

Czech Republic

Capital city: Prague
Inhabitants: 10 Million



INSTITUTIONAL SETTING AND PURPOSE

The groundwater monitoring network of the Czech Republic is managed by the Department of Groundwater of the Czech Hydrometeorological Institute. The Institute is based within the Ministry of the Environment and operates the only countrywide groundwater observation network. The Groundwater Department conducts observation and measurements of groundwater

levels and spring discharge, processes obtained data and store those in a database. The department also analyses time series, calculates impact of regime on hydrogeological structures and estimates groundwater components for the hydrological balance.

CHARACTERISTICS OF THE NETWORK

The Czech Republic has a monitoring network consisting of 1,058 shallow wells, 414 deep wells and 320 springs. Wells are measured on daily basis by automatic stations as well as approximately half of the springs. The rest of the springs are monitored weekly by observers.

PROCESSING AND DISSEMINATION

Several maps with information about the status of the groundwater resource can be found on the website of the Czech Hydrometeorological Institute. Two types of evaluation and visualization for the data are used: one for shallow boreholes and springs, and one for deep boreholes.

Maps for shallow boreholes and springs

The evaluation is based on the comparison of current level of the water table (or yield response) with the corresponding values of the 1981-2010 period (30 years). Monthly level (yield) values correspond to the averages recorded usually four times that month (one value per week). Boreholes and springs that have datasets for at least 30 years are used for the analysis.

The period of 1981-2010 is also known as normal period. This period has been selected as a reference because most of the boreholes and springs have been observed since the 1970's and 1980's. Thus, it has sufficient long-term time-series.

The method is also applied only to assess weekly and monthly changes of the levels in shallow boreholes and springs. They are grouped on a basis of their location in river basins. The groups are defined as areas containing sub-basins (2nd and 3rd order river basins) and are determined by orographic watershed. The resulting classification and the colour of the area will be the average of the objects (boreholes or springs) within it, Figure 1. The comparison makes use of the empirical Cumulative Frequency Curve (CFC).

The water level corresponding to the non-exceedance probability less than 5 % is labelled as extremely low, the band with 5-15 % as severely low and 15-25 % as moderately low. The level classified between 25-75 % is considered normal. The water level above normal is classified in a similar way. This method was employed to quantify the drought episode in 2015 in the Czech Republic. For example, to produce the map for September 2019, the monthly average was calculated using the Wednesday-values, and this result was compared with each value of September from 1981 to 2010 through the CFC curve.

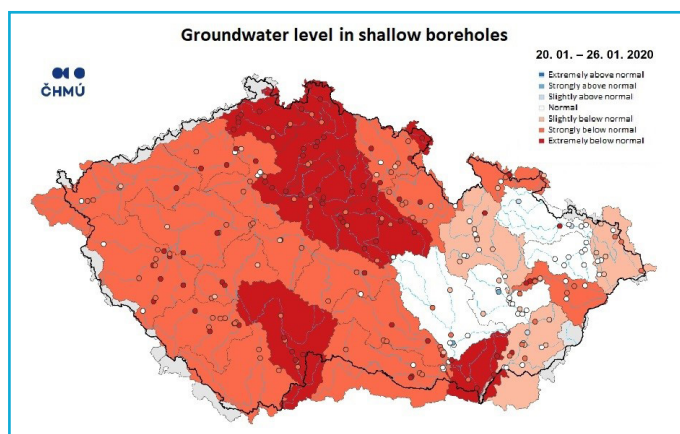


Figure 1 – Results of weekly evaluation within river basins, for shallow boreholes. Source: Czech Hydrometeorological Institute

Maps for deep boreholes

The second type is monthly evaluation of deep boreholes and the principle of visualization is similar as for shallow boreholes and springs. The only difference is the application of hydrogeological zones (HGR) instead of the river basin groups. The HGR are based on the general hydrogeological map of the Czech Republic.

Deep boreholes lack of long time-series data, therefore the water level change is just compared with the previous month (Figure 2).

