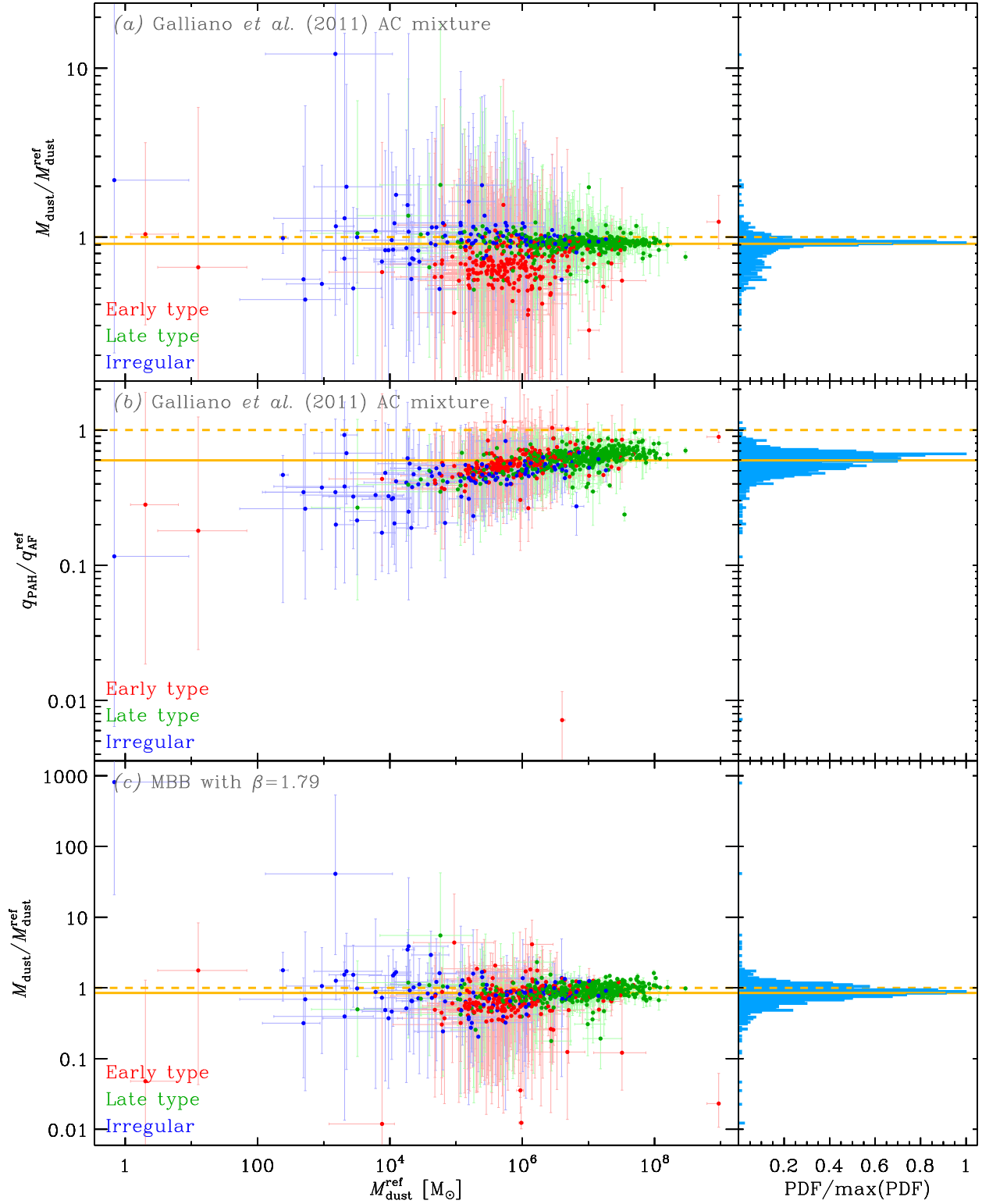




|                                  |                                                                                                                                                                                                                                                                                                          |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Publication Year</b>          | 2021                                                                                                                                                                                                                                                                                                     |
| <b>Acceptance in OA</b>          | 2022-03-29T09:12:25Z                                                                                                                                                                                                                                                                                     |
| <b>Title</b>                     | A nearby galaxy perspective on dust evolution. Scaling relations and constraints on the dust build-up in galaxies with the DustPedia and DGS samples                                                                                                                                                     |
| <b>Authors</b>                   | Galliano, Frédéric, Nersesian, Angelos, BIANCHI, SIMONE, De Looze, Ilse, Roychowdhury, Sambit, Baes, Maarten, CASASOLA, VIVIANA, Cassará, Letizia P., Dobbels, Wouter, Fritz, Jacopo, Galametz, Maud, Jones, Anthony P., Madden, Suzanne C., Mosenkov, Aleksandr, Xilouris, Emmanuel M., Ysard, Nathalie |
| <b>Publisher's version (DOI)</b> | 10.1051/0004-6361/202039701                                                                                                                                                                                                                                                                              |
| <b>Handle</b>                    | <a href="http://hdl.handle.net/20.500.12386/31987">http://hdl.handle.net/20.500.12386/31987</a>                                                                                                                                                                                                          |
| <b>Journal</b>                   | ASTRONOMY & ASTROPHYSICS                                                                                                                                                                                                                                                                                 |
| <b>Volume</b>                    | 649                                                                                                                                                                                                                                                                                                      |



**Fig. 5.** Same as Fig. 4, but this figure shows the influence of various fitting methods.

having a negligible weight in the chi-squared. These SEDs are thus wrongly fit with a very high  $\langle U \rangle$ , and scaled on the mid-IR fluxes, leading to a drastic underestimate of the dust mass.

**Nonhierarchical Bayesian.** We have fit the full sample of Sect. 2 with the physical model of Sect. 3.1, replacing the hyperparameter distribution by a flat prior (cf. Sect. 4.2.3 of G18).

This flat prior is bounded, with limits well beyond the displayed parameter range. This run thus samples the likelihood of each galaxy, independently, but does not benefit from an informative prior, inferred from the whole sample. The result is shown in panel b of Fig. 4. Similarly to the least-squares example above, there is no bias for the well sampled sources ( $M_{\text{dust}}^{\text{ref}} \gtrsim 10^6 M_{\odot}$ ), but there is a significant scatter for sources with  $M_{\text{dust}}^{\text{ref}} \lesssim 10^6 M_{\odot}$ .