Data Article

Statistics about torrents in Lower Austria, status from May 2015

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A R T I C L E   I N F O

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A B S T R A C T

This data presents analyzed data exports of Austrian torrent and avalanche cadaster (TAC) in May 2015. The TAC is developed by Austrian Service for Torrent and Avalanche Control. Data are viewed from different aspects and combinations geographically in the area of Lower Austria, a province of Austria.

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1. Specifications Table

| Subject area | Statistics, Mountain Risk and Disaster Management, Torrent and avalanche cadaster (TAC) |
|--------------|------------------------------------------------------------------------------------------|
| More specific subject area | Torrents, Hazard zones |
| Type of data | Text, tables, figures |
| How data was acquired | Raw and analyzed |
| Data format | Geographic information system (GIS), TAC |
| Experimental factors | TAC is developed since 2004. In Lower Austria since 2010 torrent catchment areas and hazard zone maps are digitized in TAC. Quantity and quality of digitized data are reaching good levels for analyzing data in different points of view. Data statistics in this data paper were made in May 2015 |
| Experimental features | In GIS torrent catchment areas and hazard zone maps are digitized and analyzed. Data were summarized for counties and the whole province of Lower Austria |
| Data source location | Vienna, Austria, Europe |
| Data accessibility | Data are included in this paper |

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2. Value of the data

- In Austrian water bodies exists a separation in torrents and rivers based on federal law [1]. This situation can be discussed with given statistics in this data paper.
- The paper shows also the dispersion and amount of torrent catchment areas and hazard zone maps in counties and the province of Lower Austria.
- The dispersion of hazard zones caused by torrents can be used for future strategies for preventions. Settlements are often built in menaced locations how should this be managed in the future.

3. Methods

The analyzed data presented here were exported of Austrian TAC (see Chapters 2 and 3 in [1]) with the focus on Austrian federal province Lower Austria. Since 2011 a lot of data were digitized in TAC in Lower Austria. Lower Austria is divided into 21 counties and four cities with own statute, each county has different number of villages. Fig. 1 shows the fragmentation of Lower Austria in its counties and cities with own statute. Each village and city has its own municipality government. Cities with own statute are treated like counties in the statistics.

4. Experimental design and data

4.1. Torrent catchment areas

In Austria torrents are defined in Austrian Forest Act 1975 [2]. Torrents exist only in mountainous regions. The hillshade layer in Fig. 2 is covered by torrent catchment areas in mountainous areas,
and lowlands are not covered. Counties and cities have different coverage of torrent catchment areas.

In the whole province of Lower Austria torrent catchment areas cover around 7000 km² or 36% of the province area. In Table 1 and Fig. 3 torrent catchment area coverage per county is shown.

4.2. Hazard zones of torrents

Since 1976 in Austria a federal regulation defines the structure and development process of hazard zone maps in torrent and avalanche areas [3]. In the following statistics only torrents and their hazard zones in Lower Austria are included.

Hazard zones of torrents are developed only in settlements, Fig. 4 shows the dispersion in whole Lower Austria. Hazard zones also demonstrate where torrents flow through settlements. West of Vienna more hazard zones were developed which illustrate that there are more and bigger settlements in mountainous regions. In lowlands there are no torrents and close to the Styrian border are mountainous regions without or only small settlements and therefore less hazard zones.

Austrian federal regulation for hazard zone maps defines that for each village with torrents in settlements a hazard zone map has to be developed. Villages which have torrent catchment areas outside of settlements do not get hazard zone maps. Table 2 and Fig. 5 demonstrate how many villages are part of the counties and how many of them have hazard zone maps.

Three cities with own statute (Krems, St. Pölten and Waidhofen/Ybbs) have hazard zone maps (100%). Wr. Neustadt (city) has no torrents therefore no hazard zone map is developed. Summarized, in Lower Austria around 53% of its villages and cities own hazard zone maps.
Table 1
Torrent catchment (TC) areas per counties, absolute and relative to the county area. Finally also for whole Lower Austria. Sur. = Surroundings; TAC 2015.

