

Groundwater quality affected by Revdalen Landfill, Bø municipality

By

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Introduction

- Revdalen Landfill was established in 1974 by Bø municipal authority and closed in 1997.
- Received all kinds of wastes from Bø municipality and Sauherad municipalities.
- As a consequence, contamination of groundwater by the leachate has been reported.
- Preliminary chemical analysis of water from the aquifer showed high pH, electrical conductivity, and chloride concentration, indicating contamination from the landfill.
- This led to establishment of monitoring wells in 1992.

Objectives

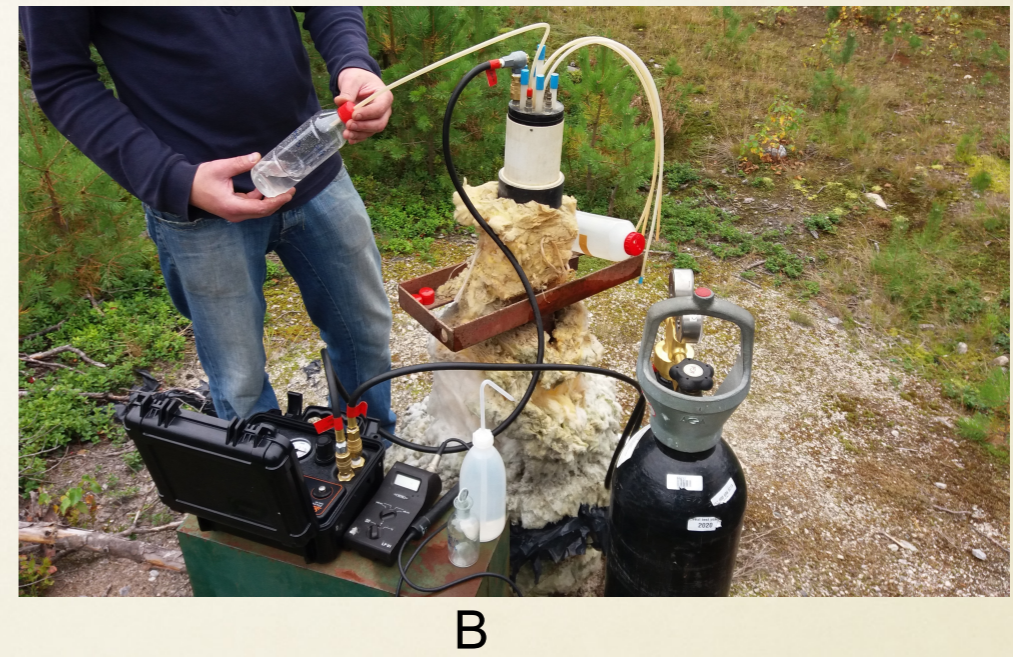
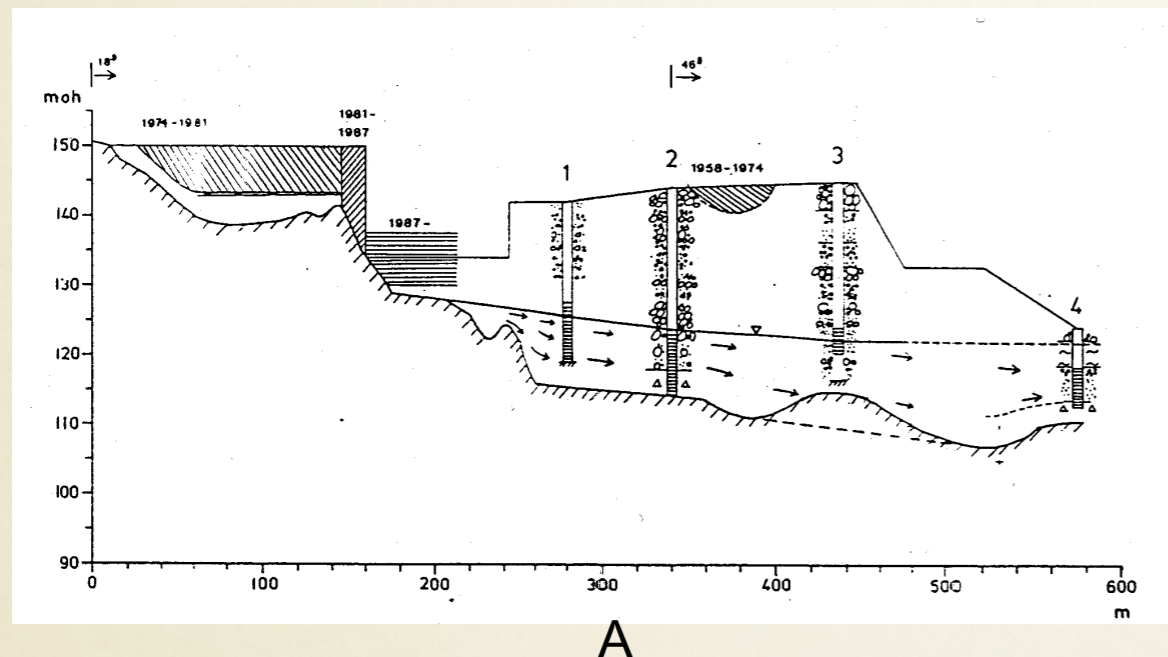
Characterise the groundwater chemistry, using a database generated for 23 years.

