

AIN'T NO MOUNTAIN HIGH ENOUGH

With Everest Base Camp in his sights, Bob Kerr, needed the Kromek GR1 Detector to measure the background radiation at various altitudes.

Summary

An unnoticeable addition to this adventurer's climbing gear, the lightweight GR1 was carried all the way up to the Everest Base Camp, taking measurements of cosmic radiation doses along the way. By simply plugging the GR1 into the USB connection of a small PC, spectral analysis could be completed on the go, with no extra power supply needed. Operational at altitudes up to 5,200m and 30,000ft above Kathmandu inside a pressurized aircraft, the GR1 successfully captured the spectral data needed to shed some light on the radiation exposure of workers at altitude.

Detecting Cosmic Radiation on the way to Everest Base Camp!

When Bob Kerr set off on his expedition to Everest Base Camp (North Base Camp in Tibet at 5,150 metres) to measure the background radiation at various altitudes, he took a [Kromek GR1 Gamma Ray Radioisotope Detector](#). His intention was to progress radiation protection science by making measurements of cosmic radiation doses received on the whole trip to Everest.

You need a light accurate detector if you are climbing!

If you are climbing the highest mountain in the world you want to travel light. The GR1 offered the perfect balance of sensitivity, lower energy range (to capture more isotopes) and high resolution (to make sure the isotopes could be differentiated from each other), ease of use and weight and size – the detector is the size of a chunky lipstick and only weighs 60 grammes. The GR1 uses a 10mm x 10mm x 10mm CZT coplanar-grid detector to give an energy range of 30keV to 3.0 MeV with an energy resolution of 2.0 – 2.5% FWHM @ 66rs2 keV.

The expedition was using a small light laptop PC as its photo storage device with [Kromek MSA Gamma Spectroscopy Software](#) installed to provide the analysis of the GR1 reading and store a record of the spectra taken.

The GR1 draws power from the PC USB connection so you don't have to drag another power supply up a mountain.



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“The main limitation with the use of this detector on Everest is the operational altitude of my netbook – at Base Camp, 5,200m altitude I am already using it outside its design capacity and I don’t want to wreck it as it is acting as my photo backup device too. However, the Kromek detector has been successfully used at sea level, at various altitudes up to 5,200m and inside a pressurised aircraft at 30,000ft above Kathmandu to gain some spectral information on the energy ranges and magnitudes of the photon radiations that we are being exposed to.”

Bob Kerr, climber and all round adventurer



Part of the Society of Radiological Protection

At the time of the expedition, Bob was a member of the Society for Radiological Protection (SRP). He was interested in finding out more the radiation exposure of workers at altitude. Anyone working or travelling at altitude is exposed to more radiation from space as they are protected by less of the atmosphere, these cosmic rays rain down on the planet continually.

What are cosmic rays?

Cosmic rays are fast-moving charged particles (high-energy radiation) mainly from sources outside the Solar System but also from the sun. When they hit the atmosphere they create showers of secondary particles. At higher altitudes, you are exposed to more of this cosmic background radiation so mountain guides are occupationally exposed to this cosmic radiations not only because they work at higher altitudes but may also take more flights to the climb locations.



[Read the full study and results here](#)