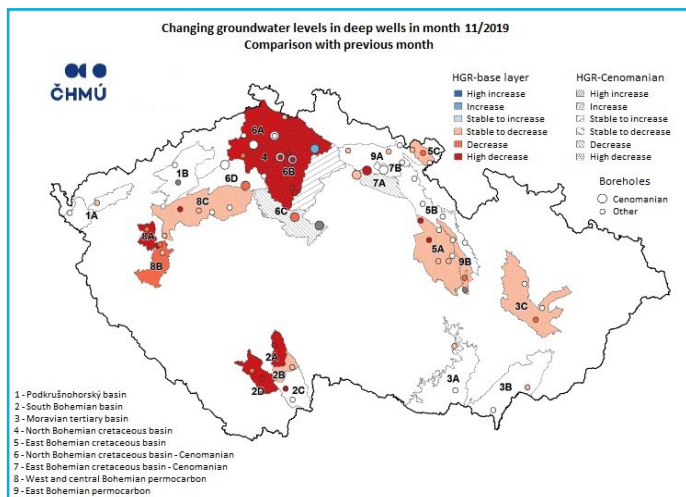


Figure 2 – Groundwater level change in deep wells compared to the previous month. Source: Czech Hydrometeorological Institute

Flood Forecasting Service also provides data on groundwater levels and yields for shallow and deep wells, and springs. When an object is selected from the main map, an additional window opens with the information on yield change, Figure 3. Data on water levels can be accessed through the View Region option.

The portal of the Czech Hydrometeorological Institute also publishes annual reports on hydrometeorological situation including the status of groundwater.

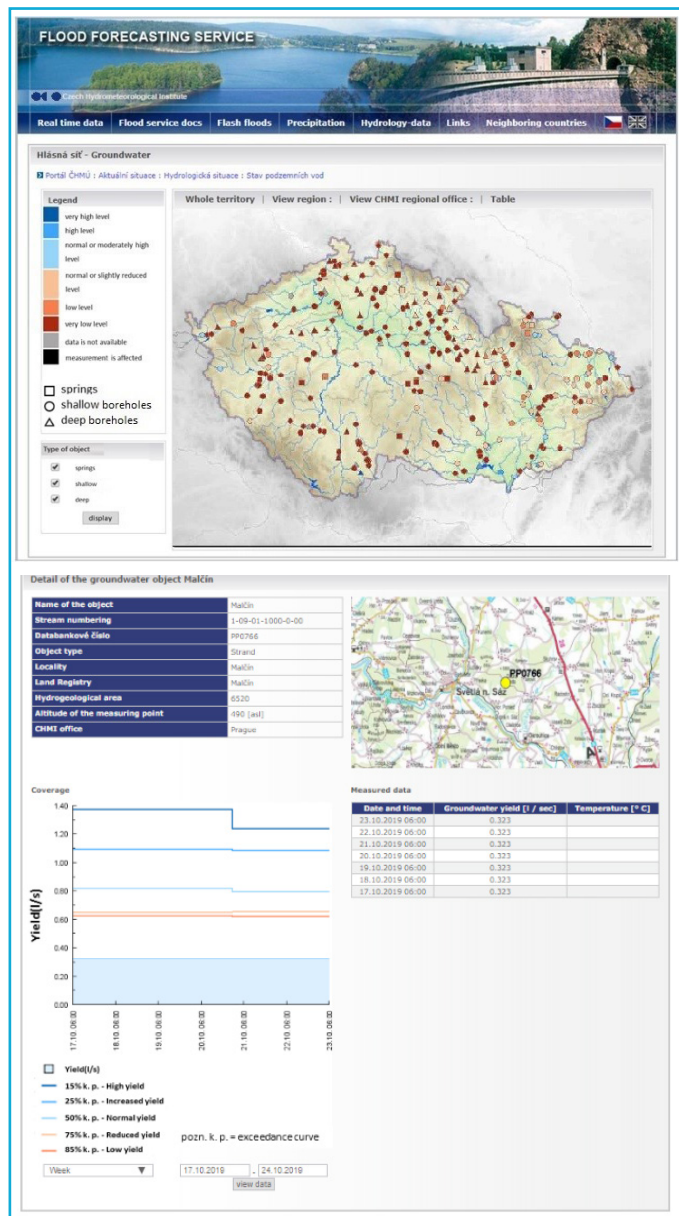


Figure 3 – Flood Forecasting Service. Source: Czech Hydrometeorological Institute

Sources

- **Czech Hydrometeorological Institute (In English)** - <http://portal.chmi.cz/?l=en>;
- **Czech Hydrometeorological Institute, Flood Forecasting Service** - http://hydro.chmi.cz/hpps/hpps_pzv.php;
- **Czech Hydrometeorological Institute, Groundwater portal** - <http://portal.chmi.cz/aktualni-situace/hydrologicka-situace/stav-podzemnich-vod>;
- **Czech Hydrometeorological Institute, Hydrological information and reports** - <http://portal.chmi.cz/aktualni-situace/hydrologicka-situace/hydrologicka-situace>; and
- **Feedback from the Czech Hydrometeorological Institute** - received on 04-02-2020.