

A sunset scene with a tree and a street lamp. The sun is low on the horizon, casting a warm orange glow. A tree is silhouetted against the sky, and a street lamp is visible to its right. The background shows a body of water and distant hills.

ExoWorlds Spies:

an exoplanet research project involving
amateur astronomers and the public

Anastasia Kokori

Helsinki, 27th April

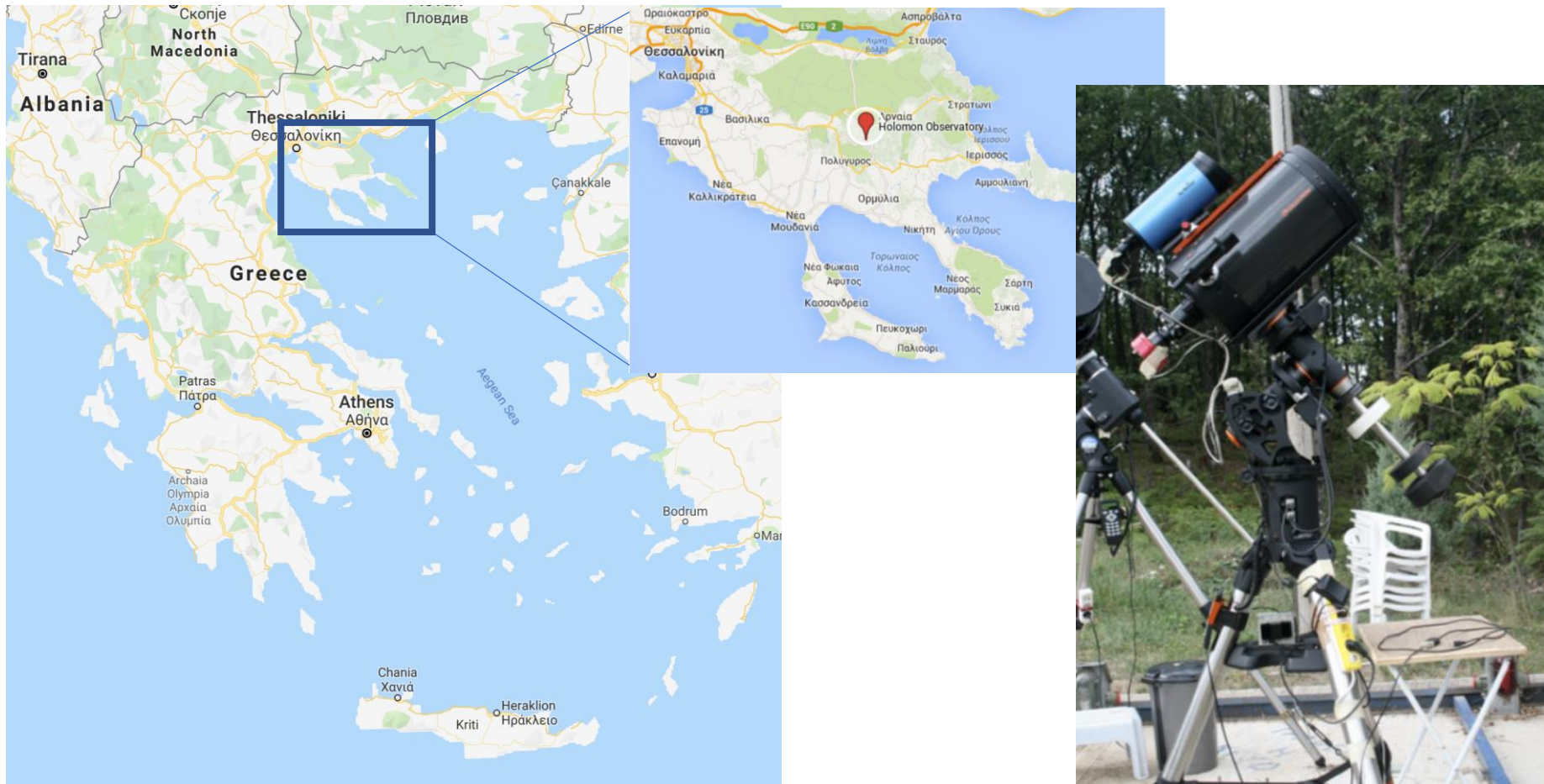
Who I am 😊

- Astrographic Officer and Science Communicator
@ Royal Observatory Greenwich
- Planetary science student
@ Birkbeck University London
- Europlanet Early Career (EPEC) Outreach chair
- Co-convener at EPSC 2019 in Geneva for
Science Communication and Exoplanets

If you are interested in any of these, e-mail me at
anastasia.kokori@gmail.com



Holomon Astronomical Station



Scope

Research

- **Open Science**
- **Inclusiveness**
- **Collaboration**

Outreach

Education



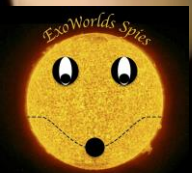
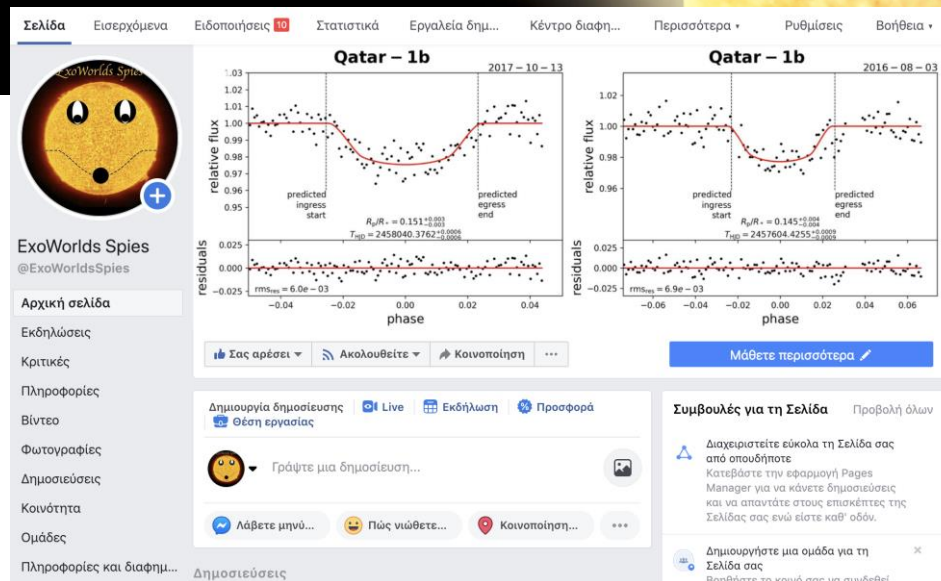
Website / Facebook

