



# ExoClock Newsletter

Dear ExoClock participants,

Hope you are all doing well!

*We would like to welcome the new members!*

*We send out a newsletter like this at the beginning of every month, while you can read the past newsletters, watch the past meetings, and have access to other educational material at:*

[www.exoclock.space/users/material](http://www.exoclock.space/users/material)

*We also organise meetings dedicated to new ExoClock members. These meetings are held just after our regular monthly meeting. The beginner's meeting will no longer be fixed on the Friday after our regular meeting, because we would like to facilitate participants with different schedules. In these meetings, newcomers have the opportunity to ask questions of any level related to the operation of the website, observations of transits, data analysis etc.*

*Note that these meetings are not recorded.*

*Finally, we have a Slack channel for more direct communication and if you want to join, please send a request at [exoclockproject@gmail.com](mailto:exoclockproject@gmail.com).*

**In this newsletter, we discuss:**

## **1. Announcements**

### **1.1. First ariel-related article**

### **1.2. Europlanet workshop (links)**

### **1.3. Update on TrEs-1b by Billy Edwards**

### **1.4. Opportunity to use observing time in LCO**

## **2. Observations behind the scenes**

## **3. Highlighted observations**

## **4. ALERTS**

# 1. Announcements

## 1.1 Ariel-related article for phase curve studies

The first ariel-related with the title “The prospects of phase curve studies in the Ariel era” has been released! It is written by *Dr. Quentin Changeat*, post-doctoral researcher at UCL. The article is available here:

[https://www.exoclock.space/articles/ariel/03\\_2022\\_phase\\_curves\\_changeat](https://www.exoclock.space/articles/ariel/03_2022_phase_curves_changeat)

The article is accessible to everyone; Feel free to share the link with anyone interested in the topic, and share with us your feedback through: [exoclockproject@gmail.com](mailto:exoclockproject@gmail.com)

## 1.2 Europlanet workshop recordings

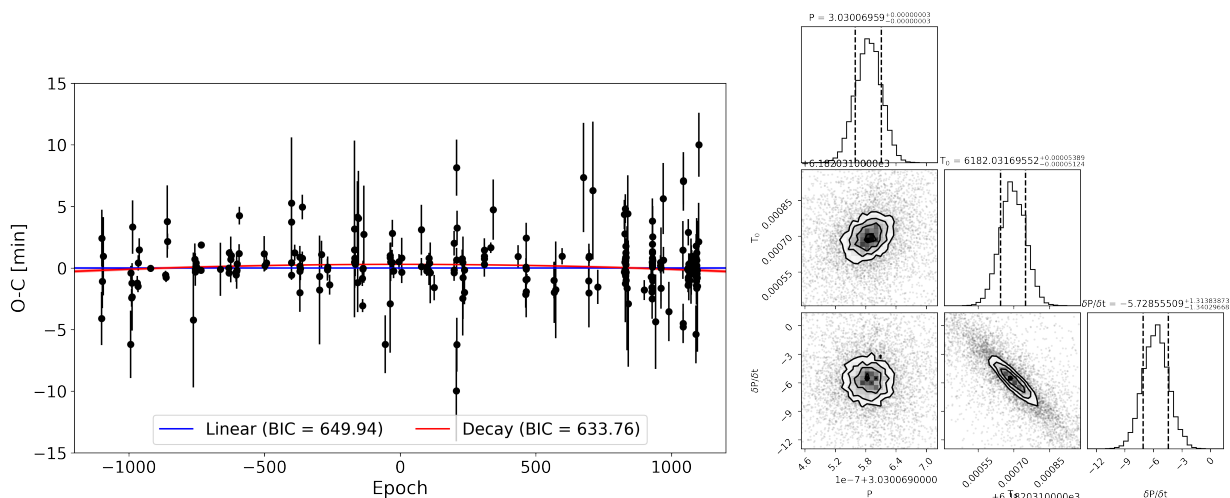
The Europlanet workshop telescope network science workshop that took place recently, included a dedicated session to exoplanets. ExoClock was presented and Mercedes Correa and Florence Libotte presented their contributions to ExoClock, receiving very positive comments!

