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Geometric albedo of WASP-12 b and WASP-76 b in the CHEOPS and TESS bandpasses *(Corrigendum)*

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This is a corrigendum to Akinsanmi et al. (2024) and Demangeon et al. (2024). The retrieval code used in these works omitted a factor of λ in the integration of the stellar ($\mathcal{F}_\star$) and planetary emission ($\mathcal{F}_{\rm p}$) necessary to obtain the planet-to-star flux ratio ($F_{\rm d}/F_\star$) at each observing band of the atmospheric retrievals (see, for example, Eq. (13) of Akinsanmi et al. 2024). The λ factor is needed because the passband response functions ($\mathcal{T}_{\rm inst}$) are photon counters. The corrected calculation of the thermal planet-to-star flux ratio is

$$\frac{F_{\rm d}}{F_\star} = \left(\frac{R_{\rm p}}{R_\star}\right)^2 \frac{\int \mathcal{F}_{\rm p}(\lambda)\,\mathcal{T}_{\rm inst}(\lambda)\,\lambda\,{\rm d}\lambda}{\int \mathcal{F}_\star(\lambda)\,\mathcal{T}_{\rm inst}(\lambda)\,\lambda\,{\rm d}\lambda}, \quad (1)$$

where $R_{\rm p}$ and $R_\star$ are the planet and star radii.

However, we note that the general analysis, results, and conclusions of the articles are not affected by this error. The omission of the λ factors is only relevant for broad bands and when the emission spectra vary significantly over the bands. This means that in our analyses, only the CHEOPS (CHaracterising ExOPlanet Satellite, Benz et al. 2021) and TESS (Transiting Exoplanet Survey Satellite, Ricker et al. 2015) bands were significantly affected. The revised values, tables, and figures are given below.

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1. WASP-12 b

In Akinsanmi et al. (2024), the atmospheric retrievals only included infrared eclipse observations as constraints (Sect. 5.2.1). Thus, the retrieval results were not affected in a statistically significant manner. We confirmed this by re-running the analysis with the corrected passband calculation.

The thermal contributions inferred from the retrieval to the eclipse depths in the CHEOPS and TESS passbands are revised from 205 ± 10 and 480 ± 19 ppm (Sect. 5.3) to 270 ± 11 and 511 ± 18 ppm, respectively. This led to updated geometric albedos, from $A_{\rm g} = 0.083 \pm 0.015$ and 0.010 ± 0.023 to $A_{\rm g} = 0.042 \pm 0.018$ and -0.010 ± 0.024 in the CHEOPS and TESS bands, respectively. This correction does not alter our general conclusion that WASP-12 b has a low geometric albedo, which is consistent with the low reflectivity observed in other ultra-hot Jupiters.

2. WASP-76 b

Similarly to what was done for WASP-12 b, the atmospheric retrievals of WASP-76 b performed in Demangeon et al. (2024) only included the infrared eclipse observations as constraints (Sect. 5.1.1). The retrieval results were thus not affected in a statistically significant manner. The retrieval-inferred thermal eclipse depths over the CHEOPS and TESS bands have increased

Table 1. WASP-76b's A_g estimates.

Bandpass	Optical species	D1[a]: HST	Datasets D2[b]: HST + *Spitzer*	D3[c]: HST + *Spitzer*
CHEOPS	With TiO/VO	<0.107	0.079 ± 0.014	0.118 ± 0.014
	Without TiO	0.072 ± 0.021	0.079 ± 0.014	0.119 ± 0.014
	Without TiO/VO	0.073 ± 0.021	0.078 ± 0.013	0.119 ± 0.014
TESS	With TiO/VO	<0.13	0.093 ± 0.017	0.172 ± 0.018
	Without TiO	0.082 ± 0.033	0.093 ± 0.018	0.173 ± 0.019
	Without TiO/VO	0.085 ± 0.032	0.092 ± 0.017	0.172 ± 0.018

Notes. Shown values and uncertainties correspond to the posterior distributions' median and 16th-to-84th percentile span, respectively. Upper limits corresponds to the 99.7th percentile of the posterior distribution. [(a)] HST (Hubble Space Telescope) eclipse depths from Edwards et al. (2020). [(b)] HST eclipse depths from Edwards et al. (2020), *Spitzer* eclipse depths from Demangeon et al. (2024). [(c)] HST and *Spitzer* eclipse depths from Fu et al. (2021).

