# Estimating hydraulic conductivity correlation lengths of an aquitard by inverse geostatistical modelling of a pumping test

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Typically pumping test are used to parameterize the hydraulic conductivity of aquitards. However, they do not take spatial variability and uncertainty into account. In this study we investigate whether a pumping test can be used to obtain the correlation lengths of hydraulic conductivity, needed for geostatistical upscaling and to account for uncertainty and spatial variability in heterogeneous aquitards.

Test site
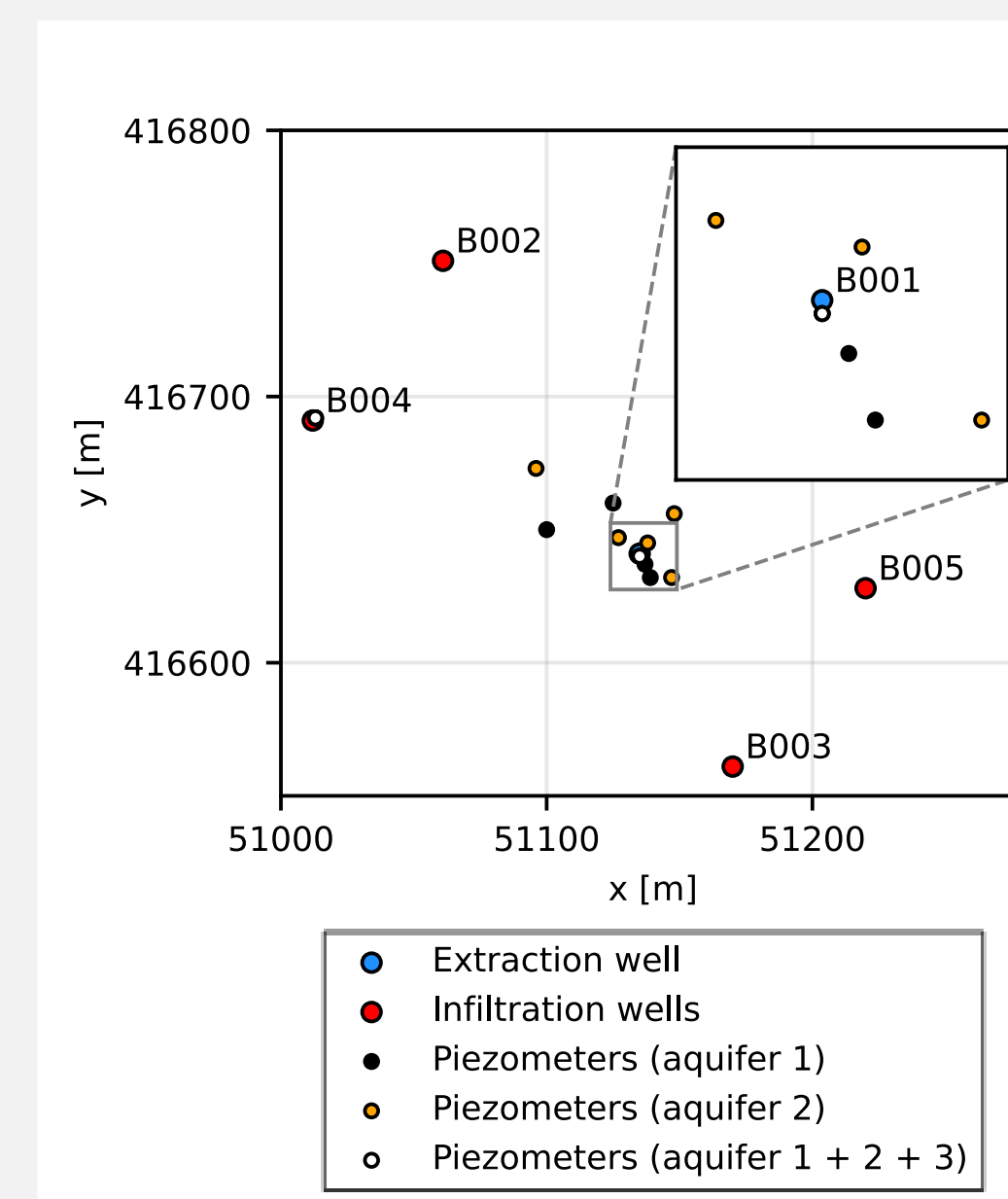
Aquitard 1	Clay	Naaldwijk Formation	
Aquifer 1	Fine sand	Naaldwijk Formation	
Aquitard 2	Clay/fine sand	Naaldwijk Formation	Layer of interest
Aquifer 2	Coarse sand	Boxtel/Eem/Peize Formations	Pumping wells
Aquitard 3	Sandy clay	Waalre Formation	
Aquifer 3	Medium sand	Peize/Maassluis Formation	

