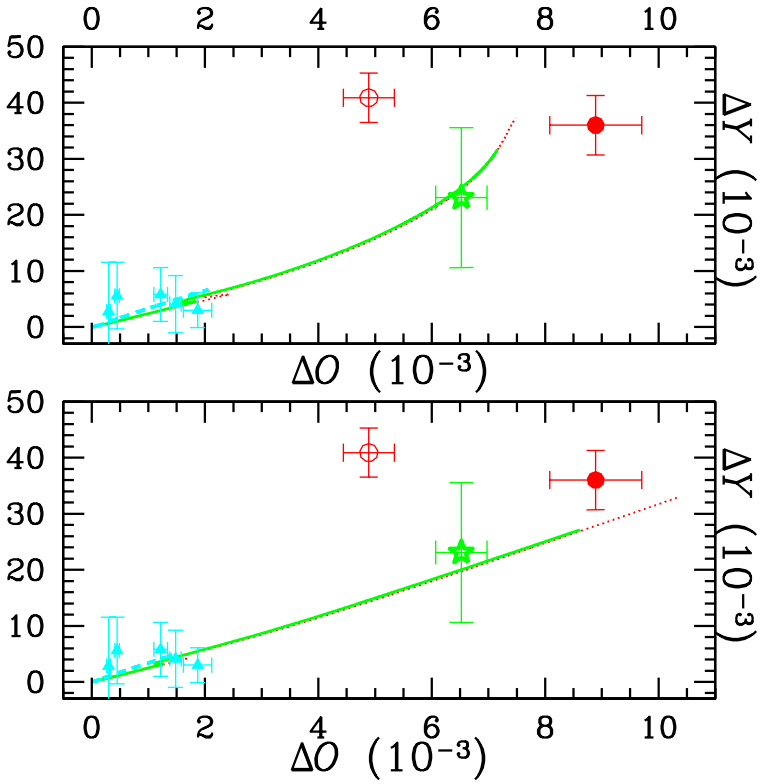

Fig. 4. Evolution of ΔY vs ΔO. The HWY model is shown in the upper panel and the LWY model in the lower panel. Chemical evolution tracks from 0 ($\Delta Y = \Delta O = 0$) to 13 Gyr (present time) for $r = 6.75$, 8, and 17 kpc (dotted-red, solid-green, and dashed-cyan lines, respectively). The three tracks in each panel partially overlap, from top to back they lie as follows: 17 kpc, 8 kpc, and 6.75 kpc. The values for the H II regions and the B stars correspond to 13 Gyr. The M17 H II region at $r = 6.75$ kpc is represented by a filled circle for $t^2 = 0.036$ (RL) and by an open circle for $t^2 = 0.00$ (FL). The solar vicinity B stars value by Przybilla et al. (2008) is represented by a star. The extragalactic low metallicity H II regions are represented by filled triangles for $t^2 \neq 0.00$ (FL) (Peimbert et al. 2007). A $Y_p = 0.2477$ is adopted (Peimbert et al. 2007). The color figure can be viewed online.

dances derived from forbidden lines under the assumption that $t^2 = 0.00$. Additional support for this result is provided by Simón-Díaz & Stasińska (2011) who, based on a study of 13 B-type stars of the Orion star forming region OB1, find that the stellar O/H abundances agree much better with the Orion H II region abundance derived from recombination lines than with that derived from collisionally excited lines.

4.3. *ΔC vs ΔO evolution compared with H II regions, and young B, F, and G stars of the solar vicinity*

In what follows we will discuss the ΔC and ΔO observational values adopted from the literature and we will compare them with the HWY and LWY model predictions. In Figure 5 we show the 0–13 Gyr evolution of the ΔC-ΔO relation for $r = 7$, 8, and 17 kpc.

The O/H ratio of the LWY model for $r = 17$ kpc and $t = 13$ Gyr corresponds to the O/H value of NGC 2363, the extragalactic metal-poor H II region best suited for our purpose. This model is in good agreement with the C/O observed ratio. Similarly the O/H ratio of the HWY model for $r = 17$ kpc and $t = 13$ Gyr corresponds to the O/H value of NGC 2363. This model is also in good agreement with the C/O observed ratio. The ΔO gas and dust values for NGC 2363 are those presented in Figure 4, while the ΔC value includes gas (Esteban et al. 2009) and dust components. We have considered the Y and O/Z values from Peimbert et al. (2007) to calculate X for NGC 2363 and to change the abundances by number to abundances by mass.

For $r \sim 8$ kpc and $t = 13$ Gyr there are several reliable C and O abundance determinations for the solar vicinity. To compare our models with observations we chose: (a) the average C/H and O/H values