in this figure we present some of the most popular Y, C, and O protosolar abundances published in the last 21 years. These photospheric solar abundances were obtained by Anders & Grevesse (1989), Grevesse & Noels (1993), Grevesse & Sauval (1998), Lodders (2003), Asplund, Grevesse, & Sauval (2005), and Lodders, Palme, & Gail (2009); these abundances were compiled by Asplund et al. (2009) in their Table 4. To obtain the protosolar abundances of the heavy elements, the photospheric abundances were increased by 0.04 dex, which takes into account the effect of gravitational settling. We used the protosolar X values shown in Table 4 by Asplund et al. (2009) to change the abundances by number to abundances by mass.

From Figure 3 it can be noted that: (a) the HWY model fits very well the Y and O protosolar values, while the predicted C is about 1σ higher than observed. (b) The LWY model matches the Y and O protosolar values within 1σ, but the predicted C is about 2σ lower than observed. (c) The solar abundances predicted by our models are in much better agreement with the recent He, C, and O protosolar values determined by Asplund et al. (2009) than with the previous ones compiled by them. (d) The He protosolar abundance determinations have remained almost constant over the years, while the C and O ones have decreased.

4.2. ΔY *vs* ΔO *evolution compared with M17 and young B stars of the solar vicinity*

In Figure 4 we present the evolution of ΔY versus ΔO. The models presented in this figure for r equal to 6.75, 8, and 17 kpc correspond to the 0 to 13 Gyr range. The data should be compared with the end point of the evolution of the corresponding evolutionary track. In Figures 4, 5 and 7 the evolutionary tracks and the related observational data have the same color.

Since there are no good abundance determinations for the outer parts of the Galactic disk, we test our models with data of irregular galaxies. Therefore, in Figure 4 we show the ΔY and ΔO values of the metal poor extragalactic H II regions determined by Peimbert et al. (2007). Specifically, we compare our 17 kpc track with NGC 2366, because it contains one of the brightest H II regions of nearby galaxies. The gaseous O abundances of the metal poor H II regions were increased by 0.10 dex to include the fraction of O atoms embedded in dust grains inside the H II regions (Peimbert & Peimbert 2010). From that figure it can be noticed that the predicted chemical evolution of the Galaxy for large Galactocentric radii ($r > 17$ kpc) at $t = 13$ Gyr behaves like that of irregular galaxies at the present time.

In Figure 4 we also present the abundances of B stars of the solar vicinity derived by Przybilla et al. (2008). We have adopted the Orion X value shown in Carigi, Colín, & Peimbert (2006) for converting Xi/H (the abundance ratio by number of any i element) of B stars to Xi by mass. The ΔY abundance derived from B stars is in good agreement with the HWY and LWY models for $r = 8$ kpc. On the other hand, the ΔO value is about 1.5σ and about 4.5σ smaller than the values predicted by the HWY and LWY models, respectively. The O/H values derived by Simón-Díaz (2010) for the B stars of the Orion star forming region are in good agreement with the Przybilla et al. (2008) determinations.

We decided to include as observational constraints the O and He abundances of the H II region M17. This object has the best He abundance determination available because its degree of ionization is very high and the correction for neutral helium, which is always indirect, is the smallest one of the well observed Galactic H II regions (see Paper I). We show in Figure 4 two sets of ΔO values, one derived from O recombination lines, and the other derived from the O forbidden lines under the assumption that $t^2 = 0.00$.

The point with the highest ΔY and ΔO values of the HWY model at 6.75 kpc presented in Figure 4 (the point at $t = 13$ Gyr) should be compared with the two M17 values. The ΔY model value is in good agreement with the two M17 values. The ΔO value for $t^2 = 0.00$ is more than 5σ smaller than the model prediction, while the $t^2 \neq 0.00$ point is less than 2σ higher than the ΔO model prediction. For the LWY model the predicted ΔY value is in good agreement with the two M17 values; but the ΔO value of the $t^2 = 0.00$ point is 12σ smaller than the model prediction, while the ΔO value of the $t^2 \neq 0.00$ point is less than 2σ smaller than the model prediction. Based on this comparison we conclude that it is possible to get an excellent agreement with the $t^2 \neq 0.00$ ΔO value using a model with yields intermediate between the HWY and the LWY models, but that it is not possible to find a reasonable model to fit the ΔO value derived assuming $t^2 = 0.00$.

Since the HWY and the LWY models fit the protosolar values and produce a reasonable fit to the observed M17 ΔO and ΔY values, we conclude that the protosolar values in the context of Galactic chemical evolution provide a strong consistency check to the O recombination abundances derived from H II regions, and are in disagreement with the O abun-