ABOUT SCIENCE PEOPLE START TRAINING DATA BASE SOFTWARE BLOG

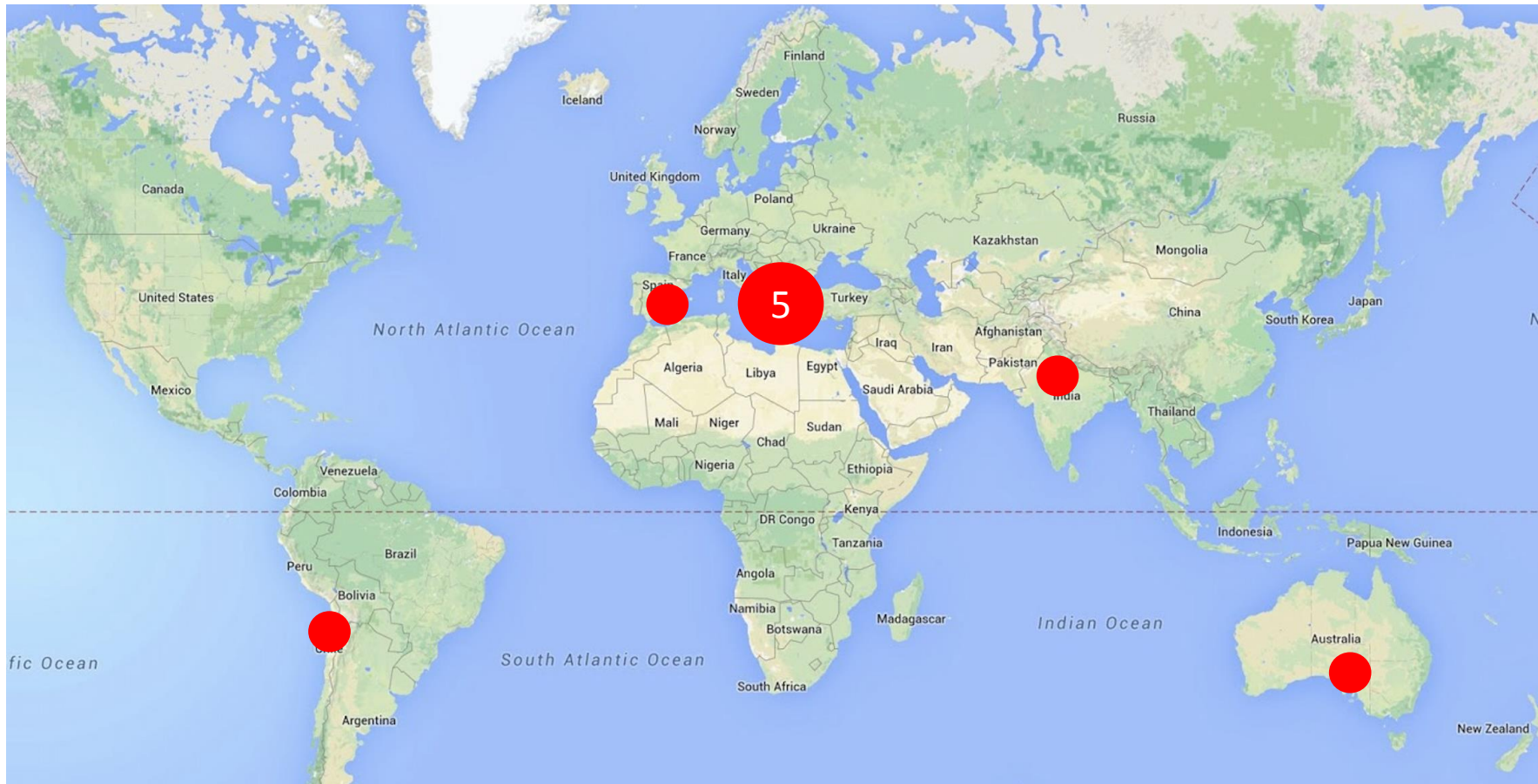
ΕΛΛΗΝΙΚΑ



Like us on



Network



Network

- Holomon Astronomical Station (Greece ~35)
- Nunki observatory (Greece ~20)
- Elizabeth observatory (Greece ~10)
- Artemis observatory (Greece ~ 5)
- Galileo observatory (Greece ~ 5)
- KM Telescope Network (Chile-Australia-Spain ~25)
- Cepheid's observatory (India)

TOTAL: ~100 transits



How to observe

- Target selection based on telescope size
- How to plan observations with ETD
- Telescope setup
 - reduction frames
 - camera temperature
 - exposure time calculations
 - guiding
 - etc...



