) to characterize spatially water chemistry at a given time (flow and dry periods), (ii) to identify geochemical tracers explaining the relationships between lake water and groundwater table and, (iii) in fine, to model the water-soil-rock interactions.

STUDY SITE

El Gouazine hill reservoir was chosen because the water balance is highly negative suggesting a relevant water loss by infiltration. The catchment is situated in the Ousseltia province, 50 lan northwest of Kairouan. El Gouazine catchment is situated in the basin of Nebhana river (central Tunisia), 50 km northwest of Kairouan. The watershed is approximately 18.1 km^2 in area and is bordered by SW-NE orientated hills. Elevations decrease from 575 m above sea level for the highest hills to 375 m above sea level near the lake.
El Gouazine region is characterized by a Mediterranean climate with a mean annual precipitation of 355.8 mm during the 1994-1997 period (CES/ORSTOM, 1996a, 1996b and 1997). Mean annual air temperatura is 19.I° C, with a minimum of 10.4° C in January and a maximum of 28.6° C in August (BOCQUET, 1993). Potential evapotranspiration stronely exceeds precipitation and is approximately 1460 mm during the 1993-1995 period (RIOU, 1980). Vegetation originally consists of Alep pines and Carob trees. Owing to increasing agricultural activities, a large part of the original vegetation has been replaced by rainfed çereals and by irrigated agricultura.
The watershed belongs to east edge of a SW-NE orientated syncline. Eocene syncline layers of limestone, limy sandstone and marl outcrop vertically in some catchment places, The dam was built in,1990 and the lake surface in overflow situation is of 9.597 10^{-2} km^{2} for a 18.1

CONCLUSION

Water chemistry and pedological observations confirm that the El Gouazine reservoir can infiltrase and supply a downstream aquifer. We need more informations to assess the permeability of porous deposits. It seems that a general (may be regional) aquifer flows in the watershed, temporarily supplies the hill reservoir and maintains an alluvial aquifer. The laboratory analyses will allow to distinguish the different chemical composition of waters defining different water types and to determine the interactions of subsurface water with surface-water features such as lake and river. Geochemical modeling will lead to evaluate on the one hand, how the different geological and pedological parts of the watershed contribute to the chemistry of the lake water and on the other hand, how reservoir water contributes to aquifer recharge.

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EXTENDED ABSTRACTS

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