Josef Fürst (on behalf of the co-authors) Feb 16, 2021
Replies are formatted in blue, while original referee's text is black.

Dear anonymous reviewer,
thank you for your thorough review and your effort to help improve our contribution. I understand your concerns and agree with most of them. I am confident, that we can resolve the issues that you pointed out. Please find detailed replies below.

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.
R: we agree that the article needs to be improved to be more consistent. We will add more details to the documentation of the sites and on the accuracies of the data.

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 very brief here.
R: We appreciate the comment on section 5. Both examples are probably too complex to be described in this context and we will provide overview presentations in section 5 only. In the meantime, an additional study using the dataset (on the effect of forest access roads on the generation of floods) became available and will be included 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.
R: We agree. We will make clear in the abstract already, that the dataset starts in 2015. The long history of the educational forest of BOKU is still important because many researchers have been working there and have collected data on forestry, vegetation, soils, etc. and gained deep insight into the system.

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.
R: we will improve the description of the sites, sensors and data by improved Fig. 1 and Tab. 1 as well as by adaption of the text as described in the detailed replies below.

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?
R: (a-c): we will completely redesign Fig. 1 to resolve your concerns and improve the text according to the suggestions. The relais is required for broadcasting between the RTUs, but not required to understand the dataset (to be removed from Fig. 1).

d) In Tab. 1 there are the sites Q1-4, K1-3, Q2S1 and Q2S2, but Q1S0 and Q2S0 are missing.
R: the missing sites will be added to Table 1

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.
R: Thank you for these recommendations! We will improve Fig. 1 and add the requested information to Tab. 1. In an additional table, we will provide details of the sensors, including sensor accuracy and operating range. Another table or figure will illustrate the time of records, measurement interval and proportion of no-data values for each site. Also mean and range of the data values will be included.

g) L127 what is measured: river discharge or water level?
R: The direct sensor output is voltage that is converted to water level. Since both, the H Flume devices and the Thomson weir at Q3, have a standard geometry with fixed rating curves (not calibrated at site), it is, in my opinion, appropriate to write about discharge measurement.

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.
R: In the revised version, we will add the following information: a description of the very uniform geological background, a soil map (as a figure) and an extended description of the vegetation (per watershed). Elevation ranges will be added to table 1.

How is the forest managed (maintenance measures, use practices, fertilisation, sustainability, roads and infrastructures)?
R: We will incorporate the following information into the revised manuscript: The forest management is performed by the Federal Forests of Austria (Österreichische Bundesforste, OeBf) which is owned by the Republic of Austria. BOKU has the right of access for educational and research purposes. OeBf claims to manage the forest according to sustainability principles, balancing protection of environment, the needs of society and commercial success. Management of the forest is characterized by long production cycles of 100 to 140 years. The main species are the broadleaved beech (fagus sylvatica) and coniferous Norway spruce (picea abies). Natural regeneration is preferred to planting. Fertilisation almost never occurs. Timber harvesting is usually done by means of harvesters and forwarders, at steep slopes cable cranes are used. Management and timber transport are supported by a dense network of forest roads (50m per hectar), suitable for heavy timber trucks. Main threats are snow break, wind throw and bark beetles, the latter affecting mainly coniferous tree species.

Chapter 4.1: Is the specific discharge (L245-246) related to site Q3? What about the other sites?
R: Specific discharge is similar in all watersheds, which will be clarified in the revised version.

As this is a data description paper - add mean and range for all four gauges. The same for chapter 4.4.

R: We will provide either a separate table or include the information in the table described in the reply to comment f) above.

Chapter 4.5: Which method was used for the isotope analyses in the lab?
R: We used a laser spectroscope (Picarro L2140-i, cavity ring-down spectroscopy). This information will be added.

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.
R: As mentioned earlier, we agree to the comment and give an overview presentation in this paper only.

3. Technical corrections
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.
R: Fig. 1 will be redesigned to fulfill this and other requirements.

Fig. 7: Same scale length or axis layout as in Fig. 5 enables a better comparison.
R: we will harmonize the axis style and also correct the y-axis scale in Fig. 5

L314: Add 'electrical' for electrical conductivity.
R: will be added

4. References
Chapter 4.6: What is the source of the DEMs? Add references.
R. references will be added

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.
R: will be corrected. *This is a bug (or missing document category) in the Endnote style sheet provided by Copernicus.*

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.
R: We will add those to the reference list.

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.
R: We will clarify all data gaps and include comments. Some gaps resulted from not being able to visit the field site regularly and collecting samples for isotope analysis.