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# Topographical catchments of the FOEN hydrometric gauging stations

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## Description of the GEO dataset

The 'EZG\_hydrometriscche\_Stationen' geodataset shows the topographical catchments of the current hydrometric gauging stations of the Federal Office for the Environment (FOEN). The catchment areas are based on the FOEN's underlying 'Topographical catchments of Swiss waterbodies' geodataset (2019 edition). [1]

The following applies to this underlying geodataset: "The catchment of a point [means] the region that drains through that point, given complete sealing of the land surface, after all the existing depressions have filled. In particular, the catchment of the point considered also includes all those regions which would in reality drain from the catchment due to underground flow processes or engineered structures. In other words, these are catchments defined purely on a topographical basis" (cf. also p.4 'Application limitations').

The hydrometric gauging station catchments have been generated by aggregating the sub-regions of the 'Topographical catchments of Swiss waterbodies'. The regional boundaries have not been further amended, even if the gauging station does not coincide with a regional outlet in the underlying dataset. In these cases the regional boundary does not run exactly past the gauging station, but the variations should be small. For analysis purposes they are negligible. In mapping terms the variations are undetectable on the scale of the catchment as a whole, but in some cases are apparent in a more detailed observation (see figure 1).

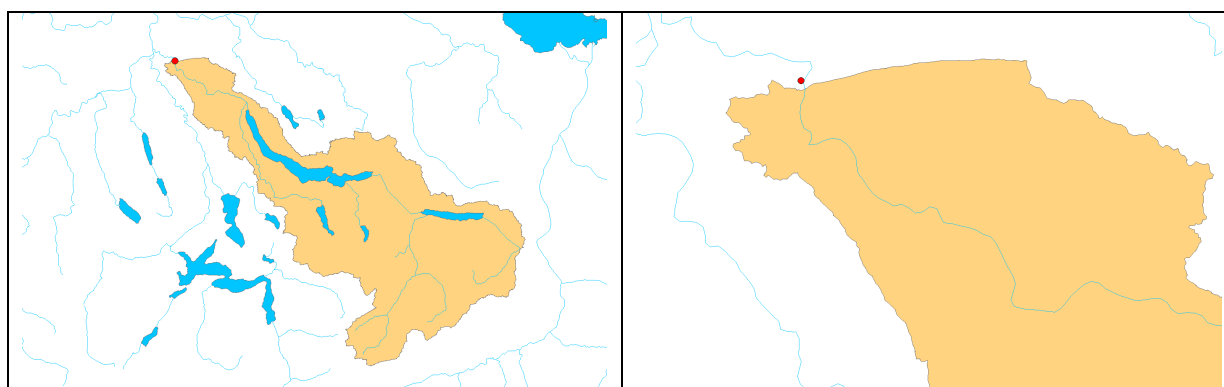


Figure 1: Because the Limmat-Baden, Limmatpromenade, gauging station (red dot) does not coincide with a regional outlet in the 'Topographical catchments of Swiss waterbodies', the regional boundary does not run

*directly past the station. This is not visible in the illustration on the left, but is on the larger-scale version on the right.*

The catchments of a few gauging stations could not be defined owing to various problems. In general this applies to substations.

The product consists of a shapefile with the catchment areas of all measuring stations and a file geodatabase containing the following elements:

- Feature class with the catchment of each individual gauging station. The number in the name of the feature class corresponds to the station number, e.g. ezg2004.
- Feature class with the catchments of all the gauging stations: ezg\_kombiniert.
- Feature class with the gauging stations: stationen. These are all the current gauging stations at November 2019.
- Attribute data table with physiographic features: ezg\_physiogeographie
- Attribute data table with the population numbers: ezg\_einwohner
- Attribute data table with the land cover: ezg\_bodenbedeckung

The attribute data tables can be linked to the catchments via the ID (station number).

