

# THE SEARCH FOR SUPERNOVA-PRODUCED RADIONUCLIDES IN DEEP-SEA SEDIMENT SAMPLES WITH AMS

Jenny Feige<sup>1</sup> A. Wallner<sup>2</sup> S.R. Winkler<sup>1</sup> S. Merchel<sup>3</sup>  
L.K. Fifield<sup>2</sup> G. Korschinek<sup>4</sup> G. Rugel<sup>3</sup>

<sup>1</sup>University of Vienna

<sup>2</sup>ANU Canberra

<sup>3</sup>HZDR Dresden

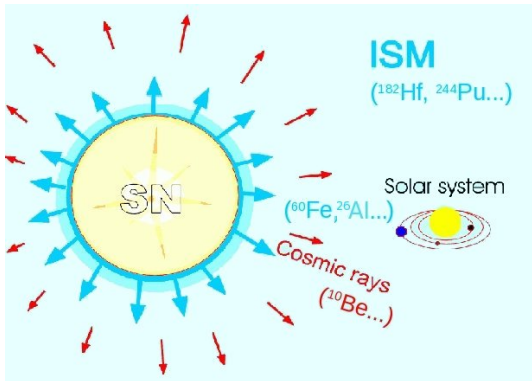
<sup>4</sup>TU Munich

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# SN-PRODUCED RADIONUCLIDES ON EARTH

Supernova Explosion ~2 million years ago in the solar vicinity

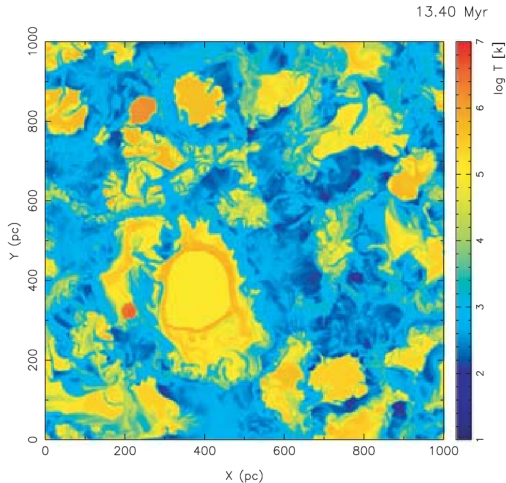
- Heavy nuclides are ejected and entrained in the SN shell
- SN explosion in the solar vicinity
- SN envelope will hit the Earth
- Traces are left in terrestrial archives
- Are we able to detect those traces?



Courtesy of TU Munich

# THE LOCAL BUBBLE

- Cavity of thin hot gas
- Emits soft X-Rays
- Deficient of HI
- About 14 Myr old
- Caused by multiple Supernova Explosions
- Extension:
  - 200 pc into the Galactic Plane
  - 600 pc perpendicular to it



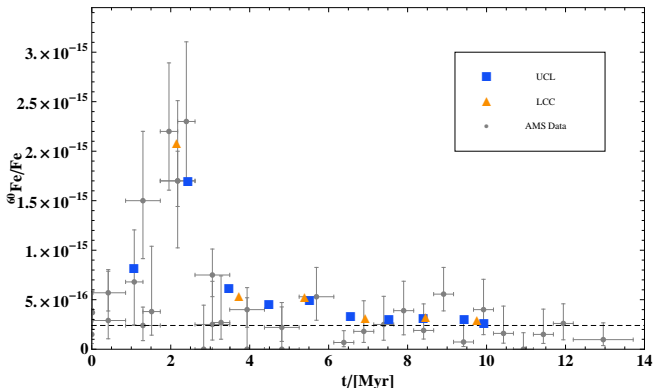
Simulation of the Local ISM by D. Breitschwerdt and M. de Avillez, 2006.

# SN-PRODUCED RADIONUCLIDES ON EARTH

An enhanced concentration of  $^{60}\text{Fe}$  was measured with AMS in the Pacific ferromanganese crust from a depth of 4830 m.

Analytical calculations to estimate how much  $^{60}\text{Fe}$  arrives on Earth:

- Input: explosion times, yields, expansion time, distance,...
- Did not one but multiple SN explosions produce the  $^{60}\text{Fe}$  distribution?



The computed data (Breitschwerdt, Feige et al., in prep.) plotted with the  $^{60}\text{Fe}$  AMS measurements from Knie et al. (2004) and Fitoussi et al. (2008).



# SN-PRODUCED RADIONUCLIDES IN DEEP-SEA SEDIMENTS

## Two sediment cores from the Indian Ocean

- SN isotopes of interest  $^{26}\text{Al}$ ,  $^{53}\text{Mn}$ ,  $^{60}\text{Fe}$  and  $^{244}\text{Pu}$
- $^{10}\text{Be}$  for dating purposes



E49-53



E45-21

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