GCE AND SOLAR S-PROCESS ABUNDANCES: DEPENDENCE ON THE ^{13}C-POCKET STRUCTURE

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We study the s-process abundances (A>90) at the epoch of the formation of the solar-system as the outcome of nucleosynthesis occurring in AGB stars of various initial masses and metallicities. AGB yields are computed with an updated neutron capture network and updated initial solar abundances. We use a Galactic Chemical Evolution (GCE) code based on [1], slightly modified accounting for the new determination of the age of the Universe (13.8 Gyr [3]) and solar abundances by [4].

At present, one of the most problematic issues of AGB stellar models is the formation of the ^{13}C-pocket, where the major neutron source of the s-process (the $^{13}C(\alpha, n)^{16}O$ reaction) burns radiatively. Indeed, the internal structure of the ^{13}C-pocket may depend on the stellar characteristic (e.g., AGB initial mass and metallicity), and on the interplay between physical mechanisms that may compete in the star itself (e.g., rotation, magnetic fields, gravity waves [5,6,7,8,9]).

Because of the present uncertainties, we adopt in our AGB models a free parametrization of the ^{13}C-pocket as has been done by [1]: this approximation allow us to investigate the impact of different internal structures of the ^{13}C-pocket on the GCE s-distribution [10]. We discuss our results in the light of the most recent studies.We follow the chemical evolution of several elements (e.g., α, Zr, Ba, Eu) along the stellar age and metallicity, comparing our results with the most update spectroscopic observations (e.g., [11,12]).

[1] Travaglio, C., et al. 2004, A&A, 425, 1029.
[3] Bennett, C. L., et al.2013, ApJS, 208, 20.
[4] Lodders, K., Palme, H., & Gail, H.-P. 2009, Landolt-Boernstein - Group VI Astronomy and Astrophysics Numerical Data and Functional Relationships in Science and Technology, Edited by J.E. Truemper, 4B: solar system, 4.4 .
[5] Herwig, F. 2005, ARAA, 43, 435.
[6] Straniero, O., Gallino, R., & Cristallo, S. 2006, Nucl. Phys. A, 777, 311.
[7] Cristallo, S., et al. 2011, ApJS, 197, 17.
[8] Busso, M., et al. 2012, 12th Symposium on Nuclei in the Cosmos, August 5 - 12, Cairns, Australia, 20.
[9] Piersanti, L., Cristallo, S., & Straniero, O. 2013, ApJ, 774, 98.
[10] Bisterzo, S., et al. 2014, ApJ, in press (arXiv: 1403.1764B).
[11] Mishenina, T. V., et al. 2013, A&A, 552, 128
[12] Yong, D., et al. 2013, ApJ, 762, 26