



Tropentag, September 17-19, 2014, Prague, Czech Republic

“Bridging the gap between increasing knowledge and decreasing resources”

Origin, Anthropogenic and Climate Influences on the Occurrences of Saline Groundwater at the City of Cairo, Egypt Deduced by Chemical Parameters of Water Composition

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Abstract

In the 16th to 18th century canals and ponds outgoing from the Nile were systematically built in the growing city Cairo, for irrigation purposes and as transport ways for ships. This network of canals and ponds was able to store temporarily the incoming flood water and in this way prevent the general flooding of Cairo City. After the construction of the Aswan High dam in the 20th century (1970) these canals were not needed anymore for irrigation and as storage capacity of the flood water. Most of the canals and ponds were filled up and used for road network extensions. However the ponds of Ain Al Sira, Khayalat Al Shorta and Abo El Soud which were now no longer connected to a canal system showed the following behaviour: As these ponds were filled up with dumping materials and one of them removed even completely from the landscape (Abo El Soud), the water was invading the basements of the constructed buildings as well as outflowing in other places. The water surface rise of the two remaining ponds is still continuing and is actually even flooding nearby roads and cemeteries.

The origin of the groundwater is from outflows of the outcropping Tertiary rocks according to the main chemical composition of Pond Nr. 1 Khayalat Al Shorta, as also outflows of the water of the Eocene formation outcrop along the Eastern bank of the Nile valley according to the main chemical composition of Pond Nr. 2 Ain Al Sira. A remediation of the present situation would most probably only be possible by restoring the pools to their original extent and maintaining the water level constant by controlled drainage of the groundwater overflow by installing a drainage system for lowering the groundwater level with small pumping stations scattered throughout the area of high groundwater levels along the main streets in the direction of the Nile (which would possibly replace the disappeared historical channel system)

Keywords: Cairo ponds, origin and chemical composition of waters, remediation of groundwater level, water logging