

AnomalyByClick

Tutorial

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Home page

1. Insert here the link
to the JSON format dataset

<https://raw.githubusercontent.com/Jok>



2. Press here to
upload the file

If you want to contribute
on Github

[Code on Github](#)

Dataset structure required 1/2

```
{  
    "z": [  
        [...],  
        ...  
    ],  
    "anomalies": [  
        [...],  
        ...  
    ],  
    "dates": ["01/01/2021", ...],  
    "dictionary": {  
        "activities": ["bed", "court", "dining_room", "hygiene",  
                      "living", "recreation_room", "wc"],  
        "codes": [0, 1, 2, 3, 4, 5, 6]  
    }  
}
```

Dataset structure required 2/2

z: this field contains the matrix routine. The matrix routine is an MxN matrix, where M represents the number of days and N the number of minutes in a day(1440). Each row must contain the code corresponding to the activity performed at that time of the day for each minute.

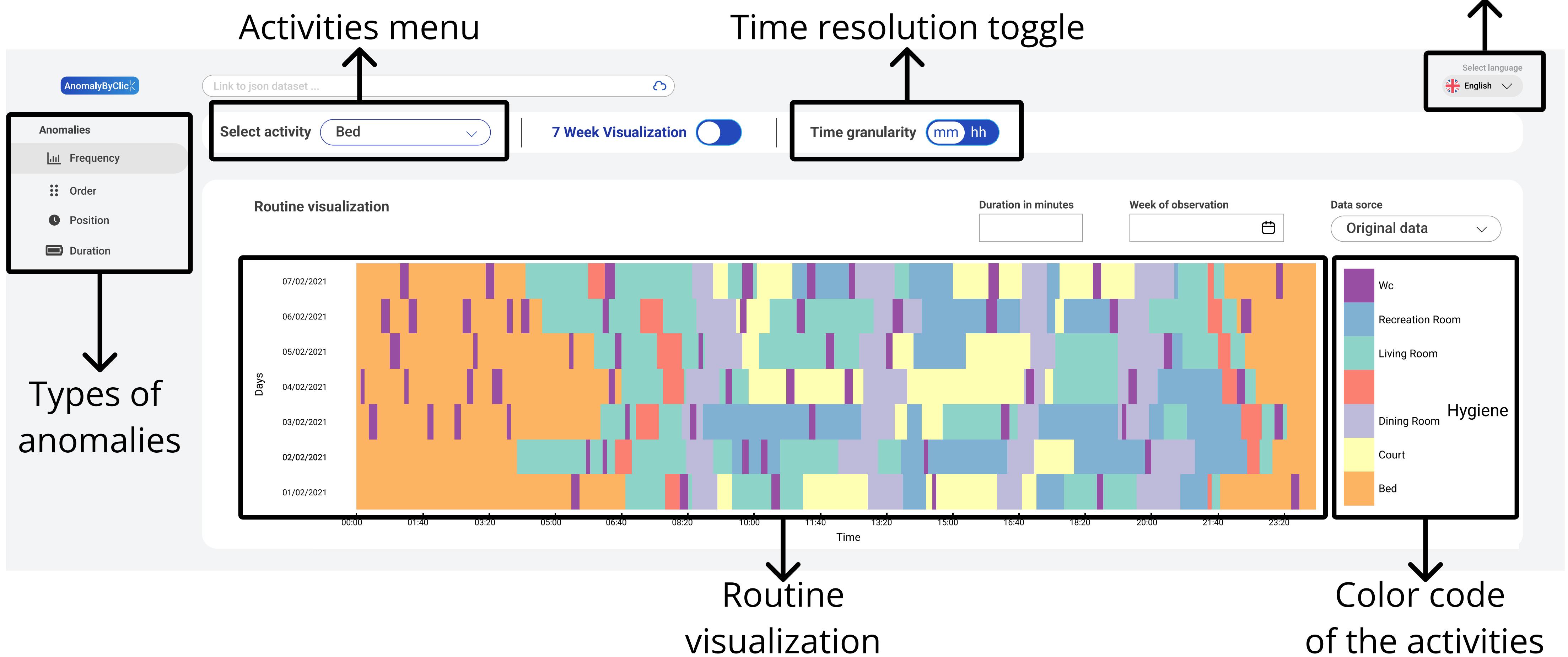
anomalies: this field has the same structure as the z field; the only difference is that it contains the codes corresponding to the anomalies rather than the activities. This field is helpful to import a dataset with pre-injected anomalies. If there are no pre-injected anomalies, this matrix must be all zeros.

dates: it is a vector that contains all the dates corresponding to the routine days'

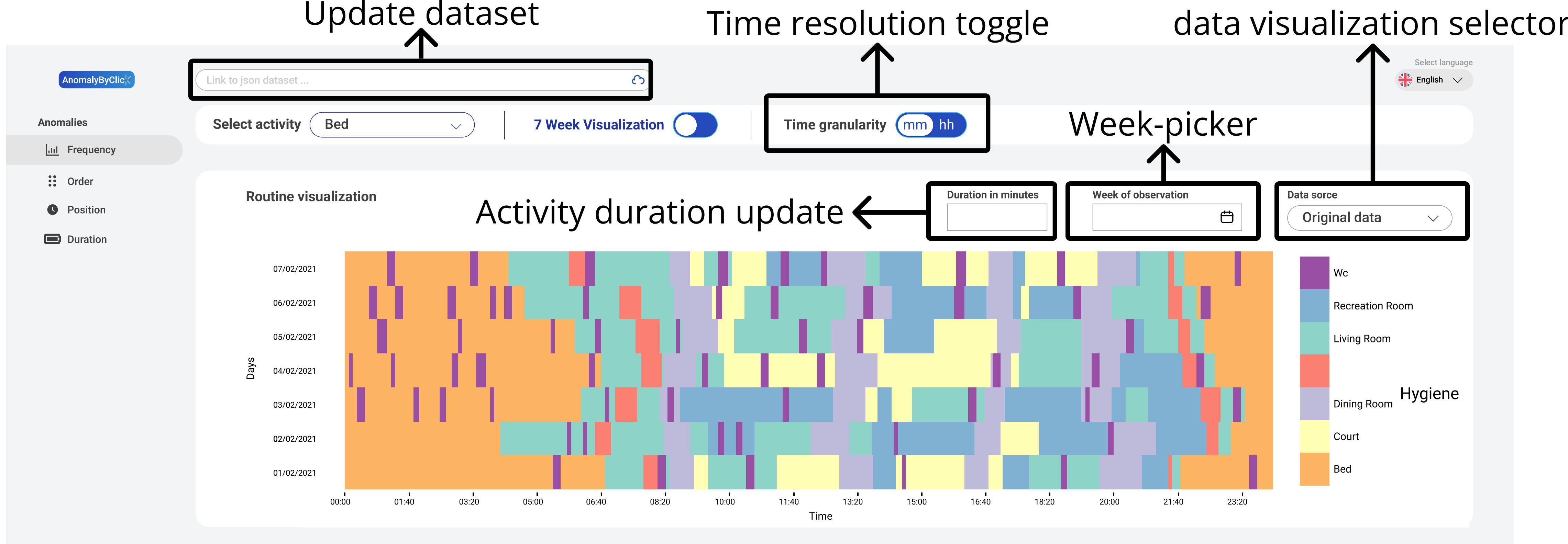
dictionary: this includes the fields to map the activities codes to a specific labels and back. "**Activities**" is the activities labels vector, and the "**codes**" is the vector with the numeric codes corresponding to the labels.