| County           | County area (km²) | TC-area (km²) | % TC-area per county |
|------------------|-------------------|---------------|----------------------|
| Amstetten        | 1186.2            | 551.7         | 47                   |
| Baden            | 753.6             | 325.9         | 43                   |
| Bruck/Leitha     | 495.0             | 88.6          | 18                   |
| Gänserndorf      | 1272.0            | 0.0           | 0                    |
| Gmünd            | 786.7             | 63.5          | 8                    |
| Hollabrunn       | 1010.8            | 65.3          | 6                    |
| Horn             | 783.7             | 173.8         | 22                   |
| Korneuburg       | 626.8             | 4.6           | 1                    |
| Krems (city)     | 51.7              | 23.2          | 45                   |
| Krems (Sur.)     | 922.9             | 508.9         | 55                   |
| Lilienfeld       | 932.1             | 783.5         | 84                   |
| Melk             | 1014.3            | 445.7         | 44                   |
| Mistelbach       | 1292.5            | 594.0         | 53                   |
| Mödling          | 277.5             | 143.1         | 52                   |
| Neunkirchen      | 1150.2            | 851.3         | 74                   |
| St. Pölten (Sur.)| 1122.6            | 594.0         | 53                   |
| St. Pölten (city)| 108.4             | 2.1           | 2                    |
| Scheibbs         | 1023.7            | 734.6         | 72                   |
| Tulln            | 657.8             | 77.9          | 12                   |
| Waidhofen/Thaya  | 669.1             | 85.0          | 13                   |
| Waidhofen/Ybbs (city) | 131.2       | 108.3         | 83                   |
| Wr. Neustadt (Sur.) | 972.3         | 644.0         | 66                   |
| Wr. Neustadt (city) | 60.9           | 0.0           | 0                    |
| Vienna-Sur.      | 485               | 190.1         | 39                   |
| Zwettl           | 1399.1            | 502.2         | 36                   |
| Lower Austria    | 19 186.1          | 6967.8        | 36                   |

Fig. 3. %-Coverage of torrent catchment areas per county; K = Krems (city), L = Leitha, St. P. = St. Pölten (city), Sur. = Surroundings, T = Thaya, VSur. = Vienna-Surroundings, WN = Wr. Neustadt (city), WY = Waidhofen/Ybbs (city), TAC 2015.
Fig. 4. Dispersion of yellow and red hazard zones of torrents in Lower Austria, TAC 2015.

Table 2
Hazard zone (HZ) maps per counties, absolute and relative to the amount of villages per county. City counties have only one village (0% or 100%). Sur. = Surroundings; TAC 2015.

| County               | Villages per county | Villages with HZ maps | %-Villages with HZ maps |
|----------------------|---------------------|-----------------------|-------------------------|
| Amstetten            | 34                  | 25                    | 73.5                    |
| Baden                | 30                  | 13                    | 43.3                    |
| Bruck/Leitha         | 20                  | 15                    | 75.0                    |
| Gänserndorf          | 44                  | 0                     | 0.0                     |
| Gmünd                | 21                  | 2                     | 9.5                     |
| Hollabrunn           | 24                  | 5                     | 20.8                    |
| Horn                 | 20                  | 12                    | 60.0                    |
| Korneuburg           | 19                  | 2                     | 10.5                    |
| Krems (city)         | 1                   | 1                     | 100.0                   |
| Krems (Sur.)         | 30                  | 24                    | 80.0                    |
| Lilienfeld           | 14                  | 14                    | 100.0                   |
| Melk                 | 40                  | 28                    | 70.0                    |
| Mistelbach           | 36                  | 0                     | 0.0                     |
| Mödling              | 20                  | 13                    | 65.0                    |
| Neunkirchen          | 44                  | 36                    | 81.8                    |
| St. Pölten (Sur.)    | 39                  | 31                    | 79.5                    |
| St. Pölten (city)    | 1                   | 1                     | 100.0                   |
| Scheibbs             | 18                  | 17                    | 94.4                    |
| Tulln                | 21                  | 10                    | 47.6                    |
| Waidhofen/Thaya      | 15                  | 2                     | 13.3                    |
| Waidhofen/Ybbs (city)| 1                   | 1                     | 100.0                   |
| Wr. Neustadt (Sur.)  | 35                  | 25                    | 71.4                    |
| Wr. Neustadt (city)  | 1                   | 0                     | 0.0                     |
| Vienna-Sur.          | 21                  | 8                     | 38.1                    |
| Zwettl               | 24                  | 17                    | 70.8                    |
| Lower Austria        | 573                 | 302                   | 52.7                    |
4.3. Comparison

Comparisons of Tables 1 and 2 or Figs. 3 and 5 show that the counties of Lilienfeld, Neunkirchen and Scheibbs have the most coverage of torrent catchment areas and the most villages with hazard zone maps. Gänserndorf and Mistelbach counties are free of torrent hazards. In some counties like Krems (Sur.), Horn, etc., the percentage of hazard zone maps is higher than the percentage of the coverage of torrent catchment areas per county. Also in whole Lower Austria around 53% of its villages and cities own a hazard zone map but only 36% of the province area is covered by torrent catchment areas.

References

[1] Lepuschitz Ehrenfried, Geographic information systems in mountain risk and disaster management, Appl. Geogr. 63 (2015) 212–219.
[2] Republik Österreich, Forstgesetz 1975 idgF (In German).
[3] Republik Österreich, Verordnung des Bundesministers für Land- und Forstwirtschaft vom 30. Juli 1976 über die Gefahrenzonenpläne (GZP-VO) idgF, 1976 (In German).