How to analyse

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ΕΛΛΗΝΙΚΑ



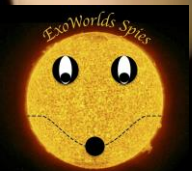
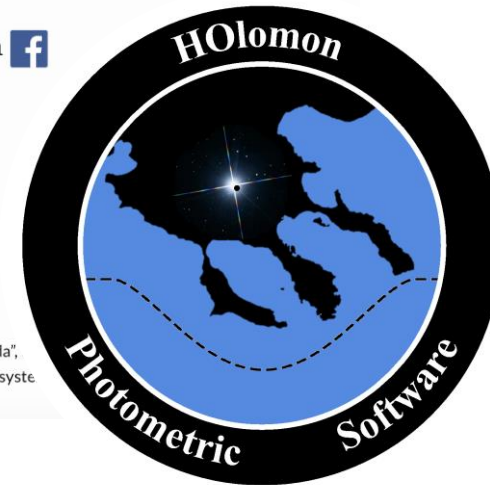
Like us on 

Software


Holomon Photometric Software

PYTHON INSTALLATION

If you have Python installed on your computer, you can skip this step. Visit the [ANACONDA WEBSITE](#), click on "Download Anaconda", download the Python 2.7 version. During installation, be careful to install Python in your home directory and add python as a system variable.



How to analyse



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Angelos Tsiaras
atsiaras@star.ucl.ac.uk

Reduction & Alignment

HELP

Directory: **Desktop/WASP85b**

Name identifier for observation files	<input type="text" value="Auto"/>	676 files found
Name identifier for bias files	<input type="text" value="bias/"/>	35 files found
Name identifier for dark files	<input type="text" value="dark/"/>	25 files found
Name identifier for flat files	<input type="text" value="flat/"/>	10 files found
Bin fits files (reduced only)	<input type="text" value="1"/>	

Show files

Detected target RA DEC: **None detected**
 Use detected values

Manual target RA DEC (hh:mm:ss +/-dd:mm:ss): **Coordinates accepted**

Exposure time header keyword	<input type="text" value="EXPTIME"/>	Keyword found
Observation date header keyword	<input type="text" value="DATE-OBS"/>	Keyword found
Observation time header keyword	<input type="text" value="DATE-OBS"/>	Keyword found

Show header

RUN REDUCTION & ALIGNMENT



Database

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ΕΛΛΗΝΙΚΑ

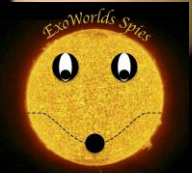


Like us on 

Database

HAT-P-16 b	HAT-P-32 b	HAT-P-36 b	Qatar-1 b
TrES-1 b	TrES-3 b	WASP-2 b	WASP-10 b
WASP-11 b	WASP-21 b	WASP-93 b	

26 available observations



Database

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ΕΛΛΗΝΙΚΑ

Like us on 

WASP-93 b

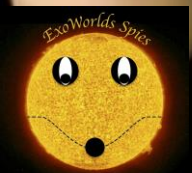


RA: 00:37:50.11
DEC: +51:17:19.5

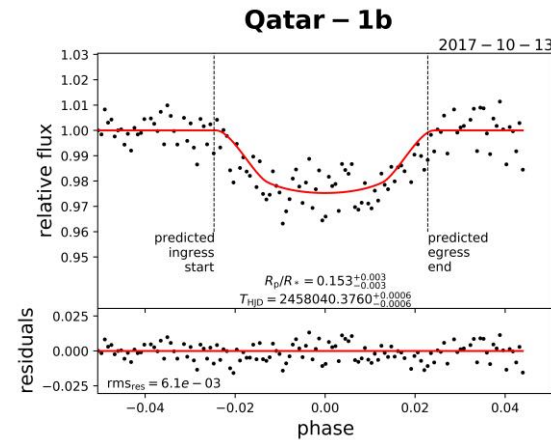
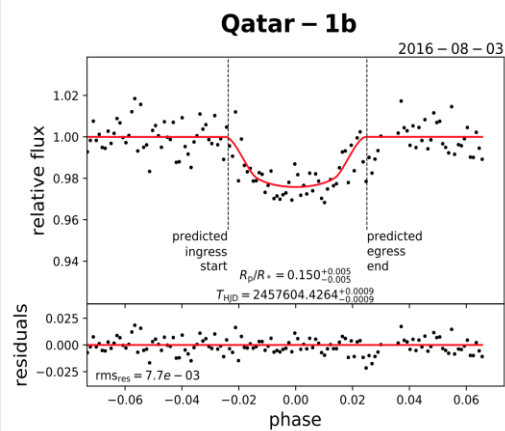
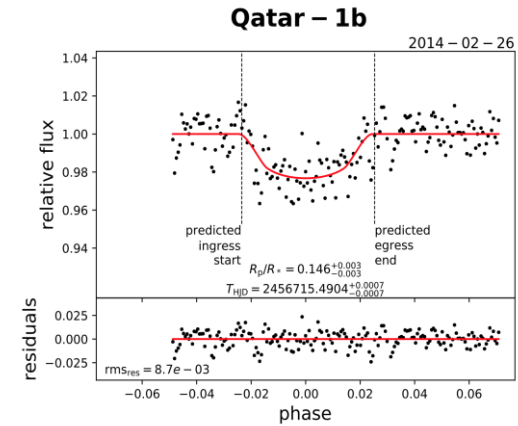
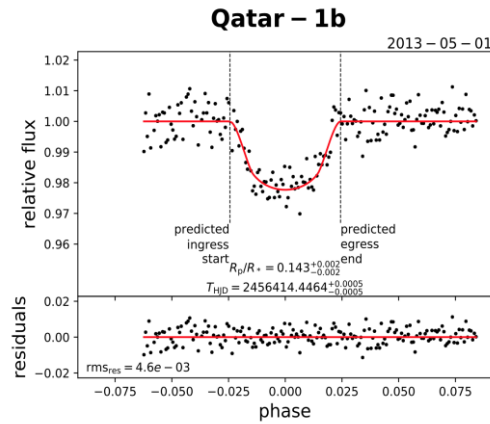
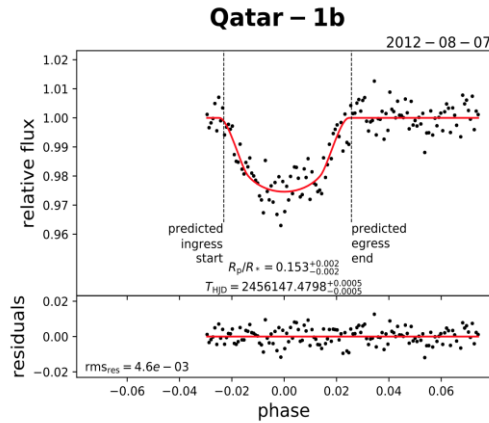
Stellar metallicity [Fe/H, dex]: 0.07
Stellar Temperature [K]: 6700.0
Stellar log(g) [cm/s²]: 4.5

