

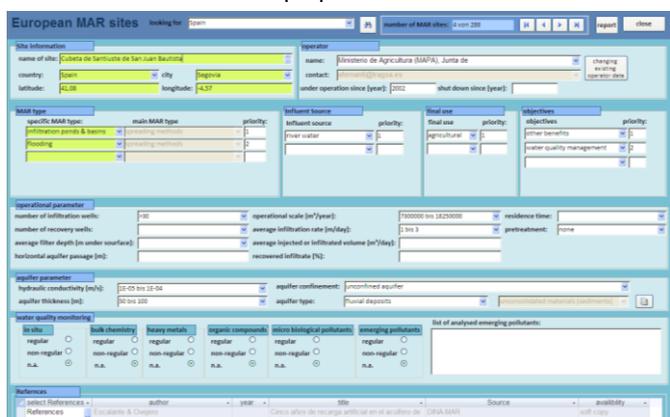
Database of European managed aquifer recharge sites

Customer

European Commission (FP 7-programme)

Purpose and aim

Different types of managed aquifer recharge (MAR) schemes are widely distributed and applied on various scales in the European countries, but no systematic categorization and data compilation existed up to now. The created European MAR catalogue (MS-Access database, see graph) includes a wide range of parameters, e.g. operational information, hydrogeological properties and water quality monitoring for different types of MAR. The database includes currently 270 MAR sites from more than 20 European countries. Based on available published information and data it is shown that MAR plays an important role in the European water supply by producing large water quantities for domestic and other purposes.



Methods

The present MAR catalogue is a result of DEMAU's partner to homogenize and structure existing information of European MAR sites. Data included in the MAR catalogue are used for statistical and geographical analysis and presentation, in order to characterize key parameter of MAR sites. The MAR catalogue is still open for further data entry and is aiming to improve its data coverage continually.

The current catalogue contains 214 active and 56 inactive MAR sites and the data indicates an increase of MAR application in Europe over the last decades. For the sites that were shut down reasons were often not reported, but many of those were used as pilot studies for a limited period of time. At other sites, operation has been suspended temporarily or shut down permanently due to economic or political reasons.

More than half of the cataloged MAR sites are induced bank filtration (54%) followed by spreading methods (29%) of which infiltration ponds & basins (23%) make up the largest share. However, this ranking is somewhat biased, because it is based on a non-representative selection by the published and available information in the literature.

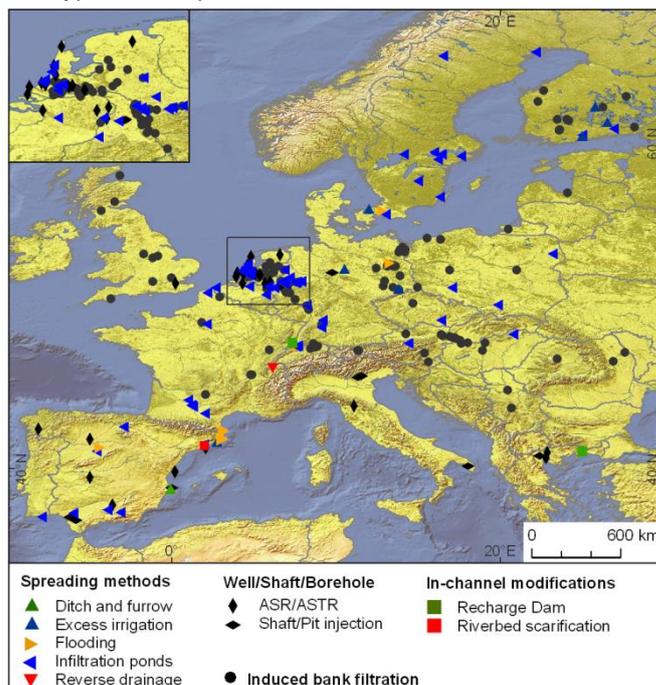
The most frequent final use is for domestic purposes (88%) followed by agricultural (8%), industrial and ecological purposes (2% each). Using MAR water for agricultural purposes appears to be very common in Spain than anywhere else in Europe. Ecological uses are common in Germany, Spain and in The Netherlands while most industrial uses can be found in Germany.

During drinking water production, the improvement of water quality is a key target. Water quality management forms therefore, the largest share of all the objective classes (71%) while another 19% of the sites aim at maximizing natural storage.

However, physical aquifer management is mostly used to prevent saltwater intrusion. Values on operational scale range over four orders of magnitude and are highest for induced bank filtration sites closely followed by infiltration ponds and basins. There is no doubt that MAR plays an important role in the European water supply and induced bank filtration often combined with infiltration ponds produces large water quantities. Huge quantities (> 36.5 Mio.m³/a) of MAR water is produced by individual sites in Hungary, Slovakia, The Netherlands, Germany, Poland and France. The share of the MAR produced domestic water to the total public water supply was calculated for various countries. In Hungary i.e. all sites included in the MAR catalogue contribute approximately 59 % to the public water. In Germany this share is about 16 % of the total public water supply. The sum of operational scale for all Slovakian MAR sites (entirely riverbank filtration) makes up approximately 55 % of total public water supply. In Finland the MAR contribution to the water supply was calculated with 20% and in Switzerland with 13 %. Well/shaft and borehole sites tend to have a lower operational scale between 0.2 – 5.8 Mio m³/a.

Results

Horizontal aquifer passage differs substantially between the various MAR types. Induced bank filtration sites show a wide range of horizontal aquifer passages from a few tens of meters (30 m) to a few kilometers (3 km). Typical horizontal aquifer passage for bank filtration systems (10th to 90th percentile) are between 50 and 1250m (median 250 m). During surface spreading the horizontal aquifer passage varies between 1450m at a sprinkler irrigation site and 30m at an infiltration pond site, while the 10th and 90th percentile was calculated with 40 up to 690m. Horizontal aquifer passage at well/shaft sites included in the catalogue was not longer than 113m and the 10th and 90th percentile is given between 30 and 110m, but with a low number of cases (n= 7). The map shows various MAR types in Europe



Kontakt

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