ECV IN BRIEF

Domain: Terrestrial
Subdomain: Hydrology
Scientific Area: Hydrosphere
ECV Stewards: Claudia Ruz Vargas, Andreas Güntner, Stephan Dietrich
Products: Groundwater volume change
Groundwater level
Groundwater recharge
Groundwater discharge
Wellhead level
Groundwater quality

Groundwater

It is estimated that groundwater accounts for about 30% of the world's total freshwater resources, and it is by far the largest available reservoir of liquid freshwater. Groundwater counts in average for one third of the freshwater consumed by humans, but at some parts of the world, this percentage can reach up to 100%. Climate change affects groundwater recharge rates through changes in precipitation and evapotranspiration. However, attributing observed groundwater change to climate change is difficult because of the influence of land-use change and groundwater abstraction. The extent to which groundwater recharge and storage has already been affected by climate change is widely unknown. Climate change can also affect groundwater through saltwater intrusion in coastal aquifers as sea level rises.

ECV Product[1]

PRODUCT	DEFINITION	REQUIREMENTS				
		FREQUENCY	RESOLUTION	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	STANDARDS/ REFERENCES
Groundwater storage change	**The volumetric loss or gain of groundwater between two time periods**	Monthly	100 km	10 cm	TBD	
Groundwater level	**The level of water table, the upper surface of the saturated portion of the soil or bedrock**	Weekly	Per well	1 cm		ISO 21413:2005

[1] Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is reviewing and will update the requirements until 2022. More information on: gcos.wmo.int and climatedata.wmo.int.

Groundwater recharge	**Natural process where permeable soil or rock allow water to readily seep into the aquifer**	Weekly	Per well	10 % (relative)		
Groundwater discharge	**Process in which groundwater leaves the aquifer at discharge zones**	Weekly	Per well	10 % (relative)		
Wellhead level	**Elevation of a well**	Weekly	Per well	1 cm		
Groundwater quality	**Chemical, physical and biological characteristics of groundwater that are relevant to the services that it provides**	Weekly	Per well	tbd		ISO/TC 147; ISO 5667-18:2001 part 18

Data Sources[2]

- Gravity Recovery and Climate Experiment (GRACE) Data
  http://grace.jpl.nasa.gov/data/get-data/
- Global Groundwater Monitoring Network (GGMN) by the International Groundwater Resources Assessment Center (IGRAC)
  https://www.un-igrac.org/special-project/ggmn-global-groundwater-monitoring-network
- UN Environment GEMS/Water Data Centre from the International Centre for Water Resources and Global Change
  https://gemstat.org/
- Satellite ECV Inventory by the CEOS/CGMS Working Group on Climate (WGClimate)
  http://climatemonitoring.info/ecvinventory

Groundwater Level

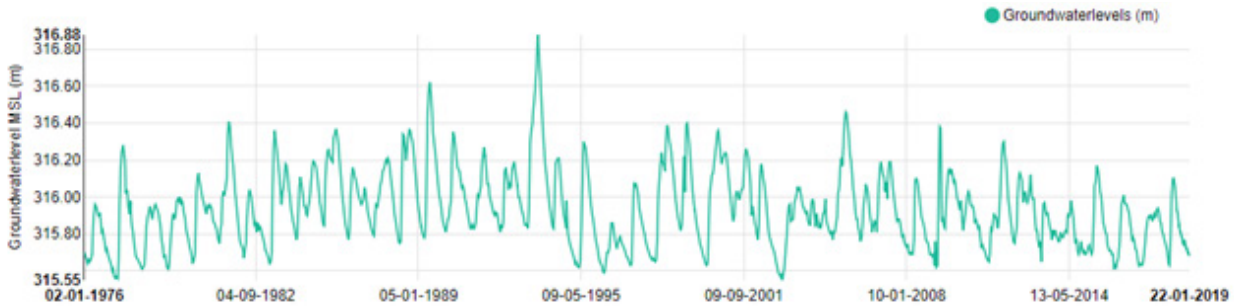

Figure: Groundwater level time series of well 32_16, Sweden from 01/01/1976 until 23/01/2019, extracted from the Global Groundwater Monitoring Network (GGMN).

[2] This list provides sources for openly accessible data sets with worldwide coverage for which metadata is available. It is curated by the respective GCOS ECV Steward(s). The list does not claim to be complete. Anyone with a suitable dataset who would like it to be added to this list should contact GCOS.