Evidence for Recent Interstellar ^{60}Fe on Earth

D. Koll[1,2], T. Faestermann[2], J. Feige[1,3], L.K. Fifield[1], M.B. Froehlich[1], M.A.C. Hotchkis[4], G. Korschinek[2], S. Merchel[5], S. Panjkov[1], S. Pavetich[1], S.G. Tims[1] and A. Wallner[1]

[1] *Department of Nuclear Physics, The Australian National University, Canberra, Australia*
[2] *Physics Department, Technical University of Munich, Garching, Germany*
[3] *Zentrum für Astronomie und Astrophysik, TU Berlin, Berlin, Germany*
[4] *Australian Nuclear Science and Technology Organisation, Sydney, Germany*
[5] *Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany*

Over the last 20 years the long-lived radionuclide ^{60}Fe with a half-life of 2.6 Myr was shown to be an expedient astrophysical tracer to detect freshly synthesized stardust on Earth.
The unprecedented sensitivity of Accelerator Mass Spectrometry for ^{60}Fe at The Australian National University (ANU) and Technical University of Munich (TUM) allowed us to detect minute amounts of ^{60}Fe in deep-sea crusts, nodules, sediments and on the Moon [1-5]. These signals, around 2-3 Myr and 6.5-9 Myr before present, were interpreted as a signature from nearby Supernovae which synthesized and ejected ^{60}Fe into the local interstellar medium.

Triggered by these findings, ANU and TUM independently analyzed recent surface material for ^{60}Fe, deep-sea sediments and for the first time Antarctic snow, respectively [6, 7].
We find in both terrestrial archives corresponding amounts of recent ^{60}Fe.
We will present these discoveries, evaluate the origin of this recent influx and bring it into line with previously reported ancient ^{60}Fe findings.

[1] K. Knie et. al. “Indication for supernova produced ^{60}Fe activity on Earth”
Phys. Rev. Lett. 83 (1999) 18.
[2] K. Knie et. al. “^{60}Fe anomaly in a deep-sea manganese crust and implications for a nearby supernova source”
Phys. Rev. Lett. 93 (2004) 171103.
[3] P. Ludwig et. al. “Time-resolved 2-million-year-old super-nova activity discovered in Earth's microfossil record”,
PNAS 113 (2016) 9232.
[4] A. Wallner et. al. “Recent near-Earth supernovae probed by global deposition of interstellar radioactive ^{60}Fe”
Nature 532 (2016) 69.
[5] L. Fimiani et. al. “Interstellar ^{60}Fe on the surface of the Moon”
Phys. Rev. Lett. 116 (2016) 151104.
[6] D. Koll et. al. “Interstellar ^{60}Fe in Antarctica”
Phys. Rev. Lett., submitted
[7] A. Wallner et al. in preparation