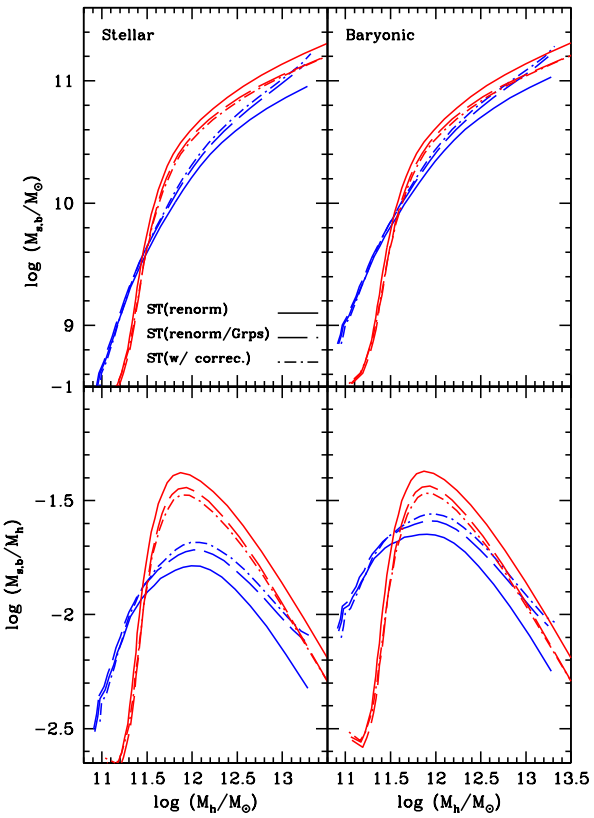

Fig. 6. Left panels: Mean $M_{\rm s}$–$M_{\rm h}$ (top) and $f_{\rm s}$–$M_{\rm h}$ (bottom) relations of central blue (blue lines) and red (red lines) galaxies when (i) no systematical corrections to the corresponding "blue" and "red" *HMF*s were applied apart from re-normalisations in the global abundance (see text, solid lines), (ii) the *HMF*s were corrected by group/cluster abundances and re-normalised (long-dashed lines), and (iii) the *HMF*s were corrected both by group/cluster abundances and late major mergers (as in Figure 4, dot-dashed lines). Right panels: Same as in left panels but for $M_{\rm b}$ instead of $M_{\rm s}$. The color figure can be viewed online.

$M_{\rm h}$ and $f_{\rm s}$–$M_{\rm h}$ relations for the blue and red galaxy sub-samples would be close to the one of the total sample if the corrections made to the *HMF* did not introduce an extra uncertainty. In fact this is not true, in particular for the group/cluster mass function introduced to correct the *HMF* associated to blue galaxies. Unfortunately, the work used for this correction does not report uncertainties. Hence, the uncertainties calculated here for the blue and red samples (shown explicitly in Figure 8 below) could be underestimated, specially at large masses.

In the mass range $11.5 \lesssim \log(M_{\rm h}/M_\odot) \lesssim 13.0$, the $M_{\rm s}$–$M_{\rm h}$ and $f_{\rm s}$–$M_{\rm h}$ relations for central blue (red) galaxies lie slightly below (above) the relations corresponding to the overall sample. For masses below these ranges, the trends invert. The $f_{\rm s}$–$M_{\rm h}$ curves for blue and red sub-samples peak at $\log(M_{\rm h}/M_\odot) = 11.98$ and 11.87, with values of $f_{\rm s} = 0.021^{+0.016}_{-0.009}$ and $f_{\rm s} = 0.034^{+0.026}_{-0.015}$, respectively. The corresponding stellar masses at these peaks are $\log(M_{\rm s}/M_\odot) = 10.30 \pm 0.25$ for blue galaxies and $\log(M_{\rm s}/M_\odot) = 10.40 \pm 0.25$ for red galaxies. These masses are around 0.23 and 0.30 times the characteristic stellar mass $M^\star \approx 10^{10.93}\ M_\odot$ of the overall YMB09 *GSMF*, respectively. The maximum difference between the blue and red mean $M_{\rm s}$–$M_{\rm h}$ relations is attained at $\log(M_{\rm h}/M_\odot) \approx 11.9$; at this mass, the $f_{\rm s}$ value of the former is 1.7 times smaller than the $f_{\rm s}$ of the latter. For larger masses this difference decreases.

At the low-mass end, roughly $f_{\rm s} \propto M_h$ ($\propto M_s^{0.5}$) and $f_{\rm s} \propto M_h^{3.0}$ ($\propto M_s^{0.8}$) for the blue and red samples, respectively, while at the high-mass end, $f_{\rm s} \propto M_h^{-0.4}$ ($\propto M_s^{-0.7}$) and $f_{\rm s} \propto M_h^{-0.6}$ ($\propto M_s^{-1.5}$), respectively.

It is important to note that the differences between blue and red $M_{\rm s}$–$M_{\rm h}$ relations at almost all masses are within the 1σ uncertainty of our inferences. We conclude that the $M_{\rm s}$–$M_{\rm h}$ ($f_{\rm s}$–$M_{\rm h}$) relation does not depend significantly on galaxy color (type). If anything, the mean $f_{\rm s}$–$M_{\rm h}$ relation of red galaxies is narrower and more peaked than the one of blue galaxies. In the mass range where the abundances of blue and red galaxies are closer ($10.0 < \log(M_{\rm s}/M_\odot) < 10.7$), the intrinsic scatter around the $M_{\rm s}$–$M_{\rm h}$ relation would slightly correlate with color in the sense that the redder (bluer) the galaxy, the larger (smaller) its $M_{\rm s}$ for a fixed $M_{\rm h}$, with a maximum average deviation from the mean due to color no larger than ∼0.1 dex. For masses smaller than $M_{\rm s} \approx 10^{9.7}\ M_\odot$, the correlation of the scatter with color would invert.

The (slight) differences between blue and red $M_{\rm s}$–$M_{\rm h}$ ($f_{\rm s}$–$M_{\rm h}$) relations can be understood basically by the differences in the respective cumulative *GSMF*s and, at a minor level, by the differences of the corresponding *HMF*s for each case. The sharp peak in the red $f_{\rm s}$–$M_{\rm h}$ relation is associated to the turn-over at $M_{\rm s} \sim 10^{10.5}\ M_\odot$ in the *GSMF* of red galaxies (see Figure 1).

In order to estimate the influence of the corrections introduced to the *HMF* for blue (red) galaxies, we have redone the analysis using the original distinct (S-T) *HMF* without any correction but renormalised to obtain the same fraction of halos as the fraction implied by the *GSMF* of blue (red) galaxies with respect to the total *GSMF*. The results