An example is available at: https://raw.githubusercontent.com/anomalybyclick/anomalybyclick.github.io/main/documents/datasets/ELinus_withanomaly.json

Main view 1/2



Main view 2/2



Routine visualization fields description

Activity duration update: This field allows setting the duration of the anomaly that we want to introduce in the routine (by default, it is set to the average duration of the analyzed activity for the selected patient)

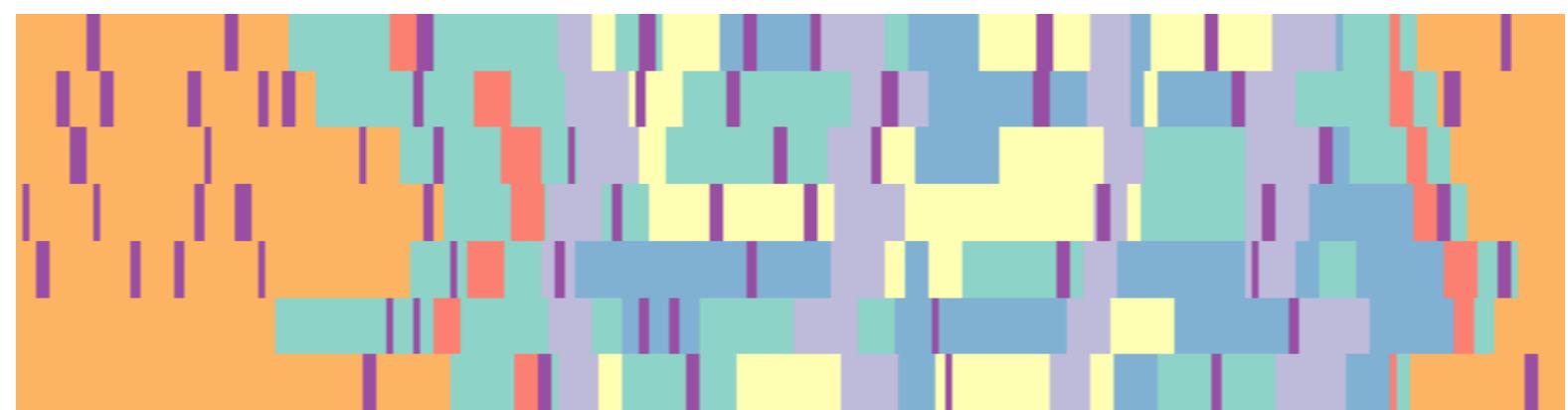
Original/Anomalies data visualization selector: To switch between the original and altered data

Week-picker: this tool helps the user select a window of 7 days. The 7-days visualization is an improvement we have introduced to enhance the data analysis that is be affected by the high dimensionality of days of observation

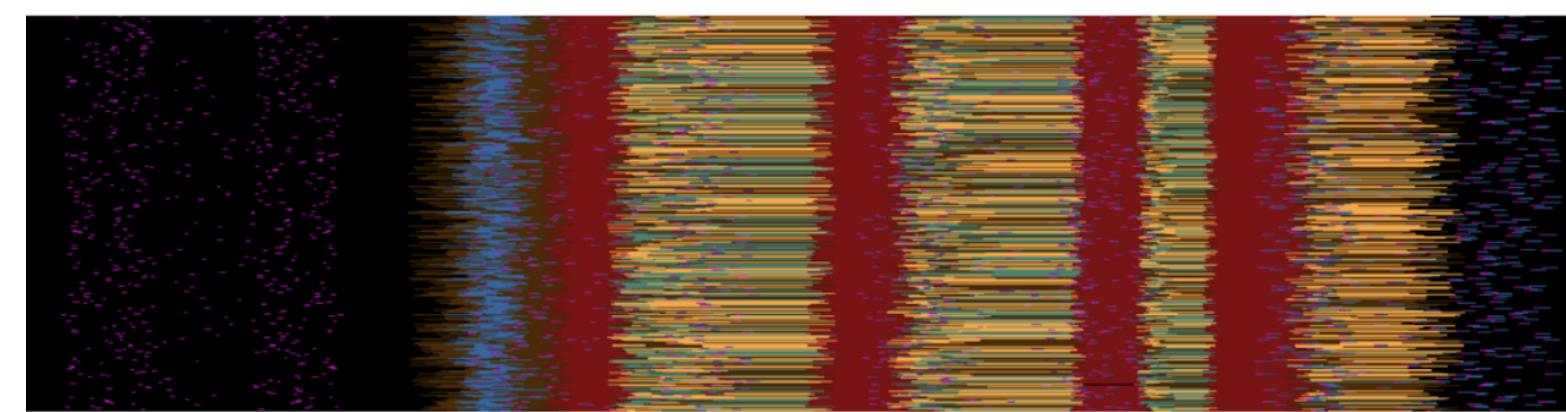
Color code of the activities: color activities legend

7-days visualization

The routine visualization is affected by the increasing number of days recorded for a specific patient; this worsens the readability and analysis of the routine. For this reason, we have introduced the 7-days vis. This method permits to focus on windows of 7 days rather than the all routine, enhancing the quality of the analysis.



