Finding Water in Crisis: Using Geophysics to Aid the Refugee Populations of Eastern Chad  
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The ongoing civil war in Sudan has created a humanitarian crisis, resulting in thousands of refugees fleeing to neighboring countries in desperate need of food, shelter, and water. In June of 2024, BGC Engineering partnered with the United Nations High Commissioner for Refugees (UNHCR) to conduct geophysical investigations at six refugee sites in eastern Chad , where the average person has access to just four liters of water per day. The main objective of this program was to explore the subsurface for groundwater resources with the intent of sitting water-well drilling locations for the refugee sites. Using electrical resistivity tomography as the applied geophysical exploration method, a linear total of 22,200 meters of data was collected over 13 field days. The survey lines were planned along paths that connected existing boreholes or wadi features (i.e., possible direct recharge sources) wherever possible to utilize existing groundwater knowledge. The main subsurface targets for the geophysical program were thick, spatially extensive zones of fractured rock. Based on the results, 17 targets were identified and sent to the UNHCR with recommendations on drilling location, depth, and criteria for well-screen installation. As of January 2025, five of the suggested targets have been drilled, with three of the wells being successful, and two of those producing upwards of 10m3/h of water. This presentation will describe some of the challenges encountered in completing the emergency-response groundwater investigation with limited resources and highlight some of the lessons learned.