

IMPROVING SNMR 1D INVERSION ACCURACY USING THE MULTI-CENTRAL LOOP CONFIGURATION

Thomas Kremer, Université de Liège

A multi-central loop configuration has been studied through forward and inverse modelling, and has been tested on the field. This set-up takes advantage of the multichannel features of the NMR device and consists of using several (2 to 3) additional receiver loops displayed concentrically with the main transmitter/receiver loop, which all record the NMR signal simultaneously within a single acquisition. If the loop diameters are chosen appropriately, the kernel sensitivity distributions for each receiver loop will show complementary features. Inverting simultaneously the data sets obtained through each different receiver loop can then enhance significantly the accuracy of the final model. To do so, a 1D QT inversion scheme in the frequency domain dedicated to the inversion of multiple data sets is being used. One challenging feature is the implementation of an adaptive weighting algorithm that can appropriately balance the fitting of the different data sets during the inversion process. The efficiency of this multi-central loop acquisition set-up and procedure is being assessed through the forward and inverse modelling of several scenarios implying varying aquifer characteristics. Finally a field case is being presented that was conducted on a low noise level site located in Germany, where conditions were favourable to the implementation and testing of circular multi-central loop configurations.