Specific objectives

- Characterise the organic and inorganic compositions of the groundwater, and identify the processes involved.
- Examine effects of landfill closure, age, and seasons on groundwater quality.

Methods

Groundwater sampling and Analysis

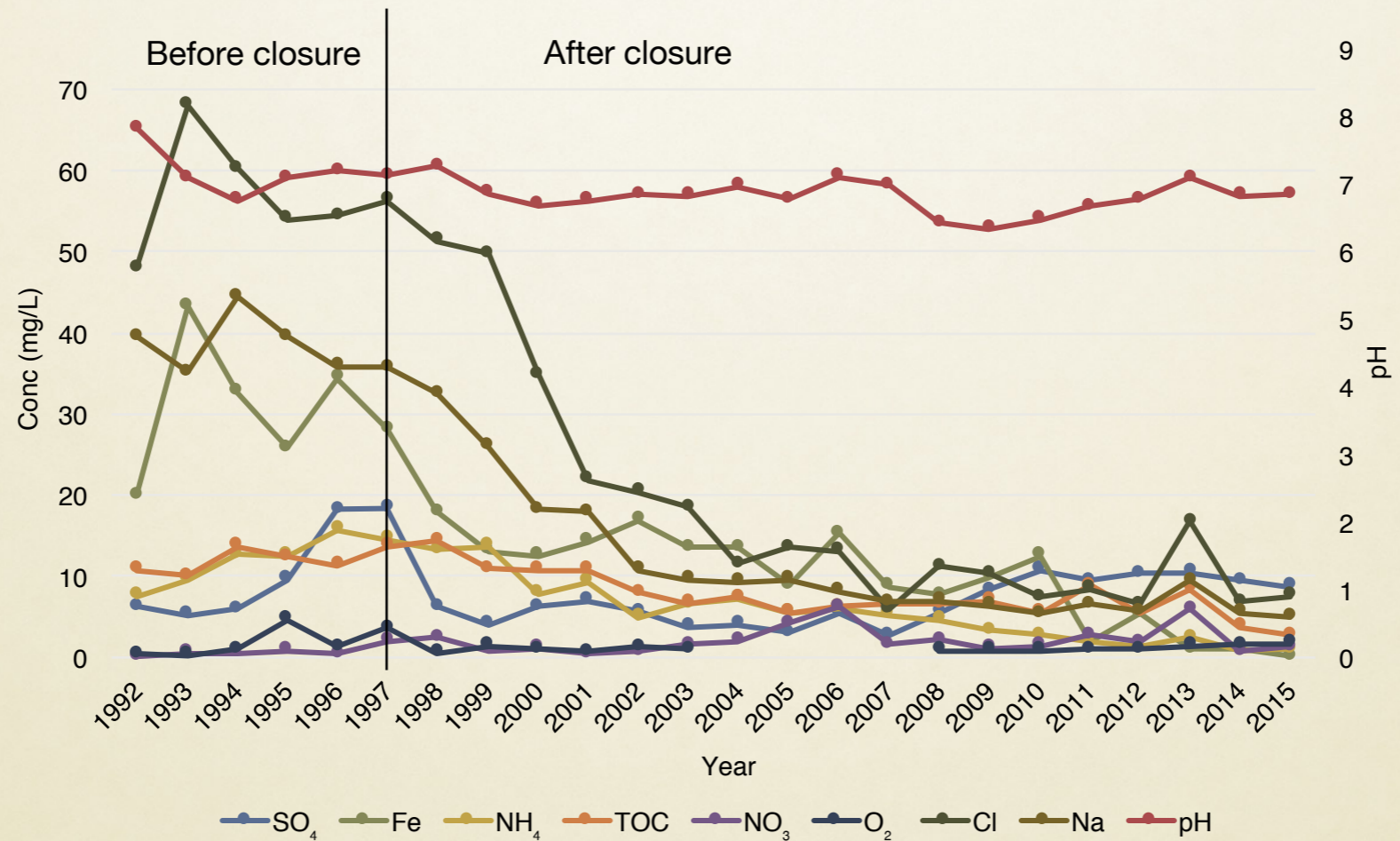


