

Hydrogeology of Wales: The Old Red Sandstone aquifer - groundwater chemistry

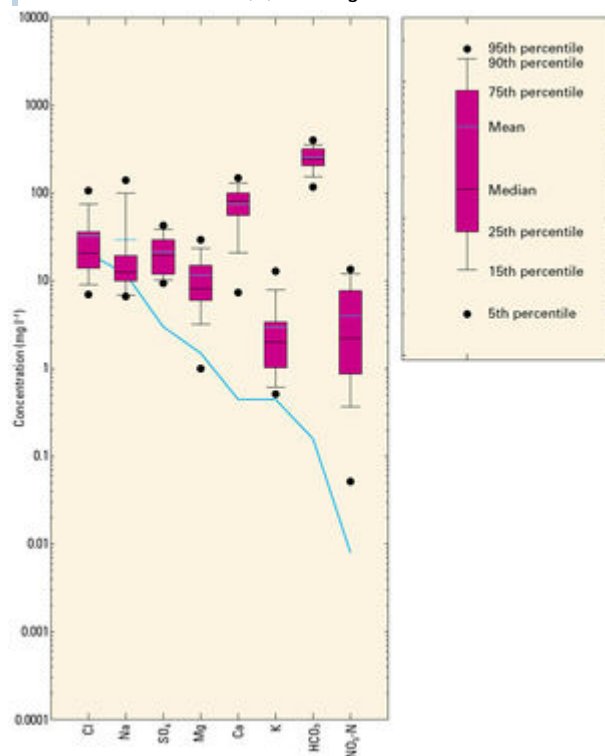
From Earthwise

[Jump to navigation](#) [Jump to search](#)

This page is part of a category of pages that provides an updated review of the occurrence of groundwater throughout Wales.

Author(s): N S Robins and J Davies, British Geological Survey

Contributor(s): D A Jones, Natural Resources Wales and G Farr, British Geological Survey



Range of major ion concentrations in the Devonian sandstone in south west Wales and parts of Herefordshire (after Moreau et al., 2004). P859271.

The chemistry of groundwater in the Devonian sandstone aquifer has evolved by natural processes of water-rock interaction ([Moreau et al., 2004](#)). The dominant process controlling the groundwater chemistry is carbonate mineral dissolution and, in the deeper groundwaters, ion-exchange. Slower silicate dissolution reactions are also important in providing Si, K and Na to the groundwaters. The groundwaters are mostly of Ca-HCO₃ type but Na-HCO₃ types are present in deeper parts of the aquifer (**Figure P859271**). Upland groundwaters show significant rock interaction even where residence times are short. In valleys this is complicated by mixing with older, locally confined groundwaters as well as surface pollutants.

The groundwaters generally have low solute concentrations. The low salinities indicate shallow groundwater flow in uplands areas, where the aquifer is well flushed. Remnants of older formation groundwaters containing higher concentrations of Na, Cl, Br and I as well as salinity occur in valleys beneath mudstones horizons. In these areas ion-exchange of Na adsorbed on clays for solute Ca occurs leading to Na-HCO₃ type groundwaters.

There are some reducing groundwaters. Iron and Mn, however, are generally low reflecting the

dominance of oxidising conditions in most of the aquifer but may be locally high (up to 3.2 and 0.95 mg l⁻¹ respectively). Trace metal concentrations are generally low, reflecting neutral pH and oxidising conditions over much of the aquifer.

Hydrogeology of Wales - contents

[Summary](#)

[Acknowledgements](#)

[Introduction](#)

[Geology and Groundwater](#)

[Topography, climate, land use and natural resources](#)

[Groundwater regulation](#)

[Issues](#)

[Precambrian and Cambrian](#)

[Groundwater occurrence in the Precambrian and Monian Supergroup](#)

[Groundwater occurrence in the Cambrian](#)

[Ordovician and Silurian](#)

[Groundwater occurrences](#)

[Groundwater studies](#)

[Groundwater chemistry](#)

[The Old Red Sandstone](#)

[Groundwater occurrences](#)

Groundwater chemistry

[Carboniferous](#)

[Carboniferous Limestone](#)

[Marros Group](#)

[Modelling the South Wales Coalfield](#)

[Coal Measures facies](#)

[Groundwater quality in the South Wales Coalfield](#)

[Permo-Triassic and Jurassic](#)

[Vale of Clwyd](#)

[Cheshire Basin, Dee catchment](#)

[South Wales](#)

[Quaternary aquifers](#)

[Groundwater occurrences](#)

[Afon Teifi](#)

[Upper Lugg catchment](#)

[Afon Cynffig coastal plain](#)

[Whiteford Sands](#)

[Newborough Warren](#)

[Management and regulation of groundwater](#)

[Groundwater abstraction](#)

[Need for management](#)

[Groundwater pollution](#)

[Management tools and future issues](#)

[References](#)

Retrieved from

http://earthwise.bgs.ac.uk/index.php?title=Hydrogeology_of_Wales:_The_Old_Red_Sandstone_aquifer_-_groundwater_chemistry&oldid=25647

Category:

- [Hydrogeology of Wales](#)

Navigation menu

Personal tools

- Not logged in
- [Talk](#)
- [Contributions](#)
- [Log in](#)
- [Request account](#)

Namespaces

- [Page](#)
- [Discussion](#)

Variants

Views

- [Read](#)
- [View source](#)
- [View history](#)
- [PDF Export](#)

More

Search

Navigation

- [Main page](#)
- [Recent changes](#)
- [Random page](#)
- [Help about MediaWiki](#)

Tools

- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Permanent link](#)
- [Page information](#)

- [Cite this page](#)
- [Browse properties](#)

• This page was last modified on 18 February 2016, at 08:32.

- [Privacy policy](#)
- [About Earthwise](#)
- [Disclaimers](#)