#### Attribute feature classes “ezgStation number”

Attribute	Type	Description
SHAPE	Geometry	Geometry of catchments; polygons

#### Attribute feature class “ezg\_kombiniert”

Attribute	Type	Description
SHAPE	Geometry	Geometry of catchments; polygons
ID	Short (integer)	Gauging station number in the FOEN measurement network
Ortsbezeichnung	Text	Location name of gauging station
Gewässername	Text	Name of water body where the gauging station is sited

#### Attribute feature class “stationen”

Attribute	Type	Description
SHAPE	Geometry	Geometry of gauging station; point.
ID	Short (integer)	Number of gauging station in the FOEN measurement network.
Ortsbezeichnung	Text	Location name of gauging station
Gewässername	Text	Name of water body where the gauging station is sited
Gewässertyp	Text	States whether the gauging station is sited on a river or lake
EZG	Text	If “Yes”, the gauging station catchment is available. If “No”, the topographical catchment could not be determined
TeilEZG_Nr	Text	Number of the sub-catchment in the ‘Topographical catchments of Swiss waterbodies’ dataset, the associated total catchment areas of which yield the catchment area of the gauging station

## Attribute data table “ezg\_physiographie”

Attribute	Description	
ID	Gauging station number in the FOEN measurement network.	
RELEASE	Year of publication	
Gesamtflaeche	Total area of the catchment in km <sup>2</sup>	
CH_Teilfläche	Section of the total catchment inside Switzerland, in km <sup>2</sup>	
Anteil_CH	Section of the total catchment inside Switzerland as a percentage of the total area	
ch_min_z	Minimum sea level in the Swiss section of the catchment	Basis: DTM-AV, Digital elevation model for the Official Survey [2], aggregated to 10m grid cell width
ch_max_z	Maximum sea level in the Swiss section of the catchment	
ch_mean_z	Mean sea level in the Swiss section of the catchment	
ch_mean_s	Mean gradient in the Swiss section of the catchment	
Min_z	Minimum sea level in the full catchment	Basis: ASTER GDEM global elevation model [3]
max_z	Maximum sea level in the full catchment	
mean_z	Mean sea level in the full catchment	
mean_s	Mean gradient in the full catchment	
x_300, x300_600, x600_900, ...	Percentage area of the adjacent elevation level on the full catchment (x_300 = elevation interval 0-300 m asl, x300_600 = elevation interval 300-600 m asl etc.)	
vergletscherungsgrad	Proportion of glacier as percentage of total catchment area	Basis: Swiss glacier inventory SGI2010 [4], Austrian glacier inventory GI 3 2008 [5], French glacier inventory 2006/09 [6], Italian glacier inventory 2005-2011 [7]

## Attribute data table “ezg\_bodenbedeckung“

Attribute	Description	
ID	Gauging station number in the FOEN measurement network.	
RELEASE	Year of publication	
Gesamtflaeche	Total area of catchment in km <sup>2</sup>	
CH_Teilflaeche	Section of total catchment inside Switzerland in km <sup>2</sup>	
Anteil_CH	Section inside Switzerland as a percentage of the total area	
	Percentage area of the underlying land cover category on the <b>Swiss section</b> of the total catchment	Basis: FSO area statistics, 2004/09 edition [8], NOAS04 standard nomenclature

AS_Siedlungsflaechen	Settlement areas	Basis: Corine Land Cover (2018 edition) [9]
AS_Landwirtschaftsflaechen	Agricultural areas	
AS_bestockteFlaechen	Wooded areas	
AS_unproduktiveFlaechen	Unproductive areas	
	Percentage of the following Corine Land Cover categories on the <b>total catchment</b> :	
	Class 1, Artificial surfaces	
CLC_BebauteFlaechen		
CLC_Landwirtschaft	Class 2, Agricultural areas	
CLC_Waelder	Class 3, Forest and semi natural areas	
CLC_Feuchtblaechen	Class 4, Wetlands	
CLC_Wasserflaechen	Class 5, Water bodies	