Monitoring wells located downgradient of the landfill (A), and assemble of equipment during sampling exercise (B).

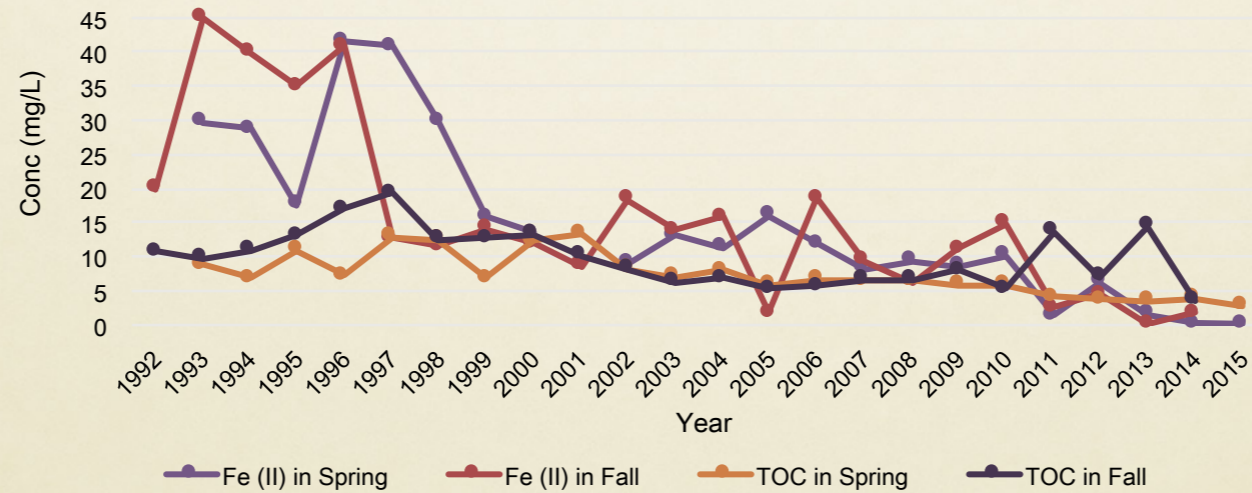
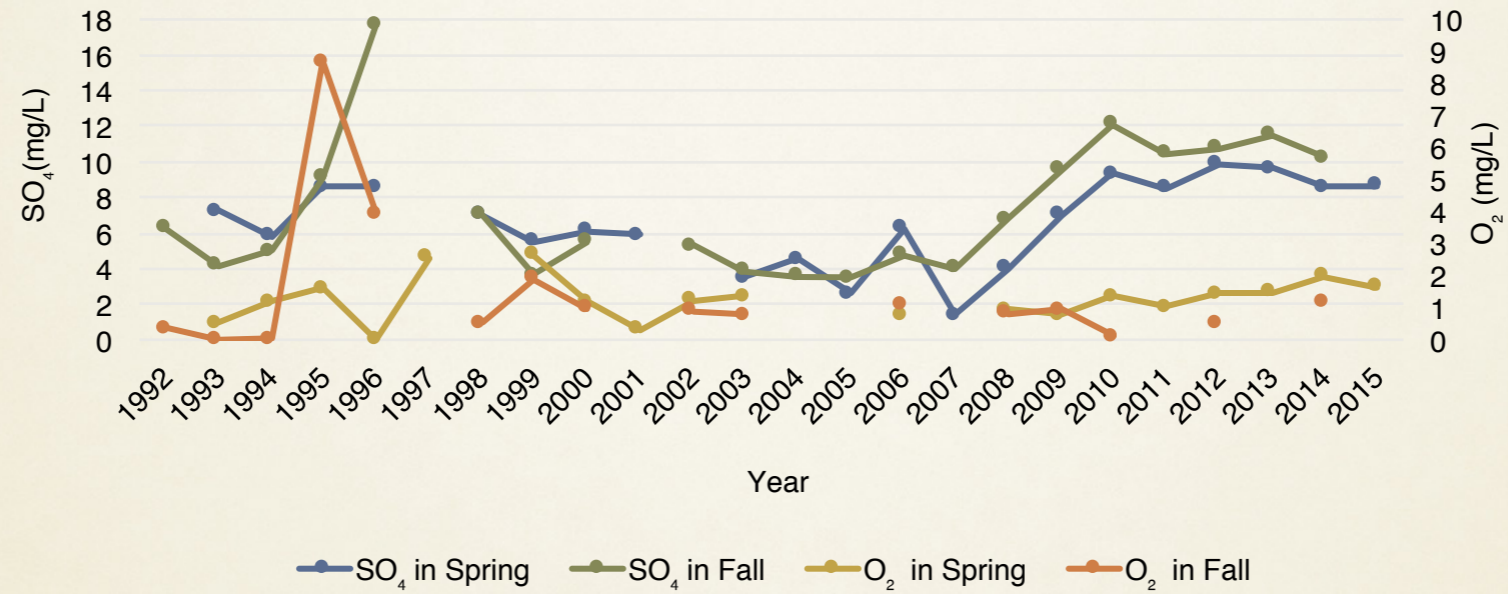
- Groundwater samples were monitored twice a year, for a period of 23 years.
- Groundwater samples were analysed for the following parameters: Electrical conductivity, O_2 , pH, K^+ , Na^+ , NH_4^+ , Ca^{2+} , Mg^{2+} , Fe^{2+} , Mn^{2+} , Cd^{2+} , Cr^{3+} , Cu^{2+} , Pb^{2+} , Ni^{2+} , Zn^{2+} , Hg^{2+} , Cl^- , SO_4^{2-} , HCO_3^- , NO_3^- , NO_2^- , Tot-N, Tot-P, TOC, PCB₇ and PAH₁₆.
- Analytical results were archived in Access database since 1992, which was retrieved for statistical data analyses.

