Origin of saltwater in the groundwater systems of Indian subcontinent

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ABSTRACT

Groundwater management and exploration in the important Indus Basin aquifer require discovering the mechanism of salt accumulation. It is undoubtedly clear that the infiltrating rivers in the Punjab are the cause of high evaporation gradually away from the rivers, which results into accumulation of saltwater in the Indus Basin aquifer. But, the presence of saltwater at greater depths confuses the Hydrogeologists working on the groundwater management of the area to build reliable models. In this paper, we explore the hypothesis of land formation in the Indian subcontinent, which unveils the noteworthy history as well as important origin of saltwater in the Indus Basin aquifer. A gigantic Himalayan's river called as "Siwalik" had been involved in the land formation of Indian subcontinent since a few million years ago as revealed by archeological records. A huge amount of debris and alluvium as transported from the Himalayas by this great river were deposited in the sea, where the present-day lands of Pakistan, Indian Punjab and Indian state of Rajasthan exist. In this paper, we simulate the hydrogeological processes of land formation to date back the origin of saltwater in the Indus Basin aquifer. Borehole logs, which were drilled up to bedrocks in the recent past, are used to evaluate the pattern of deposition. The analysis of chemical and isotope samples, as collected in the past, also indicates a possible relation between the deeper groundwater and ocean water.