Test site location of the pumping test (left), locations of the well at the test site (centre), and the local hydrogeological schematization at the test site (right)

Methods
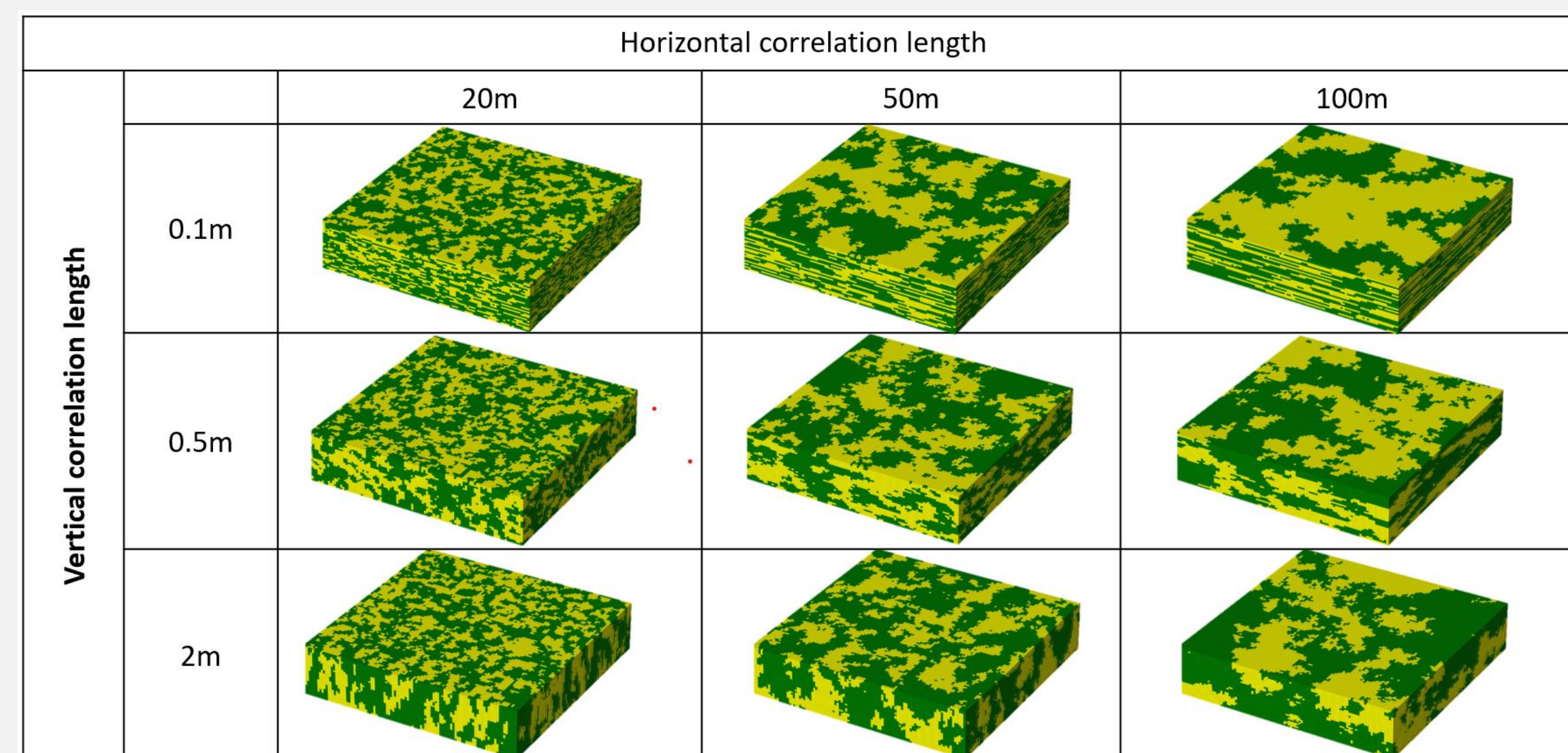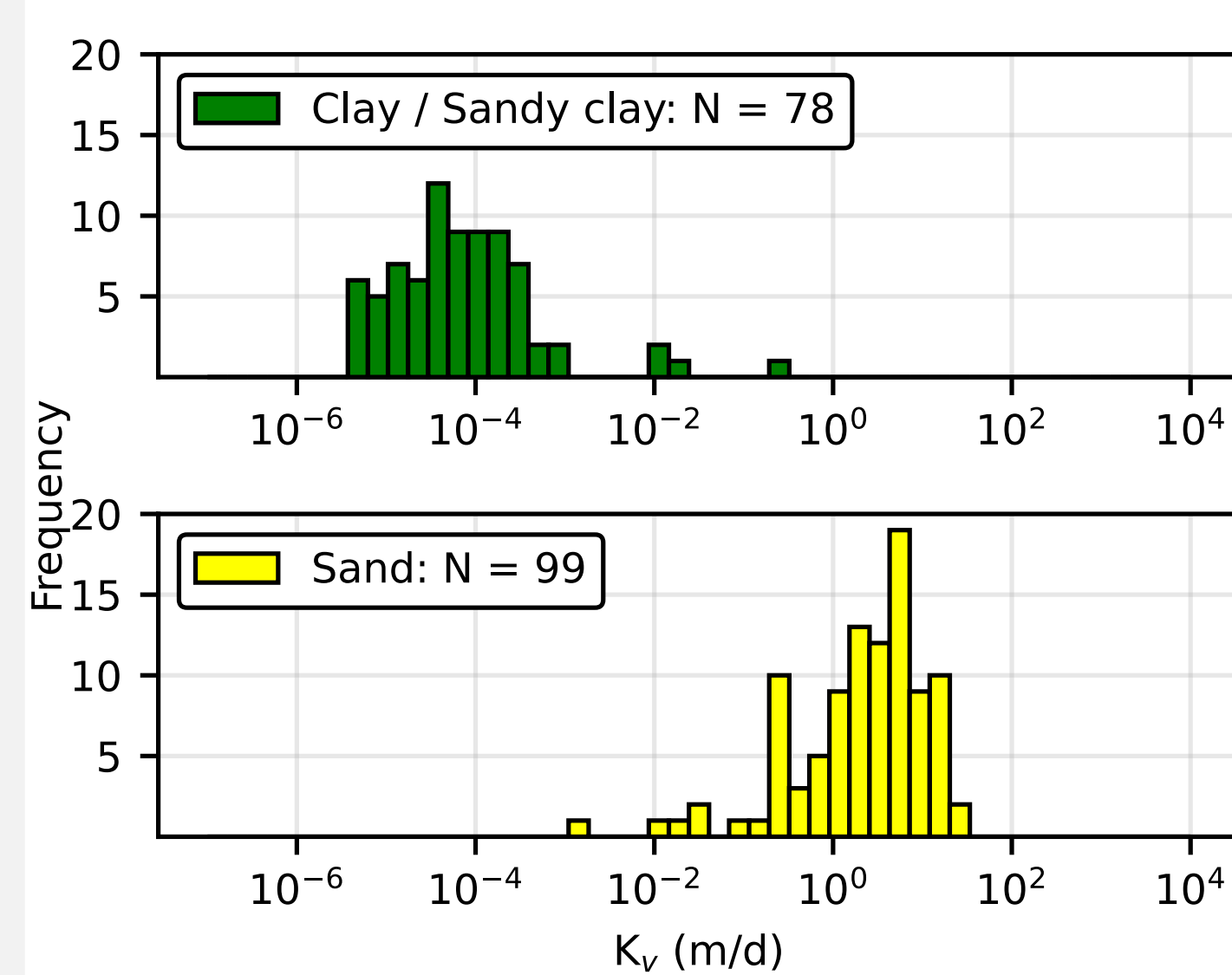
Measured core scale hydraulic conductivity measurements (left) are used to generate random realizations with varying correlation lengths inserted into a groundwater flow model which simulates the outcome of the pumping test. The calculated drawdown is compared with the observed drawdown.
