Open clusters as key tracers of Galactic chemical evolution: Oxygen abundances

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We present an analysis of high-resolution spectra of giant and clump stars in 13 open clusters obtainded with ESO and SARG telescopes. This paper investigates the peculiar behavior of forbidden [OI] feature and a possible deep-mixing mechanisms in these evolved stars. We analyzed oxygen abundance derived from the forbidden [OI] 6300$\dot{A}$ line for a sample of 84 stars of several ages and metallicities. These abundances offer a unique possibility to establish the evolutionary stage of the objects, specially for those stars embrace misclassification from the evolutionary tracks, from turn-off to clump stars. For this forbidden line, we have spectra of high S/N varying from 25 to 180 and resolution (R$\sim$40,000). This has enabled a very accurate modeling of the oxygen line and the blending Ni lines. We also analyzed a possible similarity between our sample and bulge and disk stars. This relationship could offer an indicative on the Galatic nucleosynthetic history. We have used high resolution spectra collected with UVES+FLAMES at VLT/UT2 and SARG at TNG instruments. The stellar parameters were determined using an LTE analysis based on equivalent widths (EWs) of iron lines and by imposing excitation and ionization equilibrium. Oxygen abundances were performed using MOOG and Kuruck model atmospheres. We assumed a solar distance from the Galatic centre of 8 kpc. The majority of our stars are outer Galatic disk, except for NGC 6253 and Cr 261. We confirm the lack of correlation between abundance rate and age, as well as, for Galactocentric distance. We show that, on average trends, [O/Fe] clearly decreases with [Fe/H] for all clusters, except for NGC 6253 cluster, because of three hottest stars $\sim$6000K, with significantly negative slopes in all the linear fits.