Results & Discussions

1. Changes in groundwater quality over time

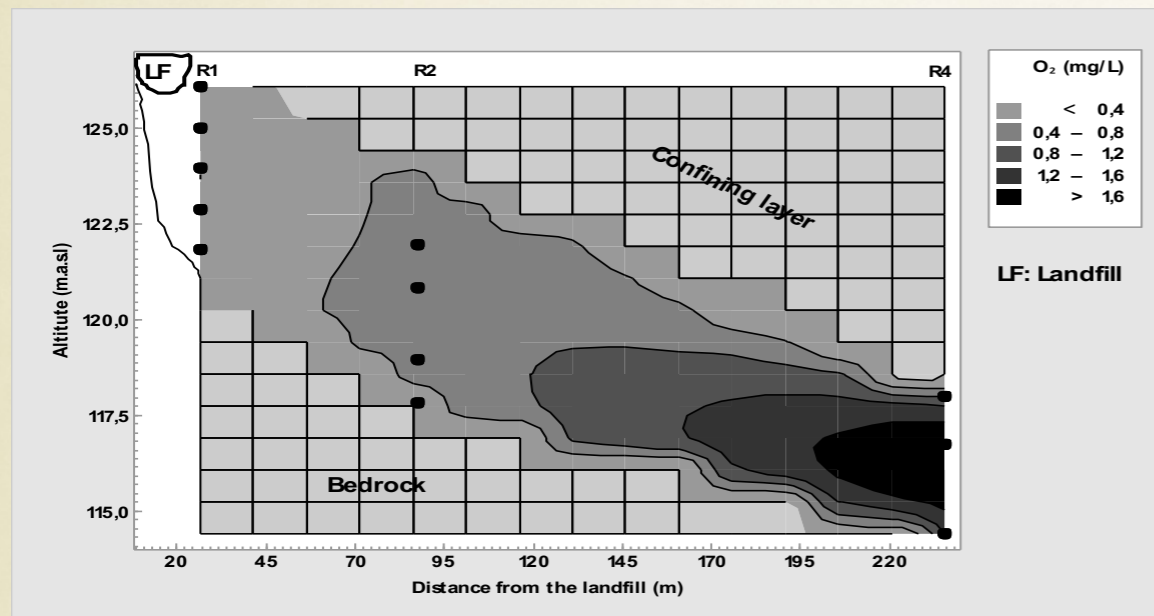


2. Seasons

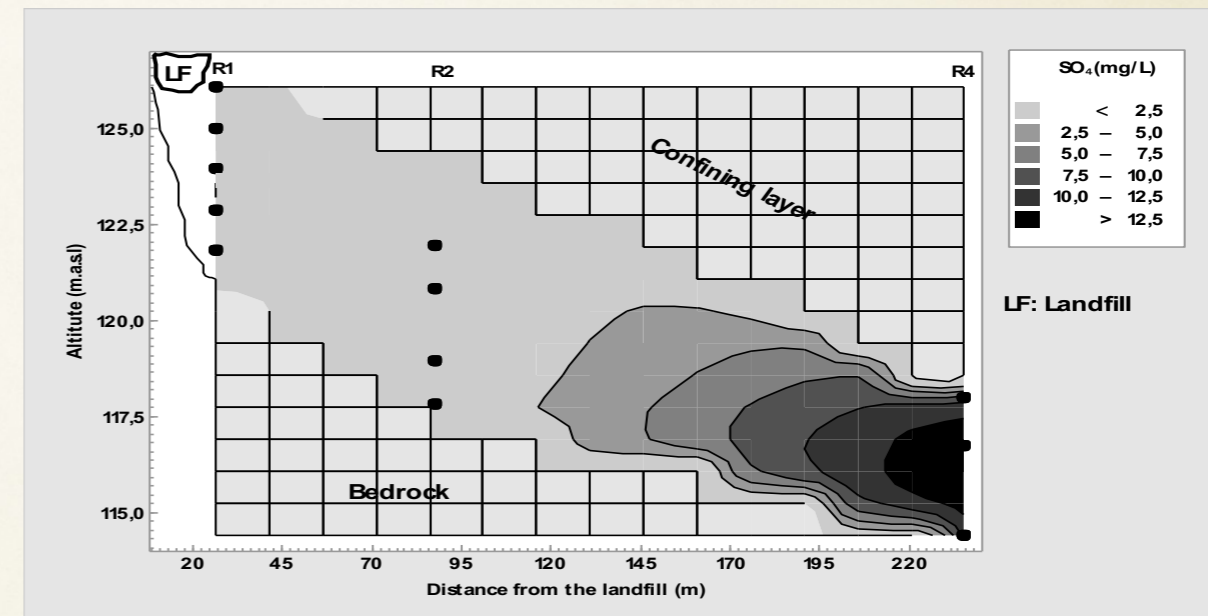


The data are of overall annual mean values for parameters in wet and dry seasons

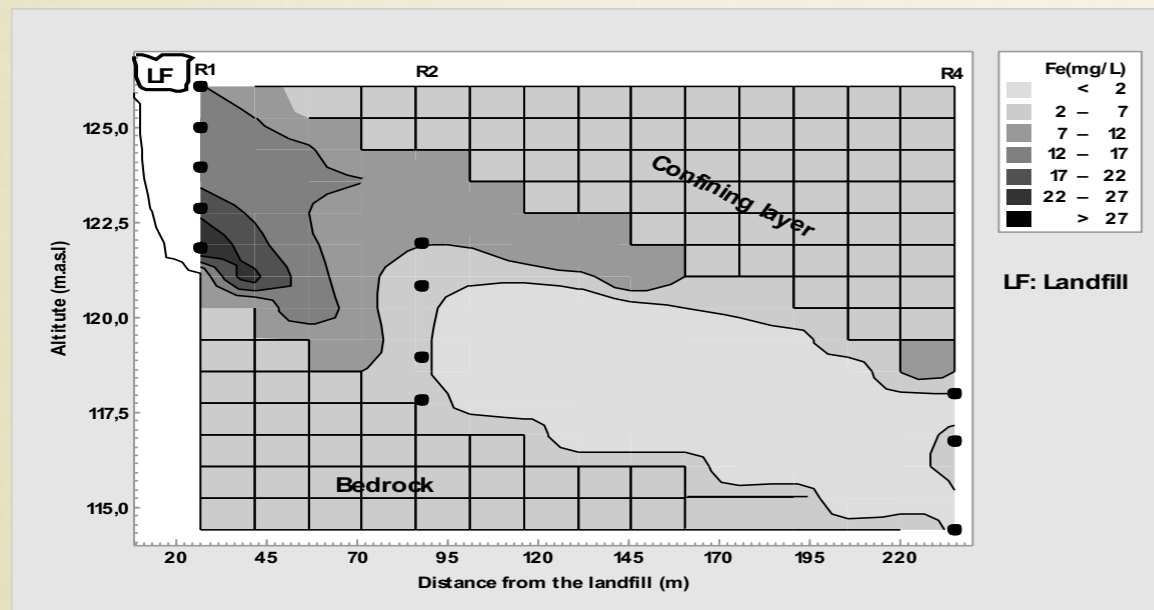