Period [days]: 2.7325321
Mid-time [days, HJD]: 2456079.5642
Rp/Rs: 0.1047
a/Rs: 5.94
Inclination [deg]: 81.18
Eccentricity: 0.0
Periastron [deg]: 0.0

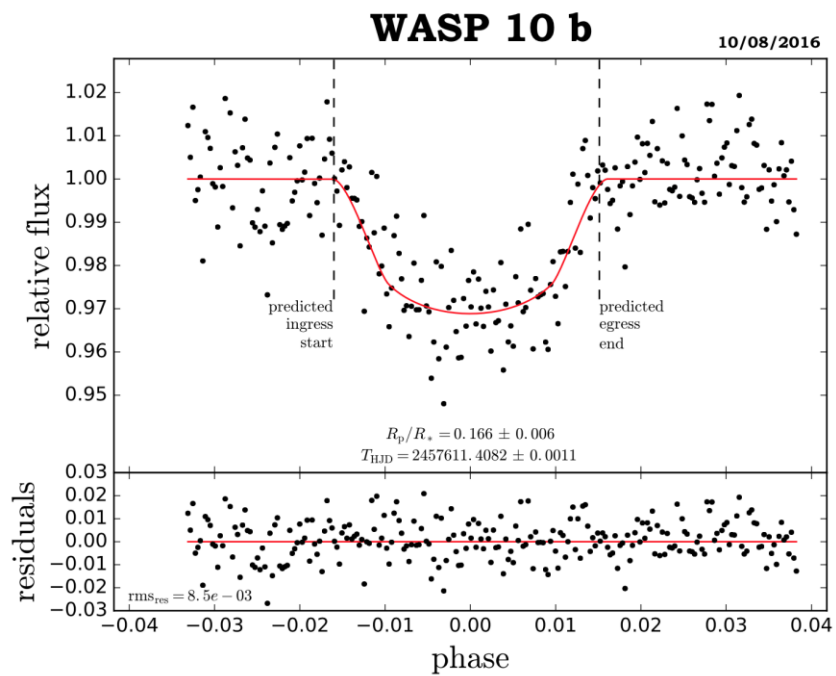
11 targets
available



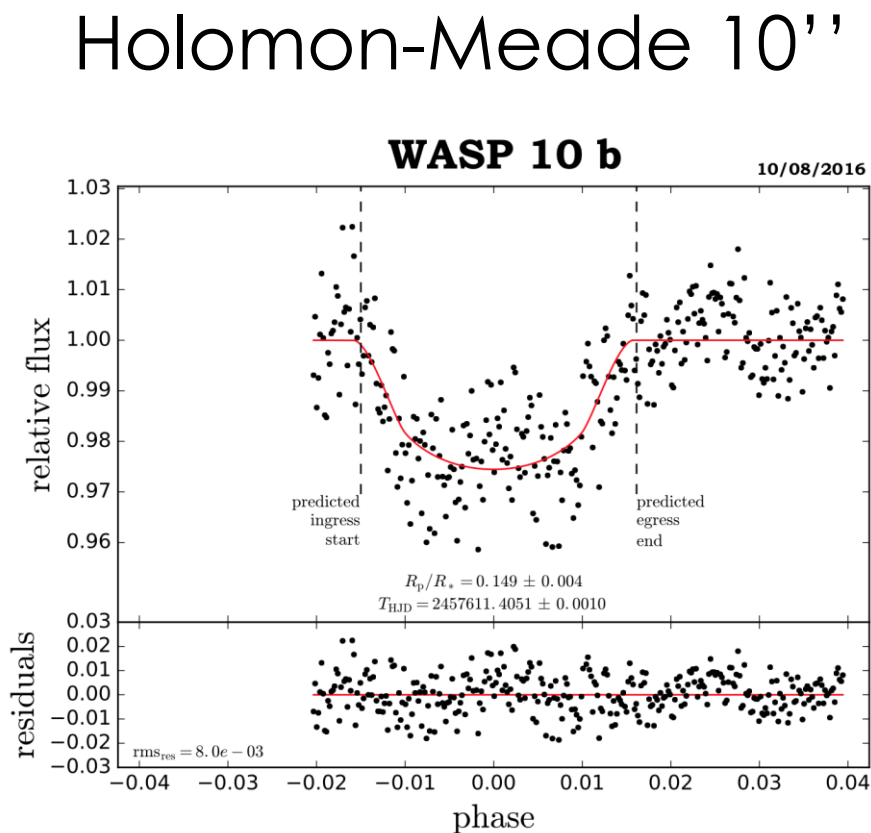
Wide time coverage



Cross validation (multi-instruments)



