

Catchment classification: medium-scale, large-scale, and similar-size catchments

Abstract

Today's technical capabilities allow the use of a multitude of catchment classifications. Data sets on the topics of the Hydrological Atlas are aggregated and made available for the known large and medium-scale catchments – and now also for “similar-size catchments”. This layer does not show intermediate catchments. Similar-size catchments are easier to compare with each other due to their relatively uniform catchment sizes.

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1 Introduction

In the printed issue of the Hydrological Atlas of Switzerland, the area of Switzerland is divided into three catchment classifications of varying sizes. These are the large- and medium-scale catchments, as well as the level with the highest spatial resolution, the “small catchments” [1]. The catchment area structure EZGG-CH is the new classification for Switzerland provided by the Federal Office for the Environment FOEN [2]. Their sub-catchments have an average area of just under 2 km² and cover all of hydrological Switzerland as well as catchments that drain into Switzerland. The sub-catchments can – based on the medium- and large-scale river basins of the Hydrological Atlas of Switzerland – be aggregated to larger spatial units and are also available as different levels of aggregation. The medium-scale catchments include both head and intermediate catchments and cover hydrological Switzerland. Intermediate catchments are restricted to just a partial area of the catchment areas lying above one point. This is why they are of limited significance in terms of individual hydrological characteristics. Additional catchment area classifications based on the catchment area structure EZGG-CH [2] are introduced below, offering new possibilities and making it possible to compare similar-size catchments.

2 Data and Methods

The interactivity of the data and analysis platform enables a larger number of spatial aggregation levels. River catchments form the basis for these new aggregation levels [3], with the catchments of the measuring stations excluded. In total, this data set comprises around 4000 overlapping catchments of various sizes in hydrological Switzerland.

The new aggregation levels are intended to include catchments that do not overlap and are of a similar size. To this end, the size classes listed in Table 1 are used. For every size class x , a data set is generated including the catchments that are as close as possible to an area of $x \text{ km}^2$. To ensure a homogeneous and dense coverage of Switzerland, an area tolerance of $\pm 25\%$ is permitted in the selection of catchments. This means, for the example of the 20 km² class, that this data set can include catchments with an area

of 15–25 km², whereby in the case of overlapping catchments, only the catchment is chosen whose area is as close as possible to 20 km². As the aggregation level increases, the number of areas in each data set decreases (see Table 1), whereas the total area of all catchments per aggregation level tends to increase.

Table 1. Size categories of similar-size catchments

Size class [km ²]	Lower limit [km ²]	Upper limit [km ²]	Number of catchments
20	15	25	621
30	23	38	412
50	38	63	276
75	56	94	188
100	75	125	146
150	113	188	100
200	150	250	76
300	225	375	52
500	375	625	38
750	563	938	22
1250	938	1563	14
2000	1500	2500	11
3000	2250	3750	8
5000	3750	6250	3
8000	6000	10 000	4
12 000	9000	15 000	3

3 Uses / Examples

The similar-size catchments provide an overview of the spatial characteristics of parameters. This enables, for example, the hydrological differences between the Swiss Plateau and the Alps to be visualised. For an individual catchment, it is also possible to find other catchments of a similar size and to compare these. This function can be called up by clicking on one of the outlet points [3] in the pop-up under “similar-size catchments”.



References

- [1] Breinlinger, R., Gamma, P. and Weingartner, R. (1992). Kenngrößen kleiner Einzugsgebiete. In: *Hydrologischer Atlas der Schweiz*. Ed. by "Bundesamt für Umwelt BAFU". Vol. 1. Tafel 1.2. <http://hydrologischeratlas.ch/produkte/druckausgabe/grundlagen/tafel-1-2>. Bern.
- [2] Bundesamt für Umwelt BAFU (2016). *Einzugsgebietsgliederung der Schweiz EZGG-CH*. <https://www.bafu.admin.ch/bafu/de/home/themen/wasser/zustand/karten/einzugsgebietsgliederung-schweiz.html>.
- [3] Bühlmann, A., Schwanbeck, J. and Hauser, F. (2018). *River Catchments*. https://hydromaps.ch/texts/00_Baselayers/waters_overlay/en_baselayers.pdf#view=page&page=1. Hydrological Atlas of Switzerland.