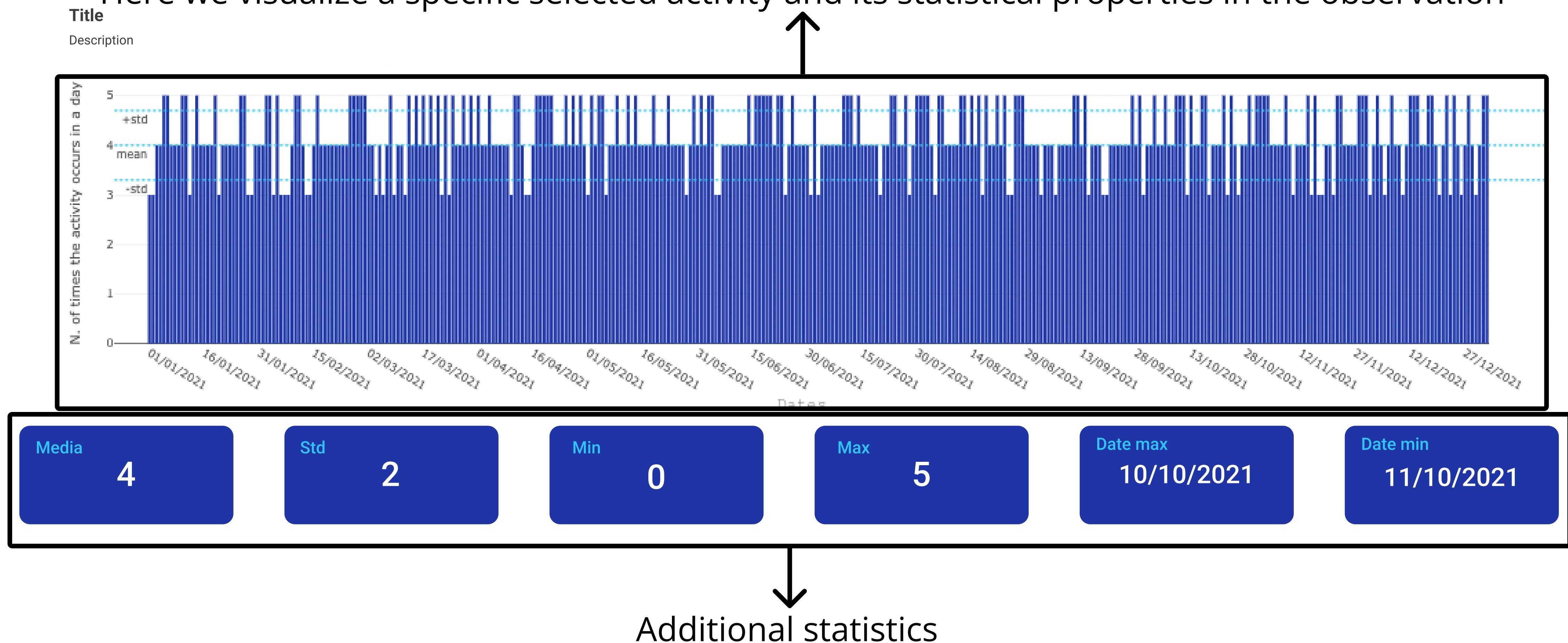
7 week resolution



Complete routine
resolution

Additional information view

Here we visualize a specific selected activity and its statistical properties in the observation



Types of anomalies

The four different types of anomaly we can introduce are:

Frequency: this anomaly is about the number of times an activity is usually recorded in a day. For example, it can be detected when a person changes his/her routine from two to zero showers per day

Duration. This anomaly is about an unusual duration concerning a specific activity. For example, this anomaly can be detected when a person sleeps more than usual.

Order: this anomaly is related to the unusual order of preceding and succeeding activities with respect to the observed one. For example, when taking meds and living activity swap, or when going to bed without going to toilet

Positions: this anomaly is related to the unusual temporal activity collocation in a day. For example, when a person starts to sleep in unusual (for him/her) hours like, for example, late morning.

Anomaly structure

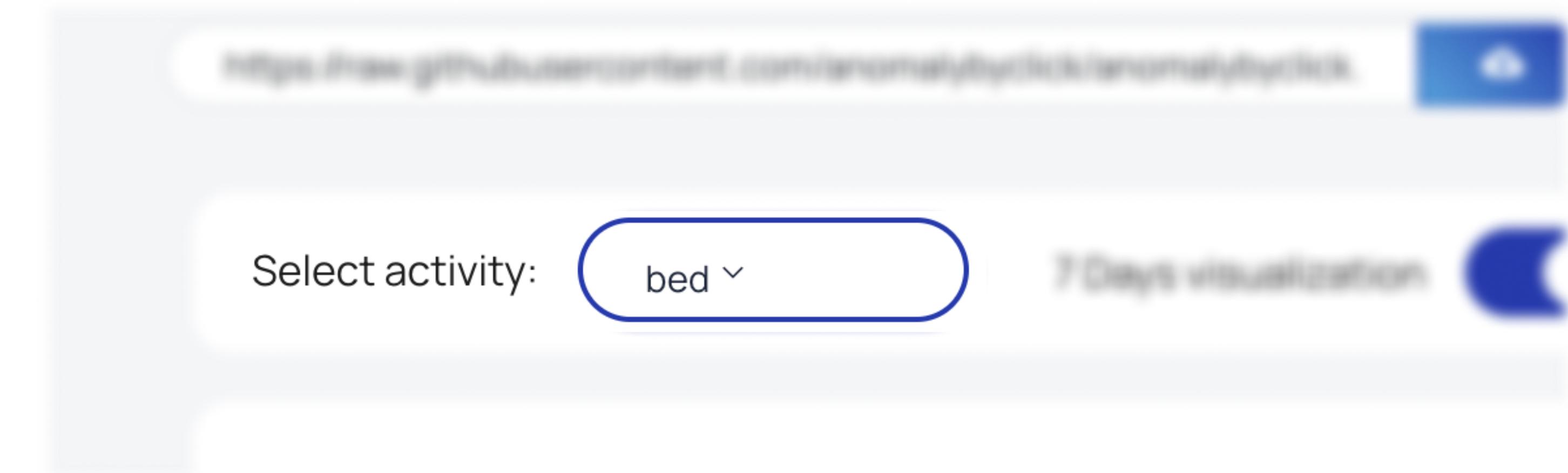
Each anomalous activity introduced in the routine has a predefined structure defined by the parameters, for each anomaly:

- it is related to a specific **activity**
- it has a specific anomaly **type**(Frequency, Duration, Position, Order)
- it has a specific **duration**