3. Distribution of redox species



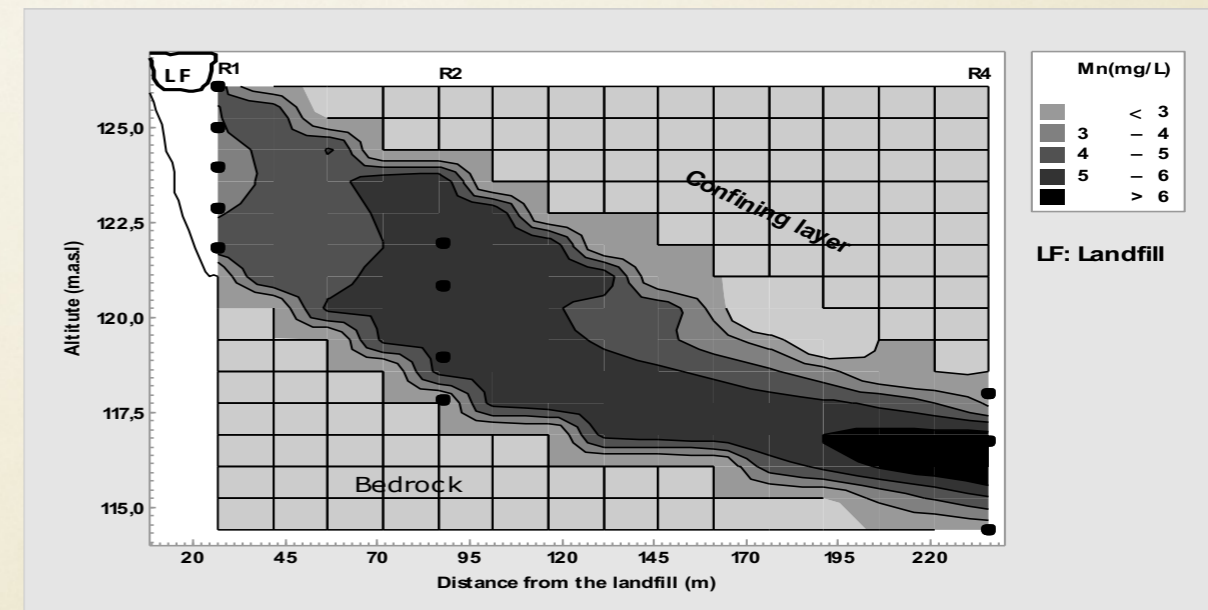
A



B



C



D

Contours of; oxygen (A), sulphate (B), iron (C) and manganese (D), in the leachate-polluted aquifer. The black dots denote the sampling levels in each monitoring wells R1, R2 and R4.