Grundvand 2004. Status og udvikling 1989-2004. GEUS 2005.

DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE

English summary

Groundwater monitoring has taken place for about 15 years. This year the report is based on data from the new and changed monitoring programme, NOVANA.

In order to judge the change of nitrate concentration in groundwater due to the implementation of the Water Action Plan in 1987 and later changes in the nitrate load, one has to look at the youngest groundwater. It can be seen that the nitrate concentration was at its highest in 1985. A decrease in nitrate concentration can be seen in the youngest groundwater after 1985, a decrease that is probably due to changes in agricultural practices before as well as after the Water Action Plan was implemented. The average nitrate concentration in the oxidised zone - the youngest groundwater - now lies under the Maximal Admissible Concentration (MAC) for drinking water (50 mg/l). It can be concluded, that the development of the nitrate content in groundwater is going in the right direction. However a large proportion of the groundwater that is monitored is older than the implementation of the Water Action Plan, which is why no development in nitrate concentrations can be seen.
Only a few results from water supply wells exceed the MAC for drinking water. This is due to the fact that wells with a too high concentration of nitrate are closed and new deeper wells are established, meaning that polluted groundwater is not used for drinking water production.

The major part of dissolved phosphorous in groundwater is of geological origin, and no great changes have taken place since 1987. The largest concentrations are found in reduced groundwater and originate from marine interglacial deposits. As most phosphorous precipitates by simple water treatment, phosphorous as a whole is not a drinking water problem. In private wells without water treatment, abstraction is from the uppermost groundwater, and therefore a high content of phosphorous can occur due to pollution from above. However, groundwater with a phosphorous content feeds into fjords etc. and can contribute to oxygen depletion in these marine waters. The size of this contribution is not known at this point in time.

In some drinking water wells in some areas high values of nickel and arsenic occur. Both substances occur naturally in groundwater, but occur under different chemical conditions, oxic and anoxic conditions. Nickel occurs where sediments with some pyrite content are oxidised (overexploitation of groundwater aquifers), whereas arsenic is released in reduced groundwater, where the groundwater has been in contact with tertiary marine sediments or quaternary sediments with a marine clay content. Nickel and arsenic in groundwater deplenishes the size of the groundwater resource available for drinking water purposes. These substances are held back to some extent in the water works filters and are usually not a problem for the drinking water quality.

In groundwater monitoring areas the percentage of well screens with pesticides or their metabolites, above and below the MAC of 0.1 µg/l for drinking water has increased once again. One of the reasons for this in 2004 is the fact that monitoring for pesticides and their metabolites now only occurs in screens with young groundwater. Besides this, a substance called metribuzin (herbicide used in potato production, banned in 2003) and metabolites hereof were included in the 2004 monitoring programme. Metabolites of metribuzin were in a single county found in more than half of the analysed screens (in 25 out of 45). Metribuzin and it's metabolites are not a part of the water works abstraction well or drinking water control programme. The declining occurrence of pesticides and their metabolites in groundwater abstraction wells for drinking water production continues in 2004. The lower occurrence is due to the fact that wells with content of pesticides and metabolites are closed down.

During the last 6 to 7 years the yearly abstraction of groundwater in Denmark has been between 600 and 700 million m^3. From 2003 to 2004 a rise of 30% in groundwater abstraction for crop irrigation has occurred. This rise is from 141 million m^3 to 189 million m^3 per year. This rise was due to a lower precipitation in the early summer months.

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Øster Voldgade 10, 1350 København K - Tlf.: 38142000 - Fax: 38142050 - E-post: geus@geus.dk
Siden vedligeholdes af: Lisbeth Flindt Jørgensen