How to introduce a frequency anomaly 1

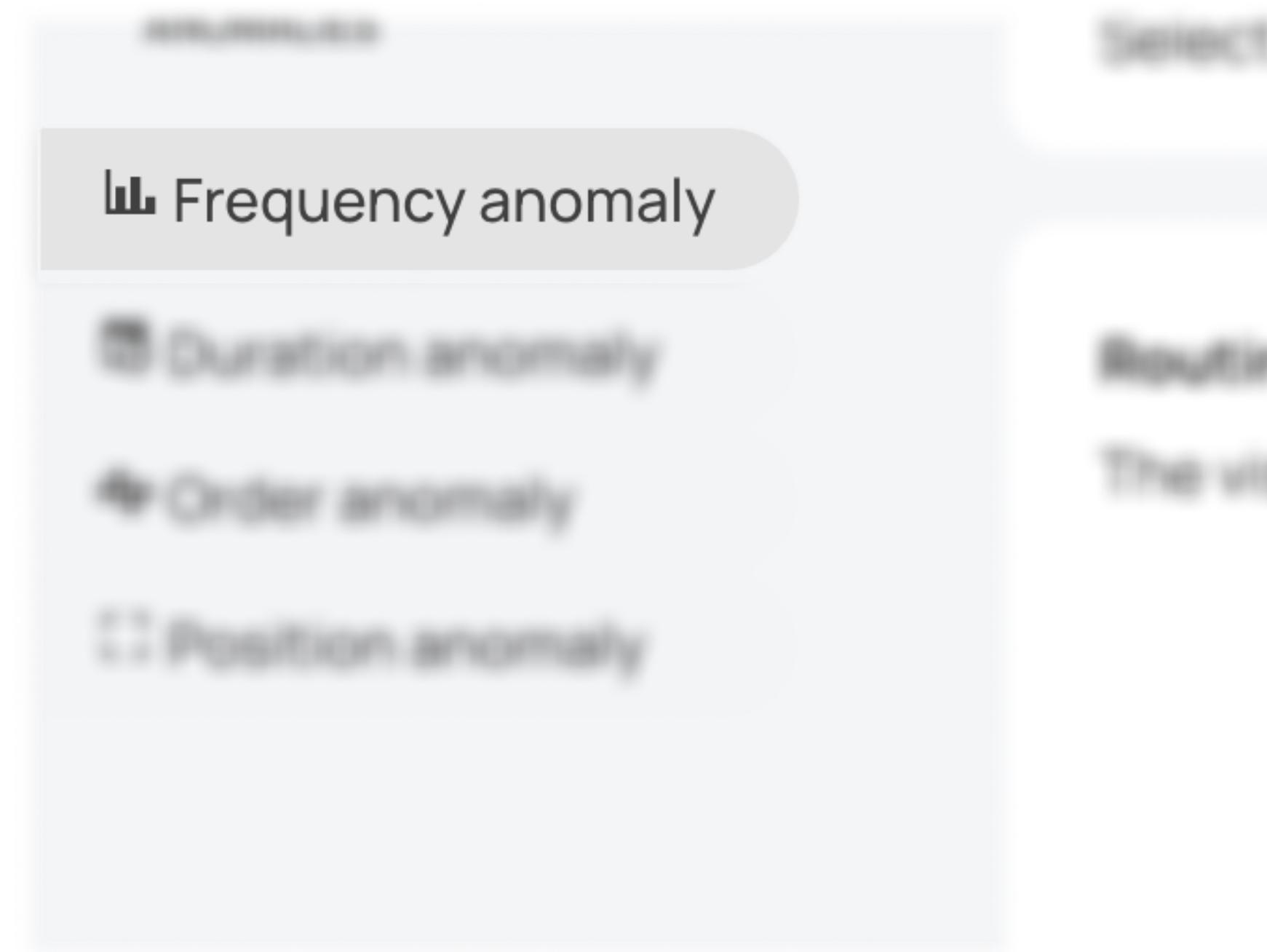
To introduce a frequency anomaly:

Select the activity that you want to be the anomalous one from the
“Activities menu”



How to introduce a frequency anomaly 2

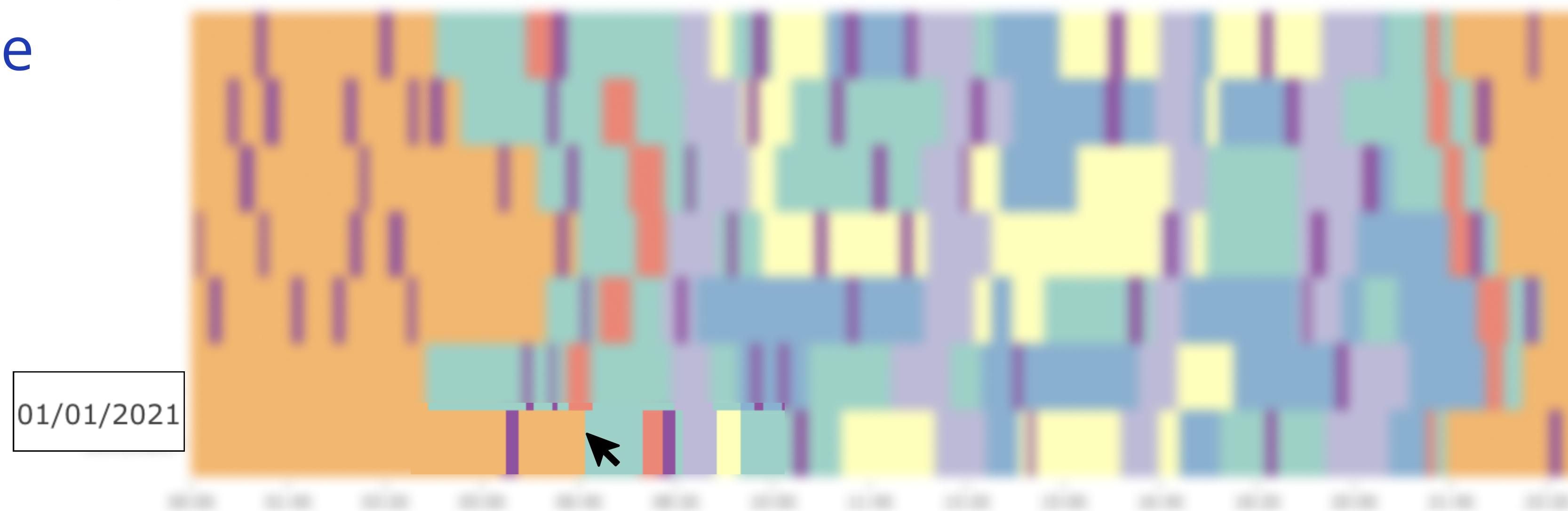
Once you have chosen it, select the anomaly you want introduce for the activity. In this case, you have to choose the “Frequency anomaly” button from the menu



How to introduce a frequency anomaly 3

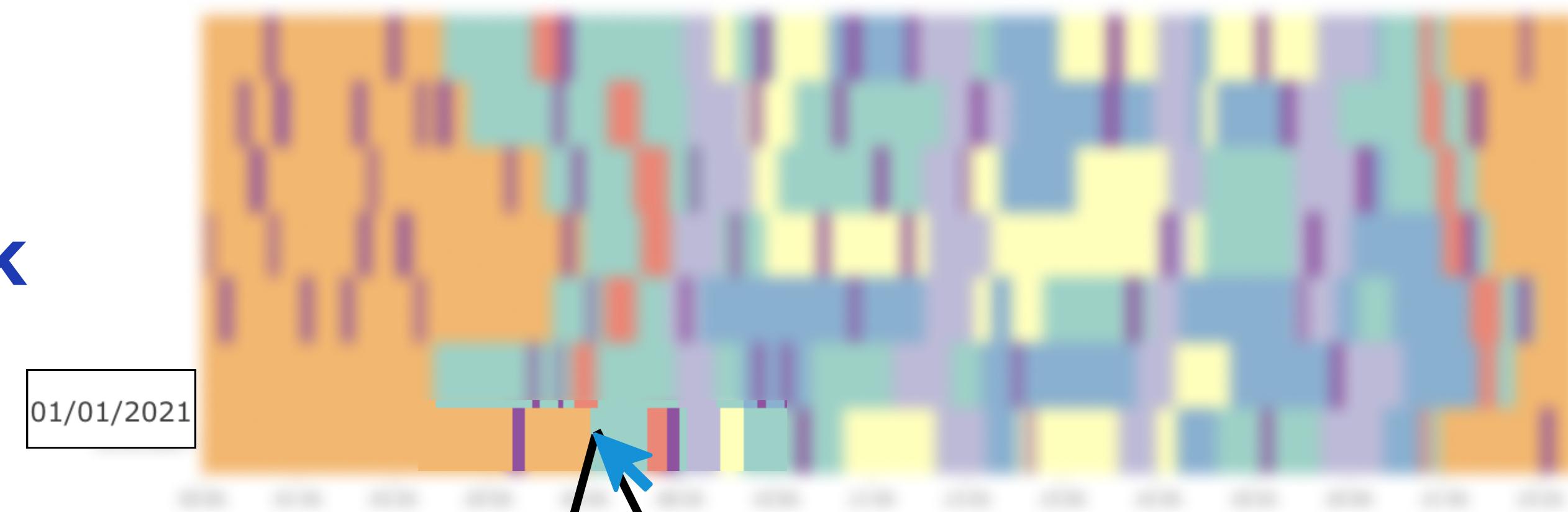
Once you have set up all the parameters for the anomaly, click on the Routine Visualization at the precise point where you want the anomaly to be introduced. Each row corresponds to a specific day and each column to a particular time.

