Mixed results have been obtained in the past decades on the chemical evolution of the intracluster medium [1,2,3,4]. One reason is that the spatial distribution of metals (among which iron is the most prominent and observable up to high z in the X-ray band), which may significantly affect the measurement of average metallicity, is not fully investigated. To solve this problem, we make the first attempt to dissect the iron abundance profiles into two components, a central peak and a large-scale plateau, and explore their evolution separately. Our results are consistent with the early-enrichment picture that most of the iron in the ICM is produced at early epochs [5], and present little evolution from redshift 1 to 0. On the other hand, we find a weak evolutionary signal in the more recently formed central iron peak, which only contributes a few percent to the total iron mass. We also show that the apparent factor of 2 evolution from z=1 to z=0 previously observed is a complex result of the use of emission weighted values coupled with some weak evolutionary signal in the more recently formed central iron peak.

We identify two components in the iron distribution in most of the clusters in our sample, including an iron peak in the center, and an approximately constant plateau across the entire cluster. Our results suggest that the majority of iron mass in the ICM of massive galaxy clusters is produced at epochs earlier than z=1, probably during the star formation peak at z∼2. On the other hand, the iron peak component, despite contributing a minority fraction in the total iron mass, shows a low significance decrease with redshift and an extremely large intrinsic scatter. In general, our results confirm the early-enrichment scenario suggested by recent works [4,5], and suggest that the evolution from z=1 to z=0 previously observed [1,2] is partially due to the use of emission weighted values and some evolution in the iron peak. Due to the incompleteness of our sample, we cannot make further definitive conclusions on the evolution of iron. We will eventually extend this study with two-component modelization to complete samples.