The workshop was an excellent opportunity for amateur astronomers that would like to get access to equipment and observe transits or other objects. The recordings are available here:

<http://mao.tfai.vu.lt/europlanet2022/>

## 1.3 TrEs-1b campaign

During our recent meeting, the ExoClock coordinator Billy Edwards presented an update on the campaign of TrEs-1b. The team is now performing the final fitting of a few literature light curves and investigating how best-fit models have changed with time (see graphs below). Additional data may be useful to complete the analysis so we might need your help again soon during April when the planet has some partial transits.



## 1.4 Opportunity to use the telescopes of LCO for transits

Would you like to observe an exoplanet transit, but you don't have the equipment? Then send us an email at [exoclockproject@gmail.com](mailto:exoclockproject@gmail.com) until the **15<sup>th</sup> of March!**

In collaboration with LCO (Las Cumbres Observatory) we have access to observing time to obtain some exoplanet transits. Priority will be given to participants that don't have access to equipment. After the deadline we will contact you to arrange the selection of a planet and the scheduling (preferably a high priority target).

## 2. Observations behind the scenes

In this "Observations behind the scenes" section we discuss the **Evaluation report** that you can see when you upload an observation and the most common issues that observers face.

There are four diagnostics in the evaluation report, which you can see after uploading an observation:

Step 1 – Rp/Rs: checks the agreement between the Rp/Rs found in your observation and the value in our catalogue

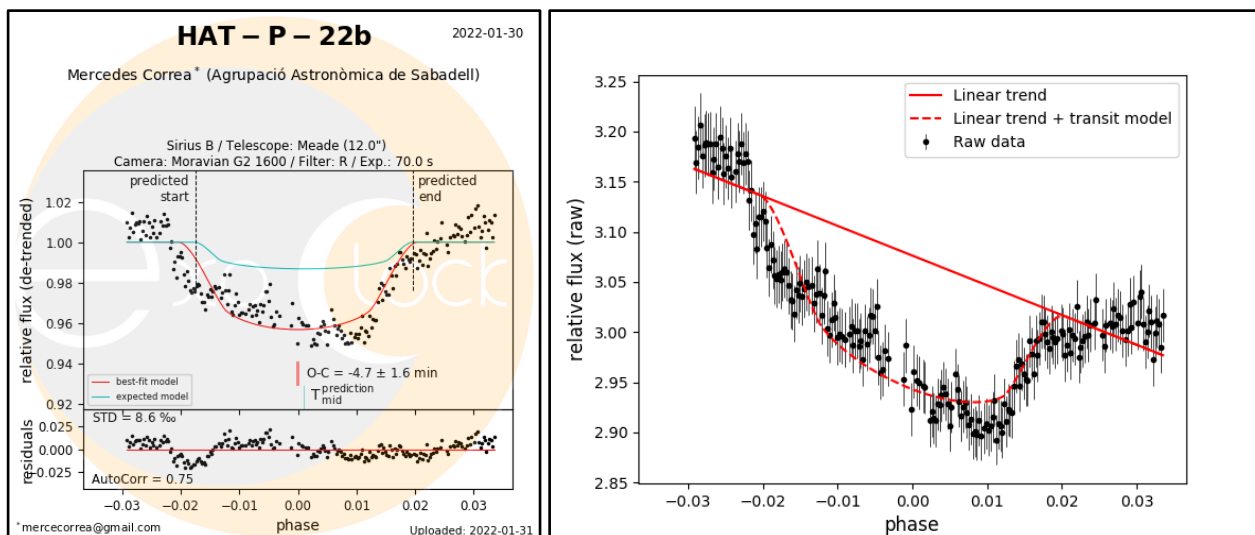
Step 2 – AutoCorrelation: checks for strong systematics in your light curve

Step 3 – Outliers: checks for strong outliers in your light curve

Step 4 – O-C: checks the agreement between the O-C found in your observation and the value found by other observers.

The O-C diagnostic (step 4) does not affect your submission and will only matter if there are many observations of the same target during the same period. If you get a red warning, please check the other observations submitted but **this should not stop you from uploading the data.**

If two out of the first three diagnostics fail (red warning) you will not be allowed to upload the observation, as this means that the light-curve is problematic. The first thing to do in this case is to check that you have uploaded the correct file and also that you have given the correct inputs (Planet, Filter, Flux format, Time format). The second thing to check is to try the different de-trending methods (the quadratic de-trending should be used for the more difficult cases).