Holomon-C11

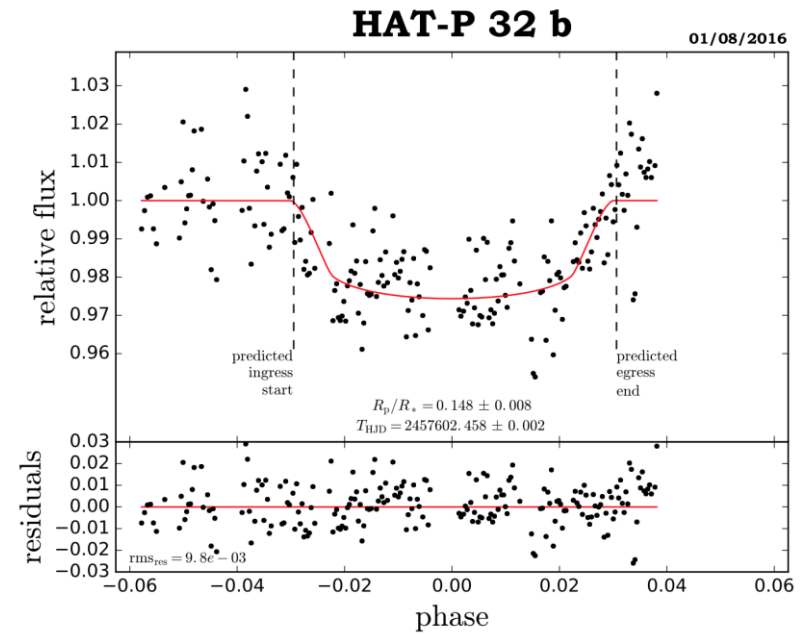


Holomon-Meade 10''

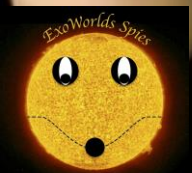
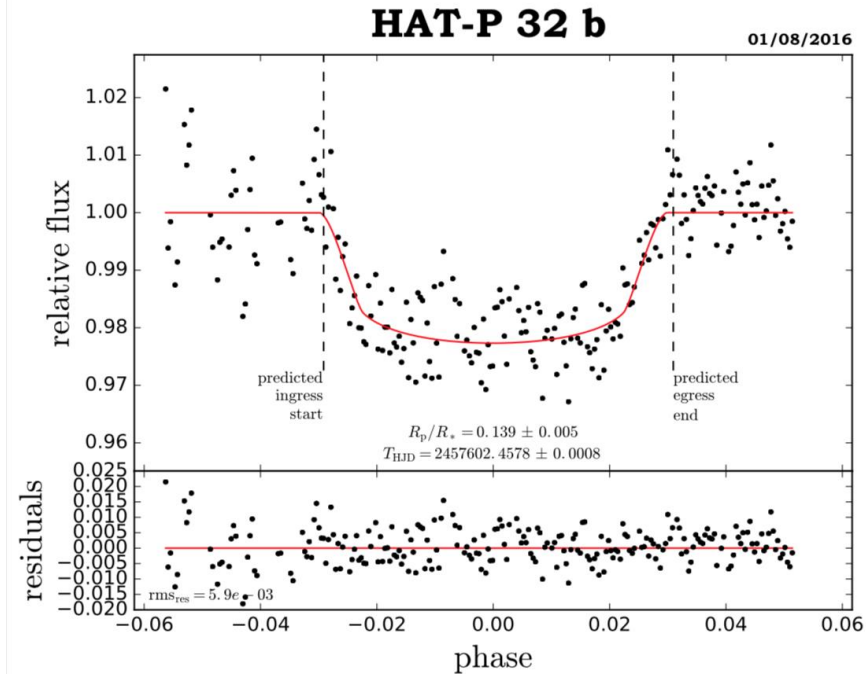


Cross validation (multi-sites)

Nunki



Holomon



What is the impact?

- How do exoplanets look like?
- How were they formed and evolved?
- What is the weather there?
- Are they habitable?
- How rare is Earth as a planet?