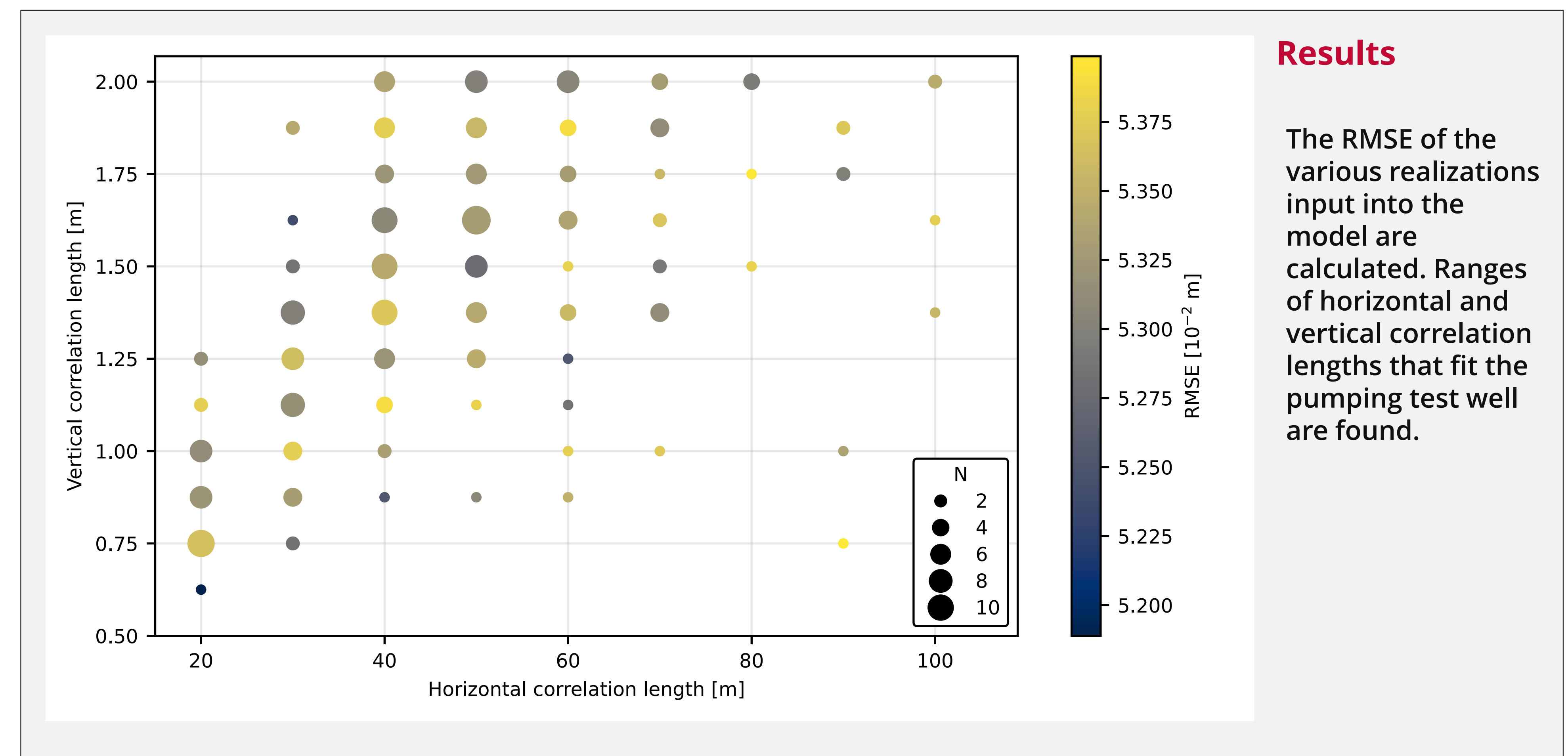
Results

The RMSE of the various realizations input into the model are calculated. Ranges of horizontal and vertical correlation lengths that fit the pumping test well are found.

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