Erratum: The tidal evolution of dark matter substructure – II. The impact of artificial disruption on subhalo mass functions and radial profiles

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The paper ‘The tidal evolution of dark matter substructure – II. The impact of artificial disruption on subhalo mass functions and radial profiles’ was published in Mon. Not. R. Astron. Soc. 503, 4075–4091 (2021). After publication of the paper, we discovered two errors in our analysis code that affect fig. 9 on p. 4086.

The legend in each panel of fig. 9 indicates that subhaloes used to compute each curve lie within a particular bin of the given quantity (e.g. \( m_{\text{acc}}/M_0 \) or \( m/m_{\text{acc}} \)). However, it is actually the case that all subhaloes with a quantity value above the lower bound of the corresponding bin interval are included in the calculation of the curve. We have corrected the legends and associated figure caption to reflect this fact in Fig. 1.

The second error arose due to an incorrect calculation of \( V_{\text{peak}}/V_{\text{vir,h}} \). Note that the impact of this error is isolated to the top middle panel of fig. 9. We have corrected this mistake and updated the figure. The normalized radial profile is nearly independent of \( V_{\text{peak}}/V_{\text{vir,h}} \), which is now consistent with the fact that the profile is also nearly independent of \( m_{\text{acc}}/M_0 \). In the published manuscript, we report that the Spearman coefficient between \( r/r_{\text{vir}} \) and \( V_{\text{peak}}/V_{\text{vir,h}} \) predicted by SatGen disagrees significantly with the Bolshoi simulation result reported by van den Bosch et al. (2016). After correcting the \( V_{\text{peak}}/V_{\text{vir,h}} \) error, we now find excellent agreement between the SatGen and Bolshoi Spearman coefficients (see Fig. 1).

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Figure 1. The subhalo radial profiles for 2000 SatGen trees with $M_0 = 10^{14.2} M_\odot$ at $z = 0$ and $\psi_{\text{res}} = \phi_{\text{res}} = 10^{-5}$. In each panel, the subhaloes are segmented by a different property and the mean $dN/dx_{\text{sub}}$ is computed for each lower bound. In order to assess the amount of bias, we plot the mean density profile of the host in each panel (dotted line). We overplot the mean Bolshoi radial profile of all subhaloes in each panel (black squares). We compute the Spearman coefficient between $r/r_{\text{vir}}$ and each property for all subhaloes ($r_{s, all}$) and the subhaloes that would survive Bolshoi withering and artificial disruption ($r_{s, W + D}$). There is little dependence on $m_{\text{acc}}/M_0$ and $V_{\text{peak}}/V_{\text{vir}, h}$. As evidenced by the $m_{\text{acc}}/M_0$ and $V_{\text{peak}}/V_{\text{vir}, h}$ panels, highly stripped subhaloes follow the host density profile with little bias whereas minimally stripped systems are less commonly found in the halo centre. Similarly, massive, recently accreted subhaloes are biased towards the outer halo whereas the inclusion of older, less massive subhaloes leads to a more unbiased profile. Withering and artificial disruption tend to weaken (or reverse) the Spearman correlation between each property and $r/r_{\text{vir}}$, bringing our $r_{s, W + D}$ into good agreement with Bolshoi ($r_{s, B}$, as computed in van den Bosch et al. 2016).

REFERENCE
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