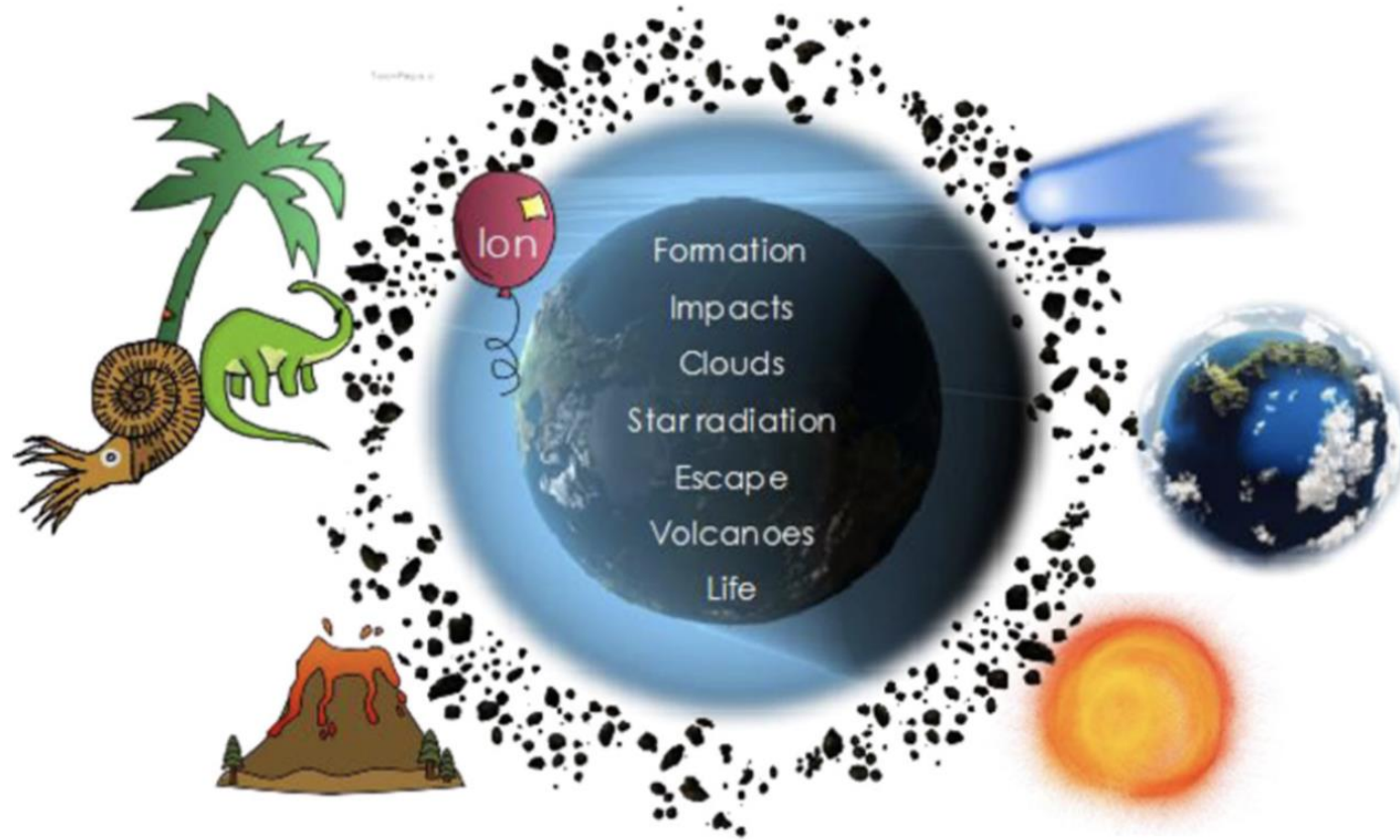


ARIEL space mission

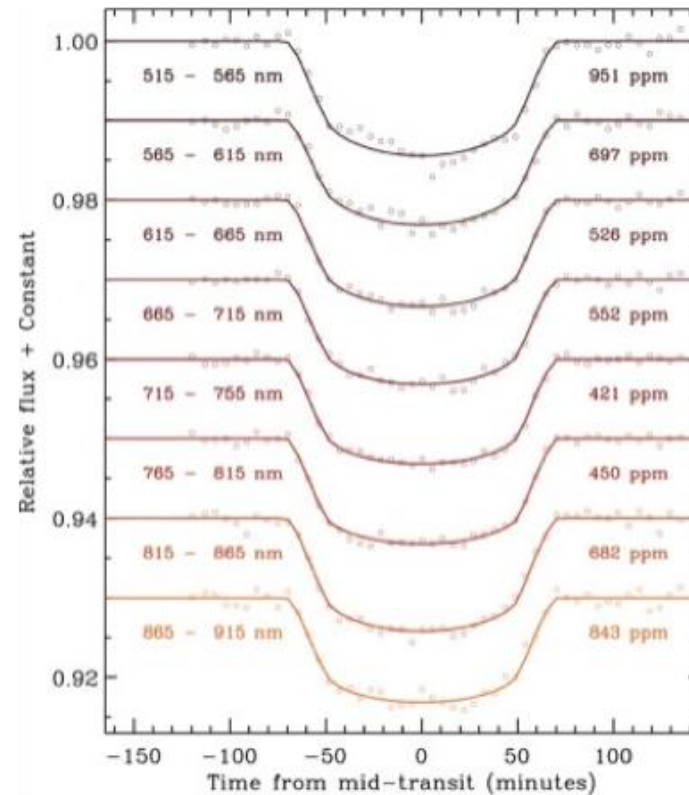
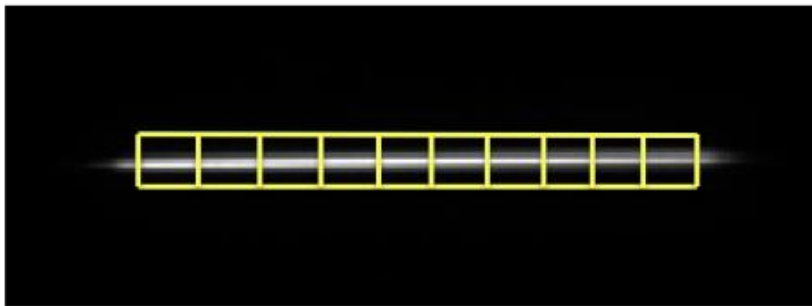
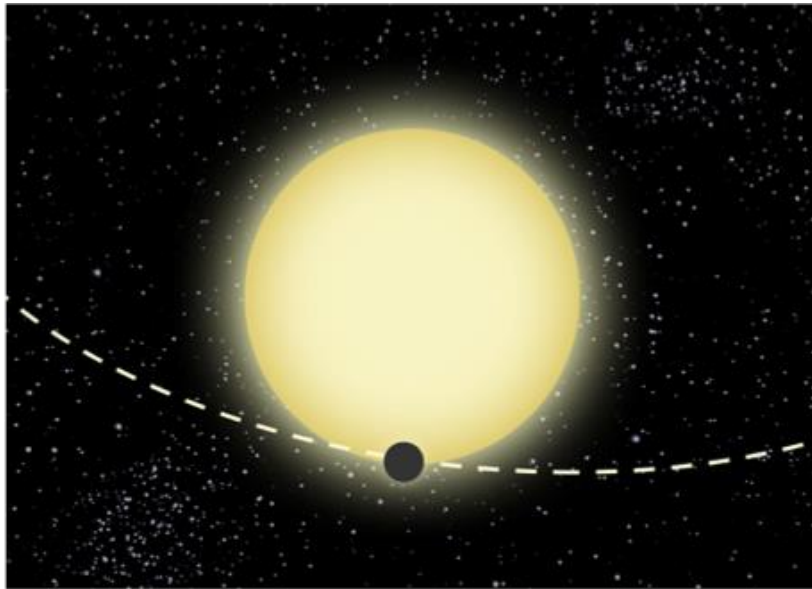
- ESA medium (M4) mission: Launch 2028
- Telescope aperture: 1 m
- Wavelength coverage: 0.5 - 7.8 μm
- Key science question:
How chemically diverse are exoplanets?
- Science goal:
Observe ~1000 exoplanet atmospheres