Repeat this operation multiple times to introduce more anomalies of the same type

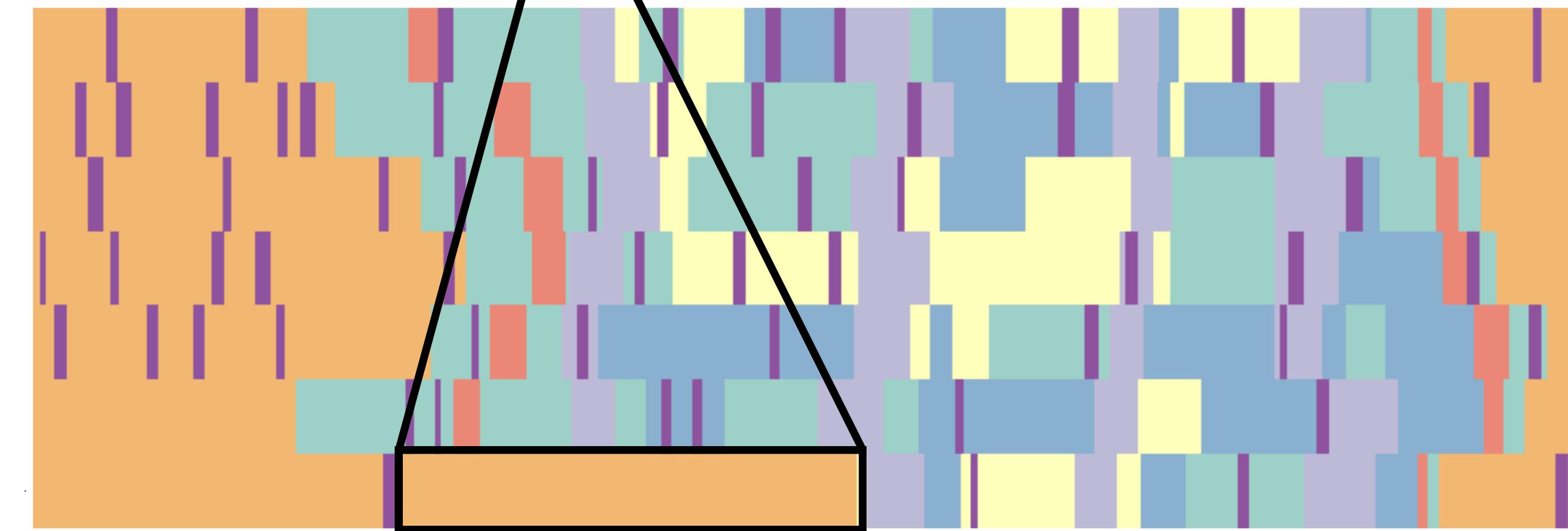


How to introduce a frequency anomaly 4

before the click



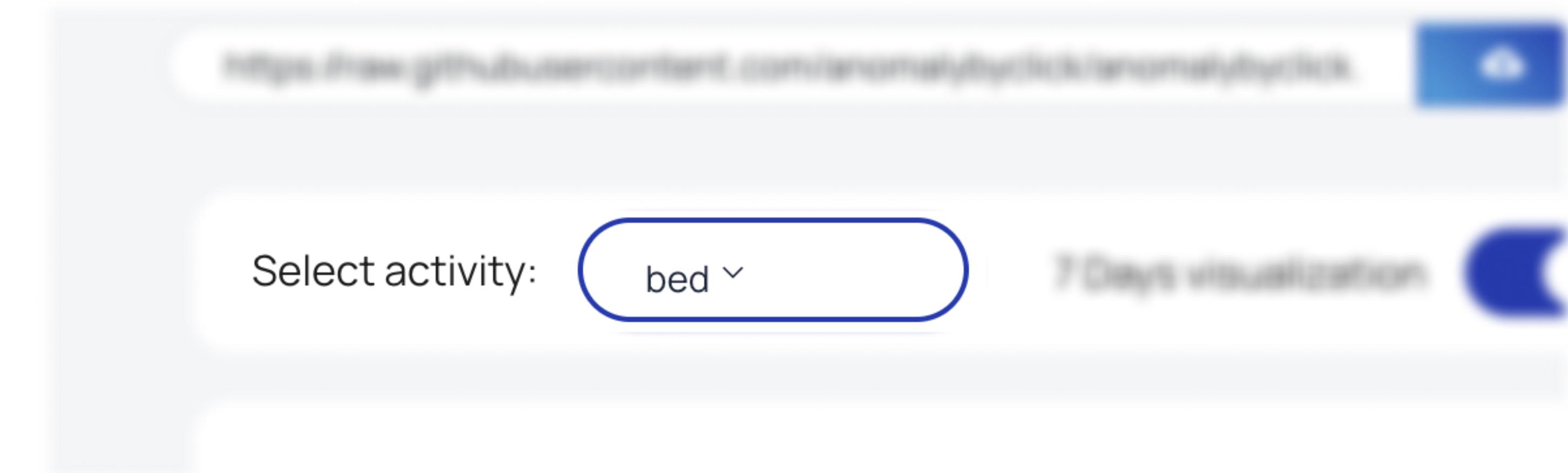
after the click



How to introduce a duration anomaly 1

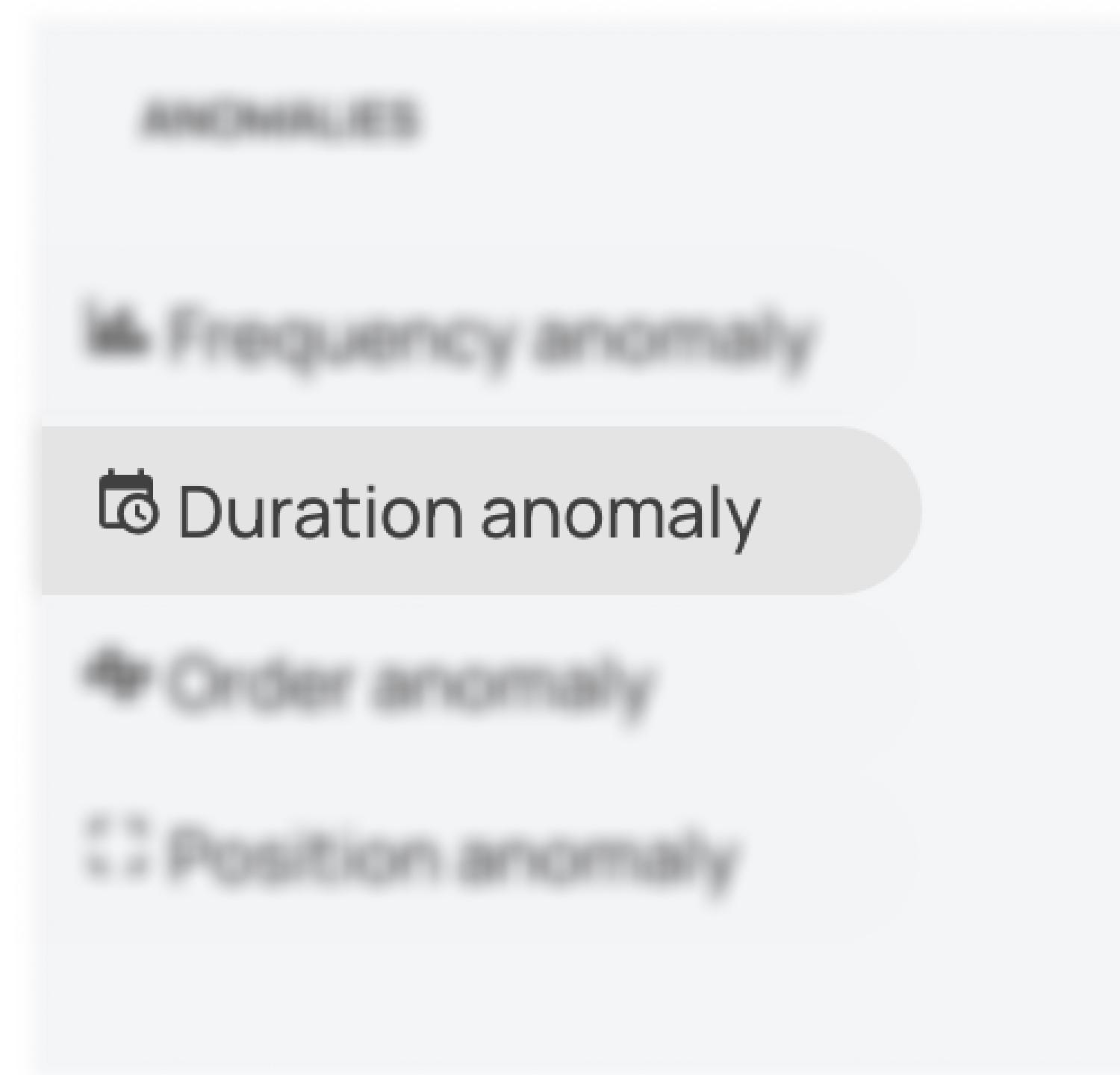
To introduce a duration anomaly:

