SUPERNOVA-PRODUCED ^{26}Al AND ^{60}Fe IN DEEP-SEA SEDIMENTS FROM THE INDIAN OCEAN

Jenny Feige[1], Anton Wallner[2], L. Keith Fifield[2], Silke Merchel[3], Georg Rugel[3], Peter Steier[1], Steve Tims[2], Stephan R. Winkler[1], Robin Golser[1]

[1] *University of Vienna, Faculty of Physics, Vienna, Austria*
[2] *Australian National University, Department of Nuclear Physics, Canberra, Australia*
[3] *Helmholtz-Zentrum Dresden-Rossendorf (HZDR), Germany*

The long-lived radionuclides ^{26}Al ($t_{1/2}$ = 0.72 Myr) and ^{60}Fe ($t_{1/2}$ = 2.6 Myr) are generated in massive stars and ejected into space by stellar winds and explosions. If a star ends its life in a supernova (SN) explosion close to the solar system, a fraction of these elements might be deposited in terrestrial archives. Recent analysis of a ferromanganese crust [1,2] evidences an ^{60}Fe concentration enhancement ~2-3 Myr ago. This radionuclide does not have terrestrial sources and is suggested to originate from one or more SNe [1].

Depth profiles with ~100 individual samples from deep-sea sediment cores (Indian Ocean) are studied to obtain a detailed data set of ^{26}Al and ^{60}Fe concentrations within the time period of the ^{60}Fe signal in the crust. The targets were measured using accelerator mass spectrometry [3]. In contrast to our ^{60}Fe data, which shows a clear signal without terrestrial background, a possible ^{26}Al signal from a SN event is hidden within a non-negligible terrestrial background production [4]. The major source of ^{26}Al is spallogenic production by cosmic-rays in the Earth's atmosphere.

This first full history of precise ^{26}Al and ^{60}Fe data over a time period of 2 Myr for two sediment cores is compared to theoretical estimations of a SN-produced radionuclide deposition on Earth considering different nucleosynthesis models and SN signal widths.

[1] Knie et al., PRL 93 (2004)
[2] Fitoussi et al., PRL 101 (2008)
[3] Wallner er al., this conf.
[4] Feige et al., EPJWC, 63 (2013)