Geophysical Research Abstracts
Vol. 14, EGU2012-9120, 2012
EGU General Assembly 2012


# Surface water - groundwater relationship in the downstream part of the Komadougou Yobe River (Eastern Sahelian Niger)

B. Hector (1), P. Genthon (2), A. Luxereau (3), M. Descloîtres (4), A. Moumouni Moussa (5), and H. Abdou (6)

(1) University of Strasbourg, IPGS-EOST, STRASBOURG, France (basile.hector@unistra.fr), (2) IRD/ Hydrosciences Montpellier, France, (3) Cnrs / Mnhr Paris, France, (4) IRD/ LTHE pour le Développement, 08 BP 841 Cotonou, Bénin, (5) Direction de l'Hydraulique, Zinder, Niger, (6) Direction de l'Hydraulique, Diffa, Niger

The Komadougou Yobe (KY) is a temporary river meandering on nearly 100 km along the Niger/Nigeria border in its lower part, before reaching the endoreic Lake Chad. There, seasonal flow from July to January is related to rainfall amount on the upstream Jos Plateau, Nigeria. In the semi-arid downstream area (350 mm annual rainfall in Diffa, Niger) the KY is the main source of recharge for the sandy quaternary aquifer which is used both for irrigation and for drinking water supply. The borders of the KY in Niger are subjected to an agricultural development involving intensive irrigated cropping of sweet pepper mainly produced for sale in Nigeria. Irrigation waters are mainly extracted from the KY, and therefore irrigation must stop when the River runs dry, but irrigation from wells is now developing with an increased risk of soil salinization. The flow rate of the KY has been impacted both by the 80s and 90s droughts, also underwent by the entire Sahel, and by the building up of a series of dams starting from the 70s in Nigeria. Therefore the KY and its relations with the underlying groundwaters should be carefully monitored to provide guidelines for policy makers in charge of the development of this area. However, in this remote area, data are scarce and often discontinuous : there are for example no continuous groundwater level data from before the drought. As part of the Lake Chad French IRD project, series of campaigns involving water level, exploration geophysics, gravity, soil sampling and social studies have been carried out between 2008 and 2011. They allowed to build a numerical model for groundwater-river interactions which in some instances has been compared with previously recorded data. This model is then forced with theoretical climatic senarii based on humid 60s data and data from the drought period. This allows discussing the relationships between the river and groundwaters in a changing climate. Our results militate for the setting up of a limited network of continuous groundwater monitoring near the river in conjunction with the existing network of gauging stations on the KY. Given the present day high variability of the climate (2010 was equivalent to one of the most humid years of the 60s, while 2005 was dry) this network could provide a validation for future models involving realistic climate senarii.