

## ***Interactive comment on “Rosalia: an experimental research site to study hydrological processes in a forest catchment” by Josef Fürst et al.***

### **Anonymous Referee #2**

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#### 1. General comments

This data description paper depicts the Rosalia experimental research site in Austria. It introduces the forested watershed and its characteristics, the monitoring stations and hydrological equipment, the recorded data since 2015, and finally two example studies.

The manuscript describes the sensors and data storage applications in detail, but it should be presented in a more consistent and structured way. In addition, full documentation of the sites and accuracies would be desirable for the understanding of readers and potential users.

The two examples give an insight into two aspects of the studies. However, because they are not the main focus of the paper, the explanations and discussions can only be

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very brief here.

The datasets are available in the specified data repository. Data collected at the described sites since 2015 are provided. It comprises a documentation of the dataset, GIS and time series data.

## 2. Specific comments

Right in the third line of the abstract, the operation of the study area since 1875 is mentioned. The reader looks forward to a long-term data series and analysis. However, he/she is then disillusioned relatively quickly that it is only about the data analysis since 2015. Many graphs even show only two years 2018-2019. I therefore recommend defusing the initially high expectations by moving the long-term aspect from the abstract to the introduction chapter.

In order to understand the multiplicity of sites, sensors and measurement data, a comprehensive listing and description is necessary. This is only done partially because the reader has to compile the information himself. The following appears to be in need of improvement:

- a) Fig. 1 shows sites of 2018, but Tab. 1 shows the status of March 2020. Is the 2018 status up-to-date and does it correspond to the 2020 status?
- b) Where is Q2S0 in Fig. 1?
- c) The function of R1 Relais (Fig. 1) is not mentioned in the text - is it relevant for understanding?
- d) In Tab. 1 there are the sites Q1-4, K1-3, Q2S1 and Q2S2, but Q1S0 and Q2S0 are missing.
- e) Chapter 3 - L127-137 – is difficult to understand and to match with Tab. 1 and Fig. 1. It would be helpful to insert the site numbers/names here. Otherwise, one has to pick up everything from these lines and the table and the next chapters.

f) It would also be helpful to add the watershed sizes to Tab. 1. The same applies also to the depths of the four soil profiles, as these are assigned very unspecifically in L134-135 and L202-203. A column with the measurement interval and start date of the sensors used to measure each parameter could also be added to Table 1. To estimate data quality and sources of uncertainties and errors, further details about the sensors, such as sensor accuracy and operating range, should be provided with the data. Data gaps to show the proportion of no-data values could also be visualised in a graph.

g) L127 what is measured: river discharge or water level?

h) Chapter 2: It would also be helpful to list the characteristics of the four sub-basins in more detail: Is there heterogeneity in geology, soils and slopes? Is further information on soil important for understanding? What are the elevation ranges within the sub-basins, are there differences between the sub-basins? A map could help for visualisation. How is the forest managed (maintenance measures, use practices, fertilisation, sustainability, roads and infrastructures)?

Chapter 4.1: Is the specific discharge (L245-246) related to site Q3? What about the other sites? As this is a data description paper - add mean and range for all four gauges. The same for chapter 4.4.

Chapter 4.5: Which method was used for the isotope analyses in the lab?

Chapter 5.2: This is an interesting topic, but too complex for this kind of data description paper. Therefore, some assumptions and relationships are unproven, not supported by numbers or graphs (~L325-336). Exact model performance remains unclear, statistical indicators are missing. Reference to other studies and a discussion are also not provided. Therefore, a separation between an overview presentation in this data description paper and a scientifically sound analysis in an original research article would certainly make more sense.

3. Technical corrections

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Fig. 1: German-language city names (Wien, München. . .) appear in Fig. 1; the English names would be appropriate for this map in an English-language paper.

Fig. 7: Same scale length or axis layout as in Fig. 5 enables a better comparison.

L314: Add 'electrical' for electrical conductivity.

#### 4. References

Chapter 4.6: What is the source of the DEMs? Add references.

Reference list: L418-419 Roadmap & Strategy Report on Research Infrastructures – cite as in the text as European Strategy Forum on Research Infrastructures, 2020 or ESFRI, 2020.

Missing references in reference list which can be found in the text: Cosby and Emmett, 2020; Gröning et al. 2012; Hydrologic Engineering Center, 2010; Hipp et al., 2019 Klaus and McDonnell, 2013; Müller et al., 2018; McGuire and McDonnell, 2006; Stevens, 2015.

#### 5. Data repository

Regarding the file 'Isotope\_ESSD.xlsx' in Table 'Q4DailyIso' in the data repository: Strange or missing values are marked and explained in the column 'Comment'. But gaps of several days are only marked by a line but not by an explanation, e.g. from 25.06.2019 to 03.07.2019, from 16.08.2019 to 28.08.2019, from 20.09.2019 to 04.10.2019, etc.

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