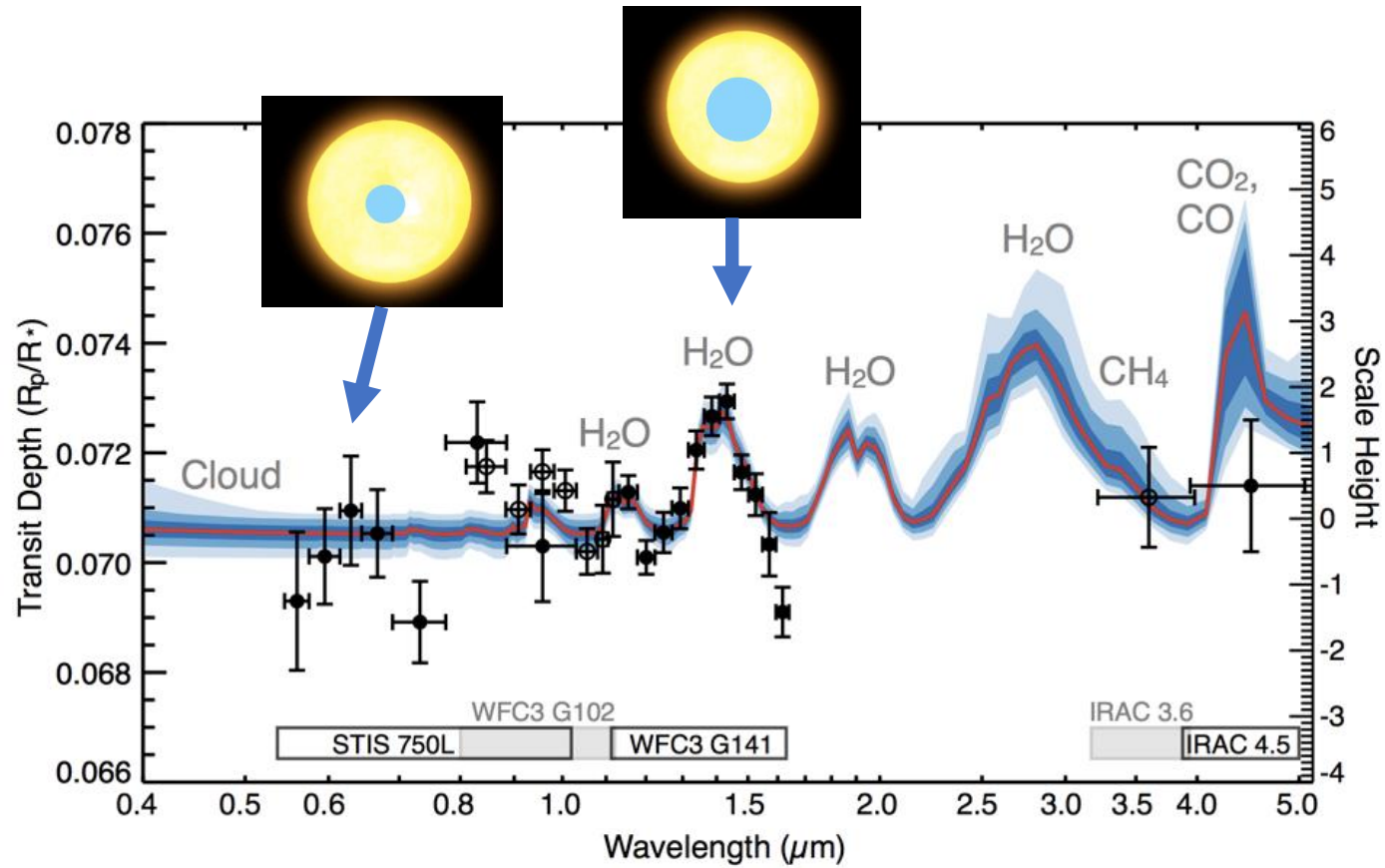
Importance of the atmosphere



Transit spectroscopy



Transit spectroscopy



Wakeford
et al. 2017



Time-critical

PLANET 1

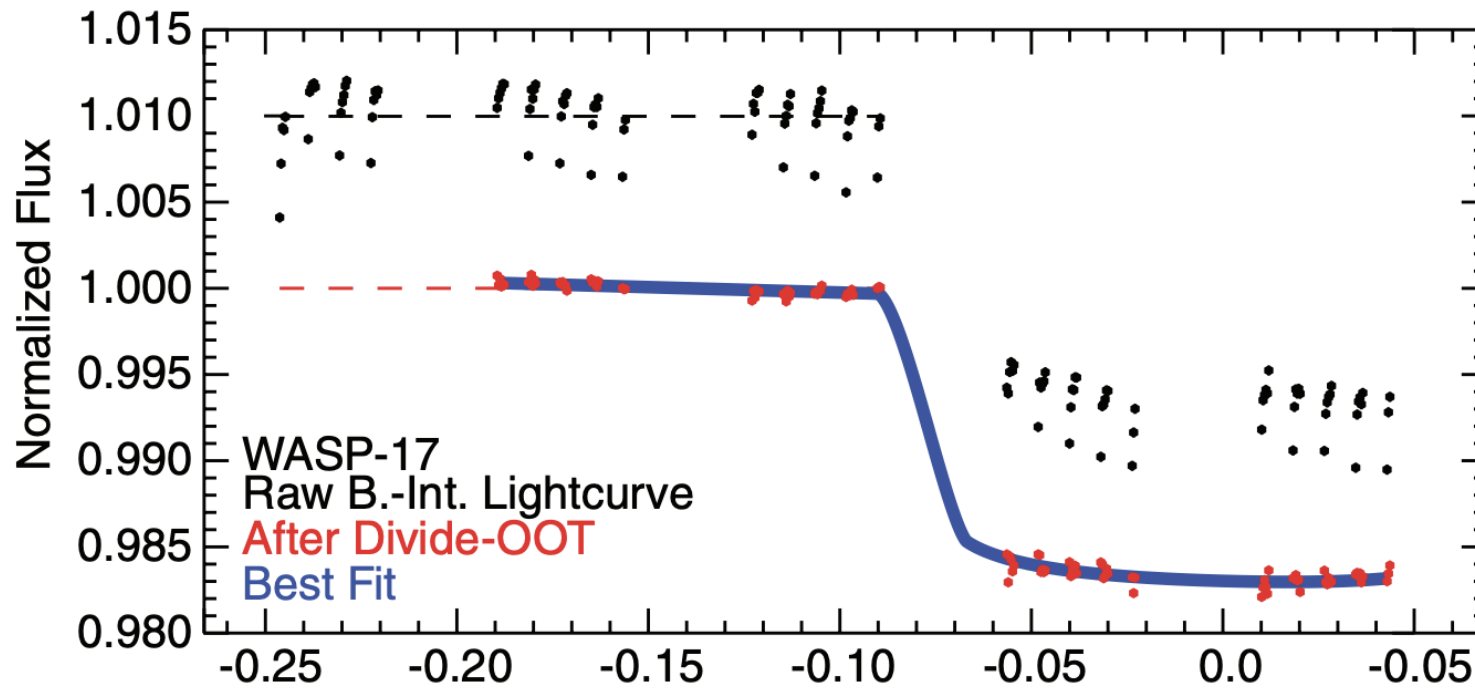
PLANET 2

EPHEMERIDES

TIME



Time-critical



Mandel et al. 2017



WASP-83 b

Hellier et al. 2015:

$$T_0 = 2455928.8853 \pm 0.0004$$

$$P = 4.971252 \pm 0.000015$$

Last observation Feb. 2012

Our observations:

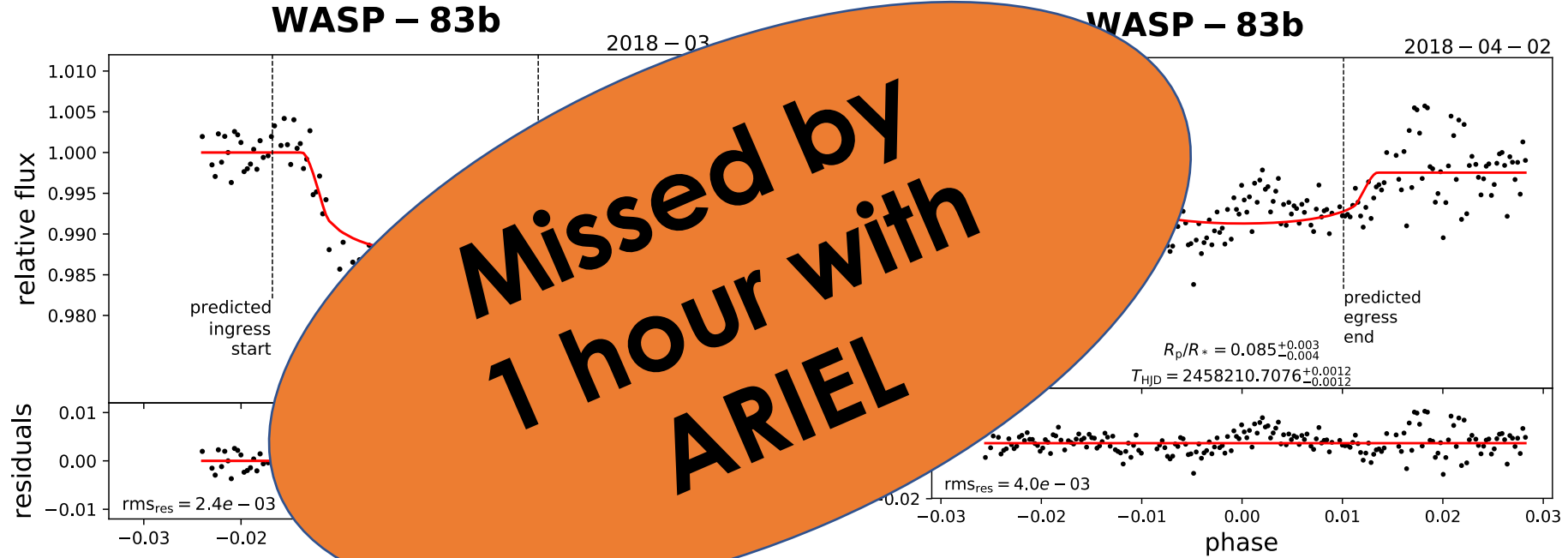
28 / 03 / 2018

02 / 04 / 2018

Expected uncertainty: **± 10 minutes**



WASP-83 b



Confirmed time shift of **24 minutes**



ARIEL – PRO/AM Working Group

Need for ephemeris refinement:

~1 observation per 1-2 year(s) for ~1000 targets!

Every transit is a unique opportunity to contribute to the mission!

This will help us answer fundamental questions about the planets

Observations will be available for more science.



ARIEL – PRO/AM Working Group

Join us!

For more information check the website

And send us an e-mail to exoworlds.spies@gmail.com for the target list (it keeps growing...!!)

