

02.12 Groundwater Levels (Edition 2001)

Abstract

Overview

Exact knowledge of the current groundwater states and groundwater reserves is essential for Berlin, since the regions **drinking water comes almost entirely from the regions groundwater** (approximately 225 million m³ in the year 2000). Of the nine waterworks supplying Berlin, Stolpe is the only one outside the city boundaries withdrawing water from the Brandenburg region. High water withdrawals are also needed for large building projects and heating systems etc. Certain areas in Berlin have high levels of soil and groundwater contamination, but with exact knowledge of the problems and treatment procedures, the groundwater is purified to produce drinking water of the highest quality.

Statistical Base

The statistical base for the map of groundwater levels are collected by the team of the regional geology and regional groundwater service of the ministry for urban development (Senatsverwaltung für Stadtentwicklung) and by the Berlin water supply company (BWB) in watershed of their waterworks. Measurements of **1,446 groundwater measurement points** only from the main groundwater aquifer (2. GWL), are processed in the present map. In the case of all daily measured groundwater measurement points the data from 31st of May 2001 was used, for the remaining ones the monthly value of May 2001.

Methodology

The non-uniform distributed data from the **measurement points** are processed into areas of homogeneous groundwater heights of the main groundwater aquifer with help of a program for the calculation and graphic presentation of surfaces (surfers 7.0, Golden software, inc.) into a equidistant data grid. This happened through interpolation after the Kriging-method. The grid size of 400 meters generated a grid with 14,241 knot points. Based on this grid the groundwater levels were designed after smoothing.

Map Description

The groundwater surface, that is strongly modified in Berlin since over hundred years by the drinking water supply, was -like in the last six years- in May 2001 on a relatively **high level**. Since 1989 a strong reduction of groundwater withdrawal can be observed. In 1989 the groundwater withdrawal amounts of the Berlin Water companies stood at 378.4 Mio. m³ (incl. Stolpe Waterworks). In the year 2000, 225.3 Mio. m³ of raw water was withdrawn, the withdrawal volume of the BWB sank 40 % (fig. 7). Reason for this is the **retrograde water consumption**, that is to be read in the reduced raw water withdrawal of the Berlin water businesses. Five smaller Berlin waterworks discontinued their production completely in the last years: Altglienicke 1991, Friedrichsfelde 1992, Köpenick and Riemeisterfenn 1995 and Buch 1997. The decline of production in the waterworks of the eastern districts between 1989 and 2000 was even still higher with 62 percent. The dramatic **reduction in demands on groundwater** especially in the neighbourhood of the recently de-commissioned waterworks, has resulted in a **city-wide groundwater increase**, especially so in the pleistocene

watercourse region of southeast Berlin. Nearby these waterworks groundwater levels are rising up to 3 m.

In July 2001, in order to achieve groundwater states which allows settlement areas without water damages and as a reaction to the spatial unequal development of water demand inside Berlins, the **Berlin senate made the following decisions:**

In the long term, 50 percent **more groundwater** should be available for the public water supply in the eastern half of the city, to be taken from the regional network where consumption allows. The groundwater supply to southeast Berlin should be increased to a future 90 Mio. m³ per year from the present 60 Mio. m³ per year. After repair and renovation, the Berlin water-pipe network should supply drinking water to the west of the city.

Through the additional groundwater withdrawal for drinking water production in the neighbourhood of the waterworks in southeast Berlin, the increase of the groundwater level can be stopped and consistent groundwater states for residential areas can be guaranteed.

As a consequence of the **increased drinking waters production in southeast Berlin** and in order to safeguard public drinking water supplies, the Berlin water companies must cut production in the western half of the city by 30 Mio. m³ per year. Thus increasing groundwater reserves in the proximity of the waterworks where production is reduced, but also spreading the problems of water-logging from east to west. In order to counteract this, the levels of **groundwater concentration** (through the infusion of purified surface water into the subsoil) should be controlled to **reduce** the problem and achieve an approximate levelling of groundwater states throughout the city.