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# The International Student Conference on Medical Geology and Environmental Health: Latin America Edition

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# Analysis of the heterogeneity of the Pampeano Aquifer sediments: towards a better understanding of the behavior of arsenic and fluoride in the Pampean Plain

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Although considerable progress has been made in the study of arsenic (As) and fluoride (F) in groundwater, the number of people affected by this problem in Argentina is still high[1]. The city of Azul in the province of Buenos Aires is located in the Pampean Plain and is supplied with groundwater from the multilayer Pampeano Aquifer, whose thickness is about 100 m. The aquifer has a complex geological heterogeneity that leads to important variations in hydraulic conductivity, which in turn affects As and F behavior. It has been shown that Pampeano Aquifer has high concentrations of As and F, but distributed erratically, both laterally and in depth[2]. These chemical species originated in several sources and are mobilized and transported by various mechanisms, both physical and chemical[3]. In addition, there are local factors such as lithology, geomorphology, topography and hydraulic parameters that affect these processes.
The main objective of this study is to determine which layers of the Pampeano Aquifer contain water with low As and F concentrations and to relate them to heterogeneity in subsurface geology.
The methodology used to characterize the aquifer sediments includes analysis of drilling logs and geophysical measurements. The use of chemical and isotopic techniques is intended to help in the understanding of hydrodynamics. The use of specific software EMMA-MIX is proposed to gain insights into the degree of mixing of water due to lithological heterogeneity and groundwater pumping[4].
An hydrogeological conceptual model it is planned to be developed which allow us to establish some criteria for water quality in the city of Azul. It is expected that this model provide scientific guidelines for hydrogeological exploration with the lowest concentrations of these ions as possible. Undoubtedly, this progress will have a positive impact on the health of the population, providing them with better water quality.

References

[1]Khan, K. M., Chakraborty, R., Bundschuh, J., Bhattacharya, P., & Parvez, F. (2020). Health effects of arsenic exposure in Latin America: An overview of the past eight years of research. Science of the total environment, 710, 136071.
[2] Zabala, M. E., Manzano, M., & Vives, L. (2016). Assessment of processes controlling the regional distribution of fluoride and arsenic in groundwater of the Pampeano Aquifer in the Del Azul Creek basin (Argentina). Journal of hydrology, 541, 1067-1087.
[3] Dietrich, S., Bea, S. A., Weinzettel, P., Torres, E., & Ayora, C. (2016). Occurrence and distribution of arsenic in the sediments of a carbonate-rich unsaturated zone. Environmental Earth Sciences, 75(2), 90.
[4] Carrera, J., Vázquez-Suñé, E., Castillo, O., & Sánchez-Vila, X. (2004). A methodology to compute mixing ratios with uncertain end-members. Water resources research, 40(12).