TIMESCALES FOR GALAXY FORMATION AND INTRA-CLUSTER MEDIUM ENRICHMENT

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Recent observations with ASCA (Mushotzky 94, New Horizon of X-Ray Astron.-1st Results from ASCA) have confirmed the prediction (Arnaud et *al.* 92, A&A 254, 49; Elbaz et *al.* 95, to appear in A&A) that the Fe present in the intra-cluster medium (ICM) is mainly due to SNII and not SNIa: α-elements (O, Ne, Si, S) are overabundant with respect to Fe. To account for the large Fe mass present in galaxy clusters as well as these abundances ratios, one must consider that the IMF was different in the past, favouring high-mass stars. Moreover, the simplest way to eject the enriched ISM into the ICM is to consider that the same high-mass stars that were responsible for the Fe enrichment have also driven a galactic wind in young E/SO's.

Fe is nearly equally distributed between the galaxies and the ICM (Renzini 93, ApJ 419, 52) so galaxies must have ejected about half of their mass to enrich enough the ICM. A simple galactic wind model, where the wind happens when the thermal energy of the ISM is larger than its binding energy, shows that the starburst must extend at the scale of the whole galaxy in order to eject half of a galaxy mass with a large enough metallicity.

The timescale for such starbursts is typically a few 10^7 years, while the typical size of an L_* galaxy is of the order of 10 kpc. Hence, star formation should propagate at a speed of a few 100 km/s to account for such galactic starbursts, while nearby star forming regions show typical speeds close to 10 km/s, although in much different physical conditions (Elmegreen 92, in Star formation in stellar systems). Hence, the only way in such scenarii to avoid invoking extreme conditions would be that E/SO's result from the merging of dwarf galaxies of 10^9 $M_\odot$ which would have experienced a strong galactic starburst favouring high-mass stars, ejected this gas due to the low binding energy and merged afterwards. While the origin of a galactic starburst is difficult to understand for a whole L_* galaxy, it may be linked to galaxy interactions in the dwarf scenario.