Select the activity that will be the anomalous one from the “**Activities menu.**”



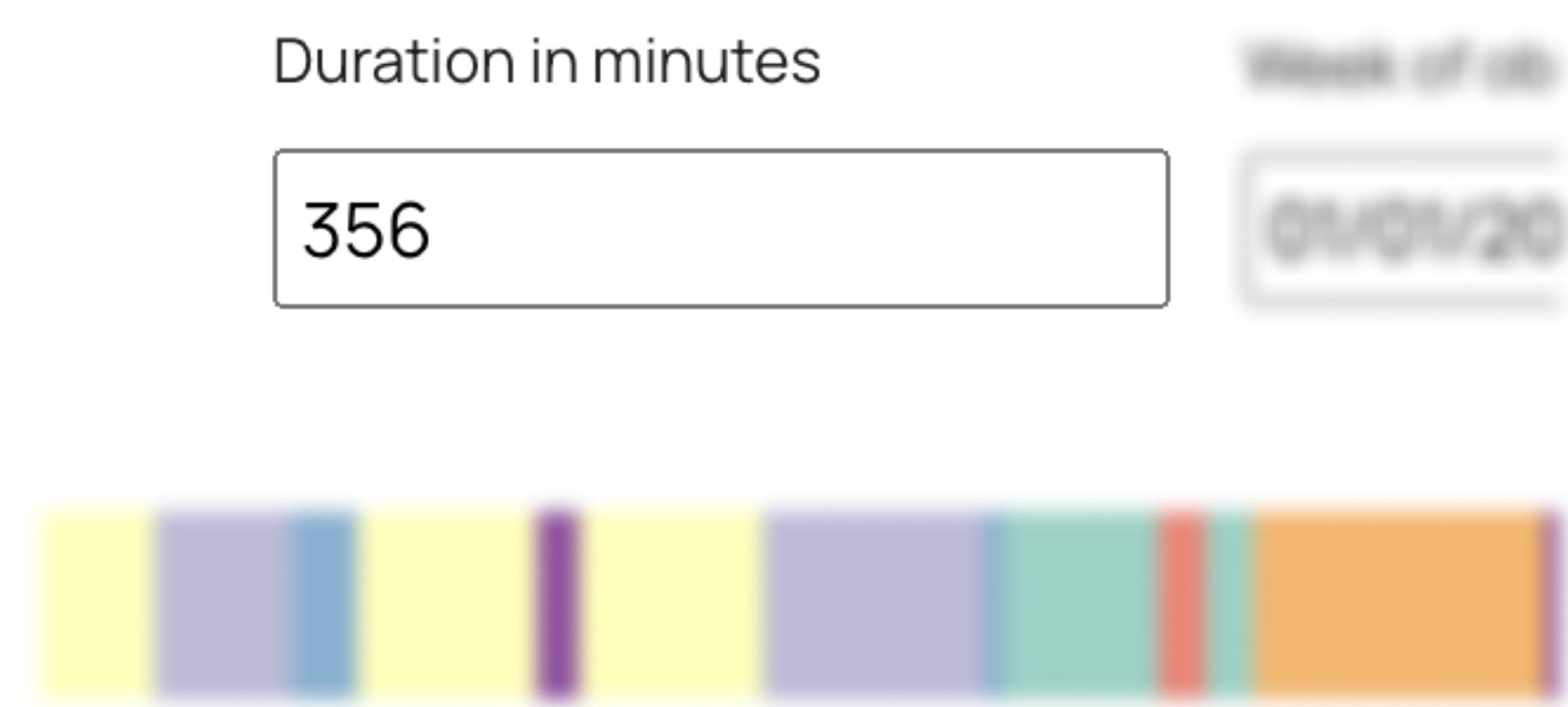
How to introduce a duration anomaly 2

Once you have chosen it, select the anomaly you want to introduce in the activity. In this case, you must choose the “**Duration anomaly**” button from the menu



