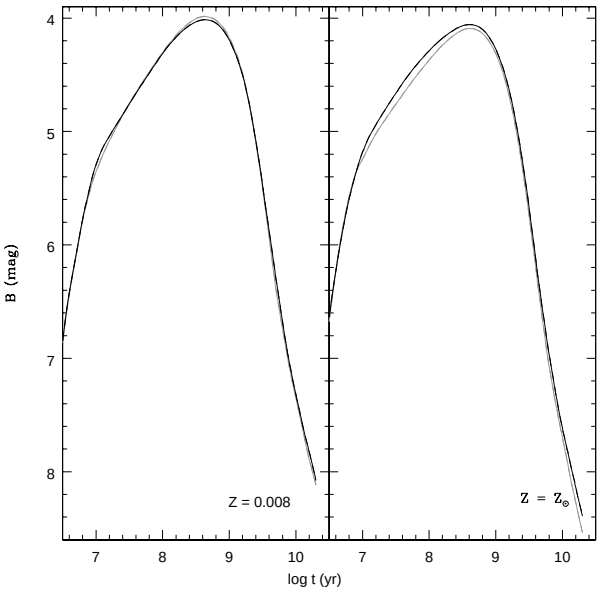

Fig. 3. Behavior of the absolute B magnitude for various models for $Z = 0.008$ (left frame) and $Z_{\odot}$ (right frame). The black solid line corresponds to a CB11 model which includes the effects of mass loss on the spectral distribution of TP-AGB stars. The black dashed line corresponds to the same model, but ignoring the effects of mass loss on the spectral distribution of TP-AGB stars (see text). The gray solid line corresponds to the BC03 model and the gray dashed line to the CB07 model. To build these models I have assumed the Chabrier (2003) IMF and an exponentially decaying star formation rate with $\tau = 1$ Gyr.

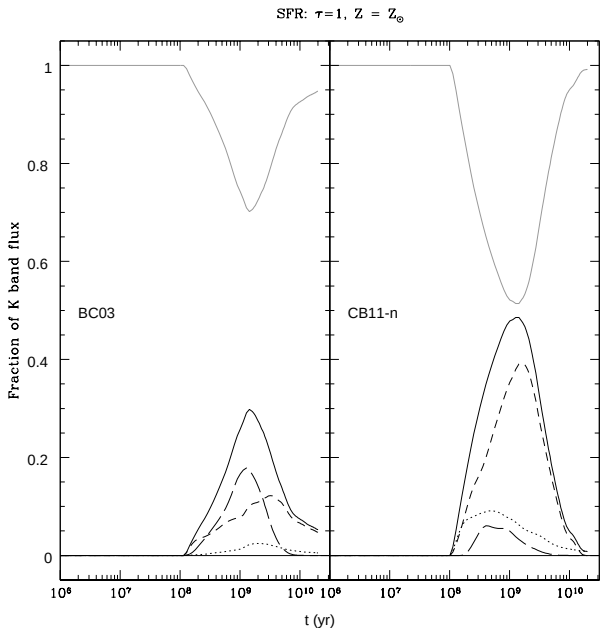

Fig. 4. Fraction of light contributed by TP-AGB stars and the "rest" of the stars (gray line) in the K-band as a function of time for the BC03 and the CB11 models. The contribution of all, the O-rich, the C-rich, and the Super Wind (SW) phase TP-AGB stars is shown as black solid, short dashed, long dashed, and dotted lines, respectively. To build these models I have assumed the Chabrier (2003) IMF, an exponentially decaying star formation rate with $\tau = 1$ Gyr, and $Z = Z_{\odot}$.

stars is followed according to the prescription of Girardi et al. (2010, private communication). This semi-empirical prescription includes several important theoretical improvements over previous calculations, and it has been calibrated using carbon star luminosity functions in the Magellanic Clouds and TP-AGB lifetimes (star counts) in Magellanic Cloud clusters. While the tracks used in CB11 account for 15 evolutionary stages in the TP-AGB (six in the O-rich phase, six in the C-rich phase, and three in the super wind phase), the BC03 models include only 1 evolutionary stage at each of these phases. The resulting CB11 isochrones are thus based on internally consistent sets of tracks, which naturally obey the fuel consumption theorem, and provide other quantities necessary for a consistent modeling of galaxies, such as chemical yields and remnant masses (Marigo et al. 2008).

The spectral energy distributions used by CB11 for the TP-AGB stars include emission from the dusty envelopes surrounding these stars undergoing mass loss. See González-Lópezlira et al. (2010) for details on the calculation of the stellar models.

In what follows I show some results from the CB11 models. All the models shown in this paper were computed for the Chabrier (2003) IMF, and an exponentially decaying star formation rate with e-folding time $\tau = 1$ Gyr.

Figures 1 to 3 show the galaxy luminosity in the K, $IRAC{-}3.5\mu$m, and B bands as a function of time for the $Z = 0.008$ and $Z_{\odot}$ BC03, CB07, and CB11 models. For the latter, the effect of including or not the emission of the dusty envelopes is shown. In the IR bands the CB07 and CB11 models are considerably brighter than the BC03 models because of the improved treatment of TP-AGB stars in the more recent models compared to BC03. This brightening overcomes the effect of the dusty envelopes.

Figures 4 and 5 show the fraction of light contributed by TP-AGB stars and the "rest" of the stars (i.e., everything else) in the K band as a function of time for the BC03 and CB11 models, with $Z = 0.008$ and $Z_{\odot}$, respectively. The CB11 models include the emission from the dusty envelopes of the TP-AGB