The Gaia-ESO Survey: Galactic evolution of sulphur and zinc

Abstract

Context. Due to their volatile nature, when sulphur and zinc are observed in external galaxies, their determined abundances represent the gas-phase abundances in the interstellar medium. This implies that they can be used as tracers of the chemical enrichment of matter in the Universe at high redshift. Comparable observations in stars are more difficult and, until recently, plagued by small number statistics. Aims. We wish to exploit the Gaia-ESO Survey (GES) data to study the behaviour of sulphur and zinc abundances of a large number of Galactic stars, in a homogeneous way. Methods. By using the UVES spectra of the GES sample, we are able to assemble a sample of 1301 Galactic stars, including stars in open and globular clusters in which both sulphur and zinc were measured. Results. We confirm the results from the literature that sulphur behaves as an α-element. We find a large scatter in [Zn.Fe] ratios among giant stars around solar metallicity. The lower ratios are observed in giant stars at Galactocentric distances less than 7.5 kpc. No such effect is observed among dwarf stars, since they do not extend to that radius. Conclusions. Given the sample selection, giants and dwarfs are observed at different Galactic locations, and it is plausible, and compatible with simple calculations, that Zn-poor giants trace a younger population more polluted by SN Ia yields. It is necessary to extend observations in order to observe both giants and dwarfs at the same Galactic location. Further theoretical work on the evolution of zinc is also necessary.

Keywords

Galaxy abundances, Galaxy evolution, Galaxy disk, Stars abundances, Open clusters and associations general, Globular clusters general.