How to introduce a duration anomaly 3

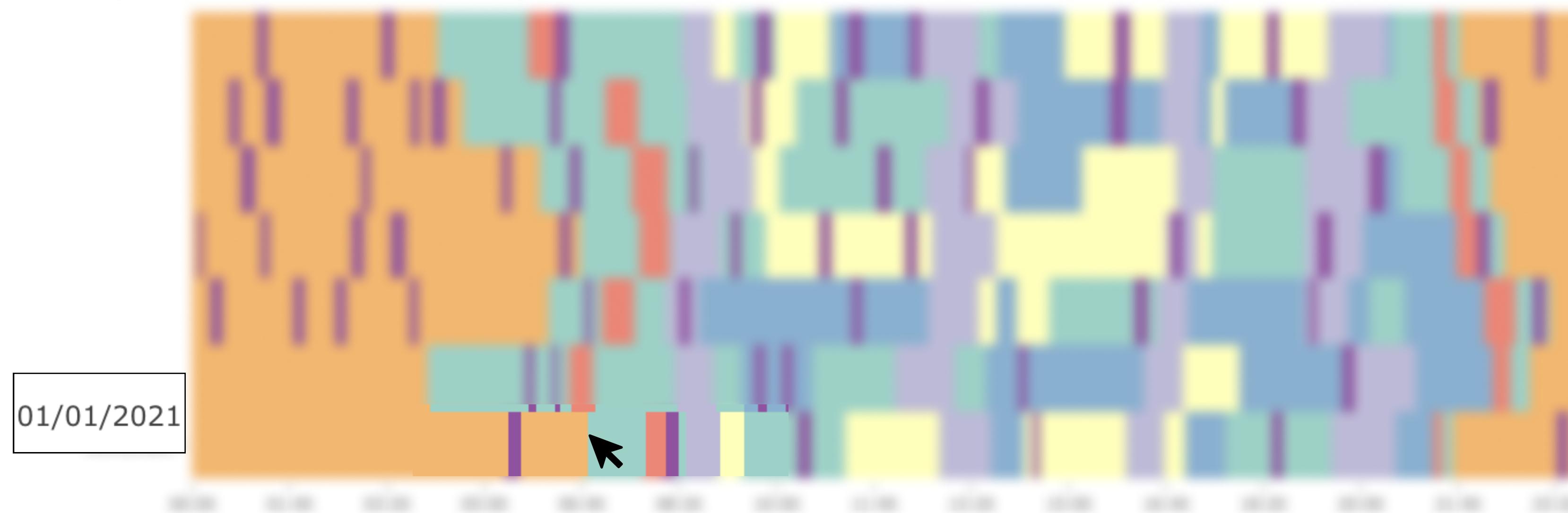
Now, the next step is to set the **anomalous duration** (in minutes) for the activity. When you select the **duration** anomaly from the anomaly types menu, a new field is added to the routine visualization. This field lets you change the average **duration** for the activity selected. It is initialized with the **typical mean** duration in the routine for the chosen activity and person, to facilitate the selection of an anomalous value



How to introduce a duration anomaly 4

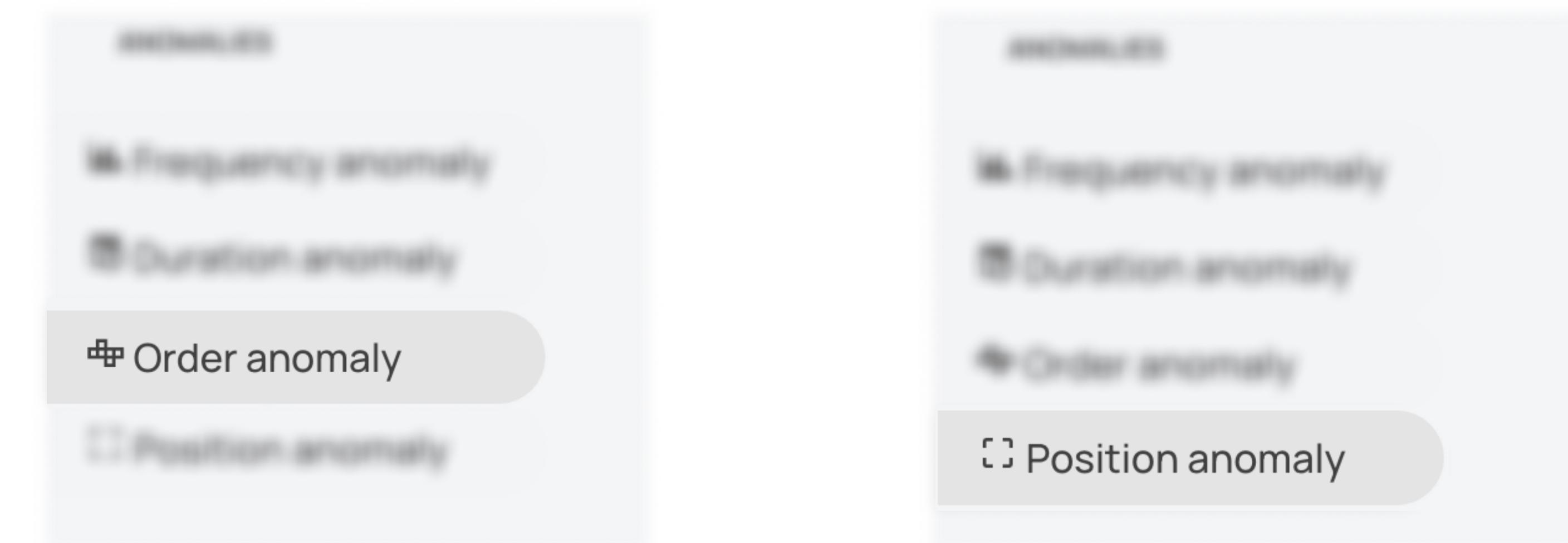
Once you have set up all the parameters for the anomaly, click on the Routine Visualization at the precise point where you want the anomaly to be introduced. Each row corresponds to a specific day and each column to a particular time.

