

# Report title

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## Contents

### Abstract

Put your abstract here.

## 1 Introduction

Put your introduction here. Cite literature as ? or (?).

## 2 Instruments, Data and Methods

### 2.1 Darcy's law

Darcy's law describes the hydraulic flux of a fluid through a cross section using the hydraulic conductivity.

Without gravitational influence the instantaneous flux  $q[m/s]$  through a porous medium with cross section  $A[m^2]$  and permeability  $k[m^2]$  of a fluid with viscosity  $\mu[Pa \cdot s]$  is given by equation ??

$$q = -\frac{k}{\mu} \nabla p \quad (1)$$

Where  $\nabla p[Pa]$  is the pressure difference over length  $L[m]$ . The negative sign means that the fluid flows from high pressure area to a low pressure area. In the case of vertical flux and by assuming a static fluid pressure we can relate the pressure to the height of the fluid by Stevin's law.

$$q(t) = -\frac{\rho g k}{\mu L} \Delta h(t) \quad (2)$$

Where  $g$  is the gravitational acceleration, and  $\rho$  is the density of the fluid. Note that we have added a time dependency of the height and thus flux. As the volume is filled up, the height (and pressure) increase, altering the flux.

The solution to the differential equation ?? shows an exponential relation between height and time.

$$h(t) = h_0 \exp\left(-\frac{\rho g k t}{\mu L}\right) \quad (3)$$

Linearizing equation ?? and solving for the permeability  $k$  yields:

$$k = \frac{a \rho g}{\mu L} \quad (4)$$

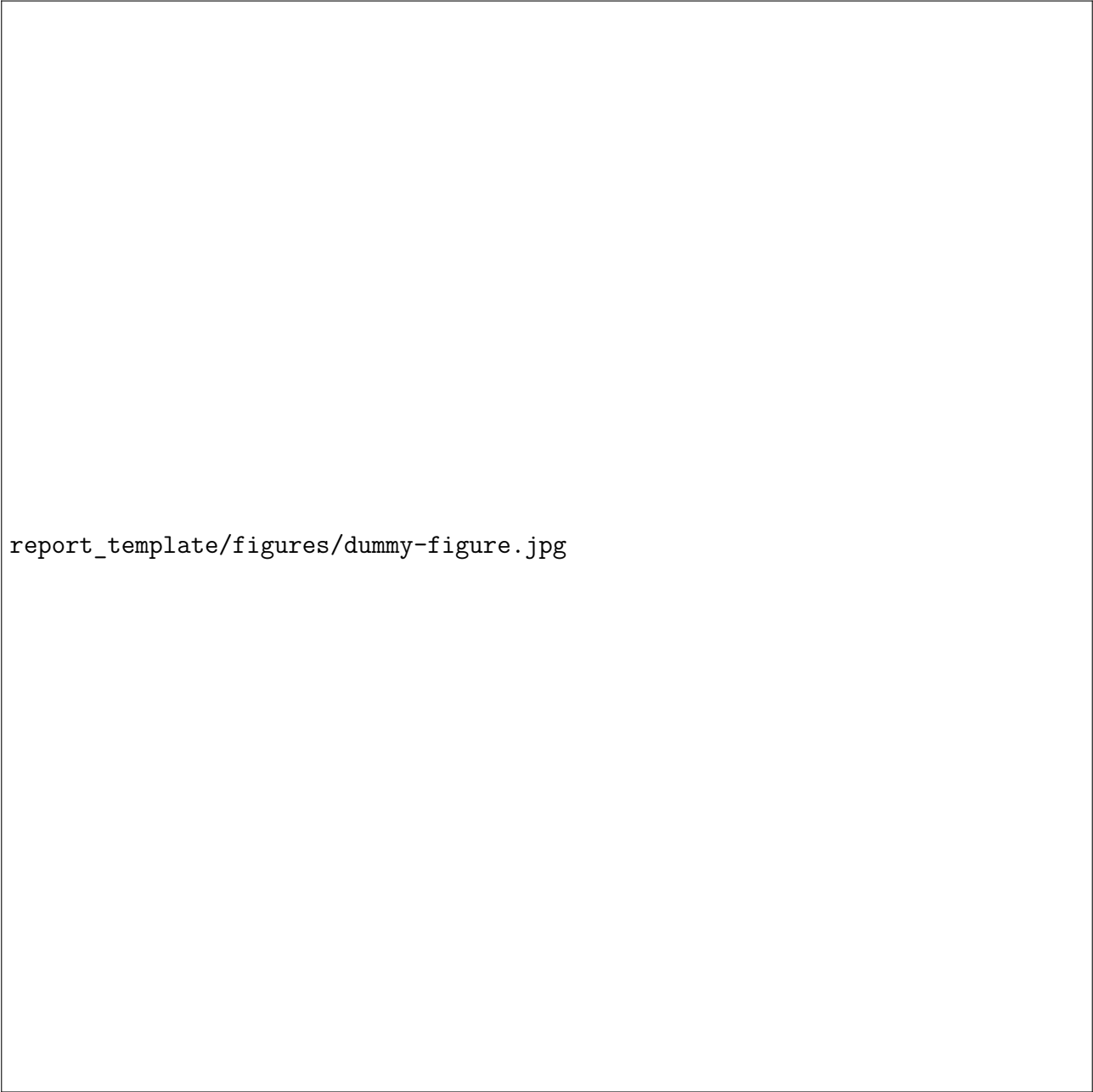
Where  $a$  is a linear relation coefficient, which can be found by regression.

## 2.2 Empirical model

## 3 Results

Put your results here.

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report\_template/figures/dummy-figure.jpg

Figure 1: Caption of the dummy figure

## 4 Discussion

Put your discussion here. Your conclusion could be included in this part, or given in the extra "05\_discussion.tex" file. Remember to include or exclude the files (comment or uncomment) in "COMPILE\_REPORT.tex" and "main.tex" accordingly!

## 5 Summary

Put your summary/conclusion here, if it is not included in the discussion section. Remember to include or exclude the files (comment or uncomment) in "COMPILE\_REPORT.tex" and "main.tex" accordingly!

## 6 Appendix

Put your appenx here, if you have any. Remember to include or exlude the files (comment or uncomment) in "COMPILE\_REPORT.tex" and "main.tex" accordingly!

If you have multiple appendices and want to structure them, you can use subsections as bellow!

### 6.1 Appendix 1

Put appendix 1 here.

### 6.2 Appendix 2

Put appendix 1 here.