### Attribute data table “ezg\_einwohner”

Attribute	Description
ID	Gauging station number published in the Hydrological Yearbook
RELEASE	Year of publication
Gesamtflaeche	Total area of catchment in km <sup>2</sup>
CH_Teilflaeche	Section of total catchment inside Switzerland in km <sup>2</sup>
Anteil_CH	Section inside Switzerland as a percentage of the total area
sum2017_ch	Population numbers in the Swiss section of the catchment [10]

### Application limitations

“In the data model shown here, catchments are defined in purely topographical terms [...]. Catchments defined purely topographically do not reflect all the phenomena encountered in reality. In karst regions, for example, huge variations can occur between topographically and hydrogeologically defined catchments. Technical facilities such as feed and drainage channels are not factored in, either. Before using the geodataset, it is important to check whether the purely topographical definition of the catchments is appropriate for the user query.” [1]

This also applies to the ‘EZG\_hydrometrische\_Stationen’ geodataset.

### Terms of use

You **may** use this dataset for non-commercial purposes.

You **may** use this dataset for commercial purposes.

You are **recommended** to provide the source (author, title and link to the dataset).

### Documents cited

[1] Topographical catchments of Swiss waterbodies, identifier 135.4 (model documentation), Federal Office for the Environment FOEN.

<https://www.bafu.admin.ch/bafu/de/home/themen/wasser/zustand/karten/gedoatenmodelle.html>

[2] DTM-AV, Digital Terrain Model of the official cadastral survey (DTM-AV), Federal Office of Topography swisstopo. (New: Elevation model swissALTI3D).

[https://shop.swisstopo.admin.ch/en/products/height\\_models/alti3D](https://shop.swisstopo.admin.ch/en/products/height_models/alti3D)

[3] ASTER GDEM, Global Digital Elevation Model, Ministry of Economy, Trade, and Industry (METI) of Japan and United States National Aeronautics and Space Administration (NASA).  
<https://asterweb.jpl.nasa.gov/gdem.asp>

[4] The new Swiss Glacier Inventory SGI2010: relevance of using high-resolution source data in areas dominated by very small glaciers. Fischer M., Huss M., Barboux C. and Hoelzle M., Arctic, Antarctic, and Alpine Research, Vol. 46, No. 4, 2014, pp. 933–945.

[5] Tracing glacier changes in Austria from the Little Ice Age to the present using a lidar-based high-resolution glacier inventory in Austria. Fischer A., Seiser B., Stocker Waldhuber M., Mitterer C. and Abermann J., The Cryosphere, 9, 2015, pp.753–766.

[6] Multitemporal glacier inventory of the French Alps from the late 1960s to the late 2000s. Gardent M., Rabatel A., Dedieu J-P and Deline P., Global and Planetary Change 120, 2014, pp. 24–37.

[7] The evolution of the Italian glaciers from the previous data base to the new Italian inventory. Preliminary considerations and results. Smiraglia C., Azzoni R., D'Agata C., Maragno D., Fuganzza D., and Diolaiuti G., Geogr. Fis. Dinam. Quat. 38, 2015, pp. 79-87.

[8] Swiss area statistics 2004/2009, Federal Statistical Office  
<https://www.bfs.admin.ch/bfs/de/home/statistiken/raum-umwelt/erhebungen/area.html> [only available in German, French and Italian]

[9] Corine Land Cover 2018, European Environmental Agency.  
<https://land.copernicus.eu/pan-european/corine-land-cover/clc2018>

[10] Population and household statistics 2013, Swiss Federal Statistical Office, FSO.  
<https://www.bfs.admin.ch/bfs/de/home/dienstleistungen/geostat/geodaten-bundesstatistik/gebaeude-wohnungen-haushalte-personen/bevoelkerung-haushalte-ab-2010.html>  
[only available in German, French and Italian]