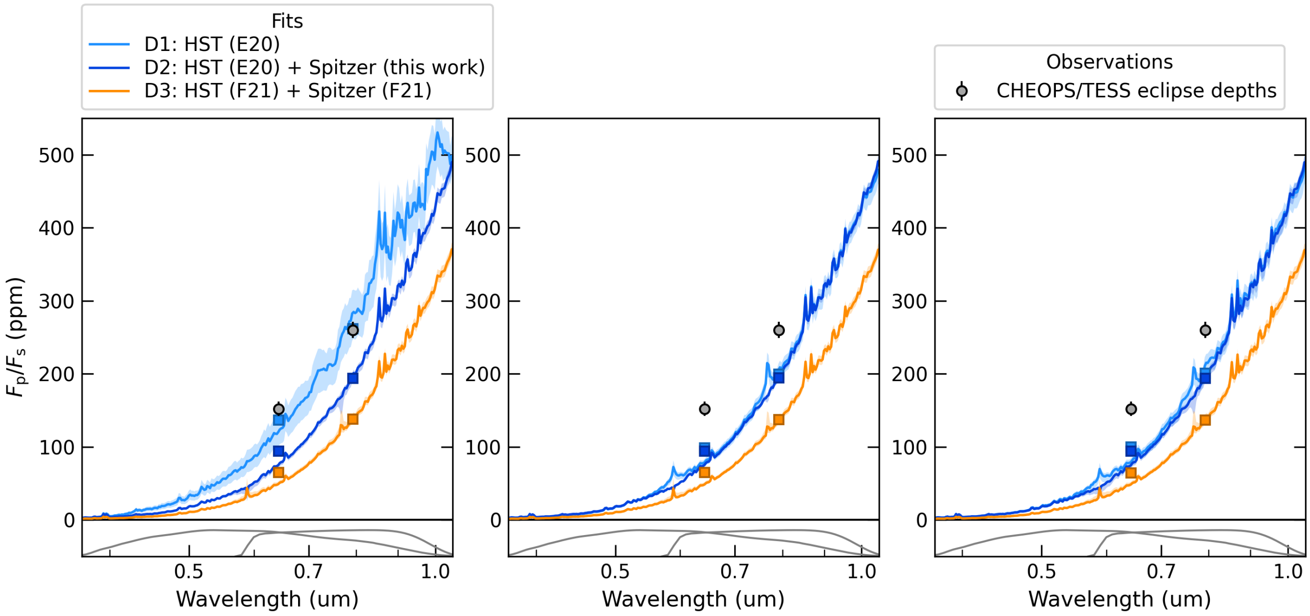

Fig. 1. Corrected reproduction of the insets of Figs. 4 and C1 of Demangeon et al. (2024): WASP-76 b occultation atmospheric retrievals for a model including the TiO and VO optical absorbers (left panel), including only VO (middle), and excluding both TiO and VO (right). The light blue, dark blue, and orange curves and their associated shaded areas show the retrieved spectra and 68% credible intervals when fitting the D1, D2, and D3 occultation observations, respectively (see the legend and notes in Table 1). The grey markers show the CHEOPS and TESS occultation measurements, although the fits are not constrained by these observations. The coloured square markers show the corrected model eclipse-depths integrated over the CHEOPS and TESS bands (see the passband response functions in grey at the bottom of the panels).

from their original values. Figure 1 shows the corrected band-integrated eclipse depths inferred from each retrieval model (correction of the insets in Figs. 4 and C1 of Demangeon et al. 2024). Table 1 shows the corrected geometric albedos (correction of Table 3 of Demangeon et al. 2024). This correction (lower geometric albedo values) does not change the conclusions (Sect. 6.1 of Demangeon et al. 2024), that WASP-76b has a low geometric albedo, consistent with that of other ultra-hot Jupiters. Taking the different composition hypotheses and the different reductions of the infrared datasets into account, we can set a 1-sigma upper limit of 0.13 and 0.19 in the CHEOPS and TESS bandpasses, respectively (correction of the values provided in Table 6).

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