Further on, if the red warnings insist, and especially the first two, it means that there is a problem with the comparison stars and/or with the reduction frames. This is the most common case of problematic light-curves and one example can be seen above. In this case, check different comparison stars (if you performed a meridian flip, try using comparison stars that are symmetrically distributed around the target), and check the quality of your flat frames (should be close to the 2/3rds of the full well depth).

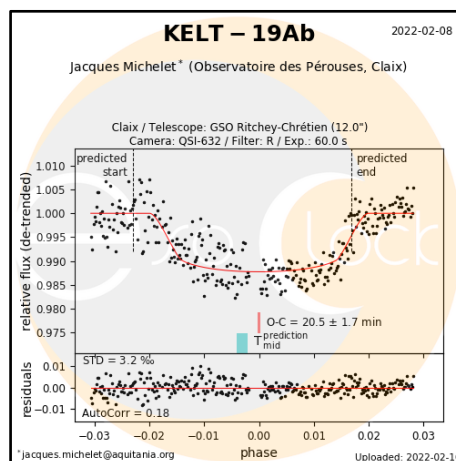
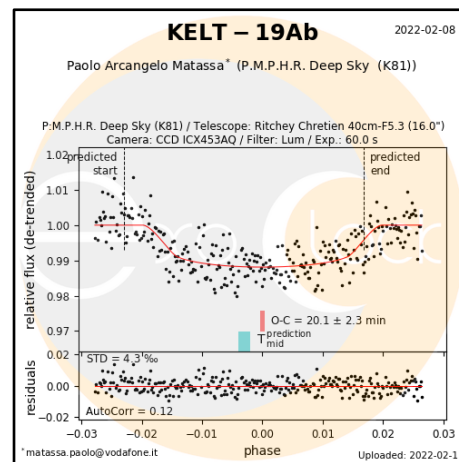
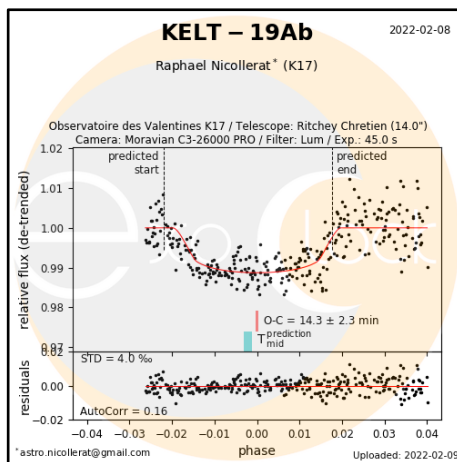
Finally, as we discussed in a previous “behind the scenes” section, you may need to remove manually any strong outliers, or remove data points from the start or the end of the observation if they seem to suffer from strong systematics (see November 2021 newsletter).

### 3. Highlighted observations

February has been another very busy month, as you submitted over 190 observations. We would like to thank you all for your efforts, and especially the new members who have been very active in 2022 so far!

We have selected KELT-19Ab, for which a shift of ~20 minutes was initially identified by Robert Roth on the 2nd of January. This drift was confirmed by more observations during February by Raphael Nicollerat, Paolo Arcangelo Matassa, Jacques Michelet, Claudio Lopresti, Anaël Wünsche and Yves Jongen. Below you can see some of the light-curves.

**Congratulations to everyone for your efforts!**



#### 4. ALERTS

Thank you all for observing the alert targets! Please check your personalised alert schedule at:

[www.exoclock.space/schedule/alerts](http://www.exoclock.space/schedule/alerts)

for the **ALERT** planets and if you get a clear sky and a long-enough night, you can try observing them!  
The following targets are in the current **alert system**:

- HATS-48Ab
- HAT-P-69b
- HATS-17b
- NGTS-1b
- WASP-192b
- HATS-56b
- TOI-905b
- TOI-1296b
- TOI-163b

Please remember that many targets were not in the alert list, before an unexpected shift was identified by you, the ExoClock participants. This highlights the importance of observing targets that are also of low and medium priorities.

Clear Skies,  
the ExoClock team