Repeat this operation multiple times to introduce similar anomalies



How to introduce a position/order anomaly

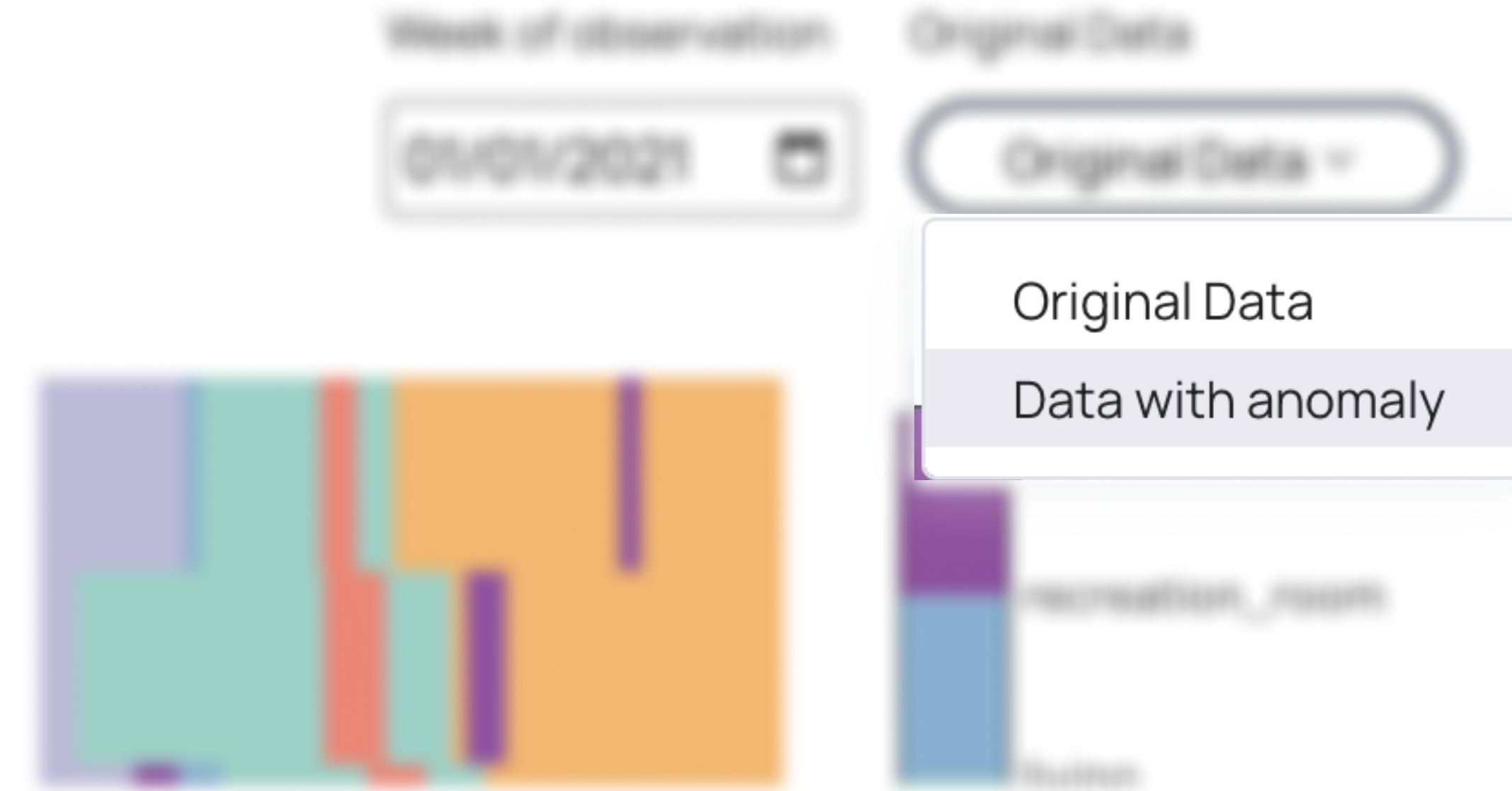
To introduce a position/order anomaly, the procedure follows the same steps of the frequency anomaly procedure discussed in the previous section, except for step number two, where you must select the correct button from the menu, as shown in the image below



How to visualize the anomalous activities 1

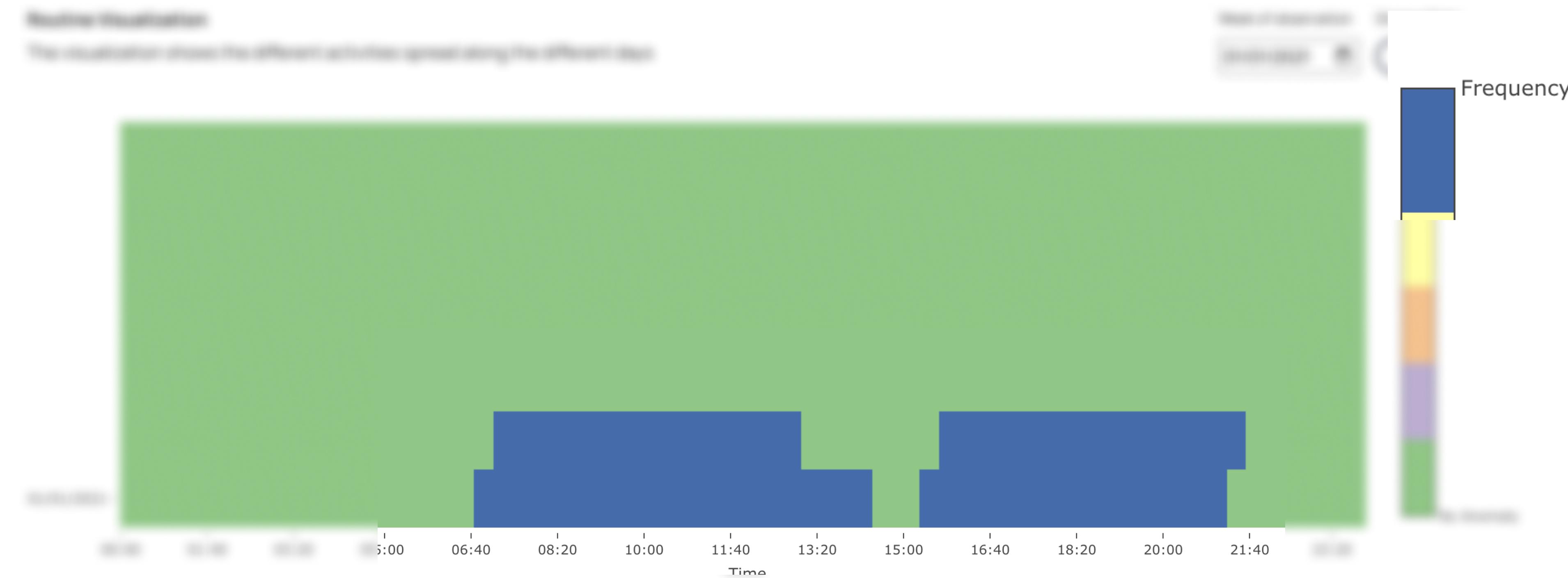
To visualize the anomalous activities:

1. Click on the “**Data with anomalies**” button in the Routine Visualization



How to visualize the anomalous activities 2

Once you click on it, the routine visualization will change like in the image below, where the line represents an anomalous activity, and the color encodes the type of anomaly.



Pre-injected anomalies 1/2

ABC not only permits injecting anomalies, but it also allows studying and confirming anomalies annotated by other tools, like the ML model. If there are pre-inject anomalies, they are highlighted in red in the Additional information view. If you want to remove them, you can click on the “red” markers, and the system provides to remove them from the dataset.



Pre-injected anomalies 2/2

before the click



after the click

