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Paper  
Title:

**The Vienna Environmental Research Accelerator**

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A better understanding of the environment should enable man to form his future more properly. Long-lived radio nuclides, both naturally produced and man-made, provide a means to study a large variety of processes in seven major domains of our environment: the atmosphere, where the chemistry, transport, origin of trace gases as well as the transport and origin of biomass burning aerosols are of interest; the biosphere, where radiocarbon dating helps in archeology, and where in-vivo tracer studies in plants, animals and humans are possible; the hydrosphere, where dating of ground water and the knowledge of its flow path are of great interest; the cryosphere, where dating of icecores provides a paleoclimatic record; the lithosphere, where exposure dating allows for erosion studies, geomorphological and paleoclimatic studies; the cosmosphere, where the galactic cosmic-ray record helps to understand the production of isotopes on earth, and the technosphere, where places for nuclear waste disposal are needed. The information is often stored in minute ratios of long-lived to stable isotopes ( $10^{-12}$  to  $10^{-15}$ ). Sometimes, the sample material available is very small (several milligrams) or it is very expensive to get. In addition high accuracy is often needed (below 0.5 percent). All of these requirements can be met by Accelerator Mass Spectrometry (AMS), which, in the last twenty years, developed into an universal tool for measurements in the environment.

In 1993 the Austrian Ministry of Science and Research decided to finance the dedicated AMS facility VERA (Vienna Environmental Research Accelerator), which went into operation in 1996 [1]. It is on the way to become available as a full AMS research facility at both national and international level. VERA is based on a 3-MV tandem accelerator and is, in principle, capable of accelerating and transporting ions up to the heaviest elements. It is thus possible to perform AMS experiments with any radionuclide or stable nuclide of the entire nuclide chart. Up to now several different experiments using Carbon-14 have been performed, some of them with direct relevance to the theme of the conference (e.g.  $^{14}\text{C}/^{12}\text{C}$  ratios in aerosols), and measurements with Aluminum-26 (e.g. cross section data for fusion reactor technology). Currently, tests for AMS measurements using Beryllium-10 (useful for paleoclimatic studies) are carried out. We also started an investigation on the  $^{14}\text{CO}$  concentration in the atmosphere which can be used as a means to study the global OH radical distribution. We present an overall description of VERA and its capabilities.

[1] W. Kutschera et al., VERA: A new AMS facility in Vienna. *Nucl. Instr. and Meth. B* 123 (1997), 47 - 50

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