Geophysical Research Abstracts
Vol. 14, EGU2012-4640, 2012
EGU General Assembly 2012

Flowing Fluid Electrical Conductivity Logging at the Heletz Site for Detailed Hydraulic Information for CO_2 injection

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A complete background information such as porosity, permeability, aquifer thickness, hydraulic head, geometry of cap-rocks, salinity are necessary for the successful planning of the field injection or for modeling the flow and transport of injected supercritical CO_2 in the target formation. In the MUSTANG project, two new wells at the vicinity of Heletz 18 (H-18) are being drilled and will be used for the study of the effects of CO_2 injection for geological storage. To determine the hydraulic conductivity structure of a reservoir layer of new wells, the Flowing Fluid electric conductivity (FFEC) method will be applied. In this method, the wellbore water is first replaced by DI water (or a constant salinity distinctly different from that of formation water). Then the well is shut in and an electric conductivity probe is used to scan the electrical conductivity of borehole fluid as a function of depth and time while pumping the wellbore water at constant rate. At depth locations where water enters the borehole, the logs display peaks. Analysis of the time evolution and skewness of these peaks allows estimation of the flow rate and salinity, and further, if two or more logs are taken at different well flow rates, the initial ambient pressure heads of each individual inflow/feed point can also be estimated. The depth resolution of the inflow locations is typically of order of well diameter. These data can be used to define the detailed transmissivity/permeability structure of the reservoir layer. In the present presentation, the FFEC method will be applied to the salinity data on the target layer from the Heletz site and model analysis results will be compared with those from core samples.