OCCUPATIONAL RADIATION DOSES OF UNITED KINGDOM HIGH ALTITUDE MOUNTAIN GUIDES AS A RESULT OF COSMIC RAY EXPOSURES.

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1. Introduction
United Kingdom (UK) based professional mountain guides receive radiation doses from ultraviolet radiation (UVR) and cosmic rays during air travel and their time spent at elevated altitudes in the mountains of the world. These radiation doses are recorded as part of their employment. This paper examines these occupational cosmic radiation exposures and poses some issues for further consideration.

2. Seven summits
The term “seven summits”[1] refers to the highest mountains on each of the Earth’s seven continental plates. Their locations are illustrated in the map on this page. Guides often take clients up the seven summits and receive a greater cosmic radiation exposure through their delivery of their work than they would have received by doing guiding work in the much lower altitude mountains of the UK.

3. Discussion
UK based high altitude mountain guides receive occupational cosmic radiation exposures, both at ground level and during transit. To guide one client up each of the seven summits takes approximately 189 days, involves approximately 225 hours of flying and results in over 2 milliSv of occupational radiation dose of which over two thirds of the dose is received whilst at ground level overseas as shown in the graph to the right.

In their next set of recommendations, the ICRP should consider whether the occupational cosmic radiation exposures of high altitude mountain guides should be included as a specialised group for whom some control and assessment of cosmic radiation exposures may be justified.

REFERENCES

An ascent of Mount Everest gives greater than 1 milliSv of dose at ground level and so such is a significant radiation dose for the UKmissing Radiations Regulations 1999 (CR) to be applied to this existing exposure situation. The European Community Basic Safety Standards Directive 96/29/EURATOM (CR) does not apply to exposure to cosmic radiation prevailing at ground level to passengers on aircraft. There is an anomaly in radiation protection where the cosmic radiation exposures of interest for short durations at altitudes lower than mountain guides operating at high altitudes for prolonged times have to be taken into account. UK-based high altitude mountain guides are undergoing planned occupational exposures to cosmic radiation whilst still on the ground.

The amount of cosmic radiation dose received for each of the seven summits is illustrated in the bar graphs below. All cosmic radiation exposures estimated are based on average 2011 data calculated using reference ID.

Cosmic rays are fast-moving charged particles. The Earth’s magnetic field deflects cosmic rays, causing them to spiral around the magnetic field close to the poles.

Magnetic field lines are roughly perpendicular to the aurorae. Mountain guides are occupationally exposed to cosmic rays particularly when at high altitudes or high latitudes.

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4. Conclusions
High altitude mountain guides from the United Kingdom can potentially receive greater than 1 milliSv per year of cosmic radiation dose in excess to what they would have received at UK ground level. The precise amount of dose received would have been received in their home country at ground level.