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Nuclear weapon test debris 'persists' in atmosphere

By Rebecca Morelle Science reporter, BBC World Service



Radioactive particles from bombs tested during the Cold War remain in the upper atmosphere

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Radioactive particles from nuclear tests that took place decades ago persist in the upper atmosphere, a study suggests.

Previously, scientists believed that nuclear debris found high above the Earth would now be negligible.

However this research shows that plutonium and caesium isotopes are still present at surprisingly high concentrations.

The work [is published in the journal Nature Communications](#).

Lead author Dr Jose Corcho Alvarado, from the Institute of Radiation Physics at Lausanne University Hospital in Switzerland, said: "Most of the radioactive particles are removed in the first few years after the explosion, but a fraction remains in the stratosphere for a few decades or even hundreds or thousands of years."

However, he said the levels were not high enough to pose a risk to human health.

Radioactive hangover

At the height of the Cold War, when the nuclear arms race was in full swing, weapons were

being developed and tested around the world.

But more than 50 years on, their radioactive legacy remains.

"The concentrations we measured were in the order of about 1,000 to 1,500 levels higher in the stratosphere"

Dr Jose Corcho Alvarado Institute of Radiation Physics

While nuclear explosions initially throw material up into the air, scientists had thought that the radioactive particles would remain for a limited time.

In the troposphere (the lower layer of the atmosphere that sits directly above the Earth), the isotopes are removed fairly quickly, as they are "washed out" by attaching to rain or snow or are drawn down by gravity.

However, in the stratosphere (the layer that sits from about 10-50km above the Earth), the Swiss team believes that some particles become trapped.

"The concentrations we measured were in the order of about 1,000 to 1,500 levels higher in the stratosphere than in the troposphere," said Dr Jose Corcho Alvarado.

While the tests were carried out over Switzerland, the team said they expected similar levels would be found at the same latitude elsewhere around the world.

The scientists also found that this material can be moved around in the atmosphere by natural events such as volcanic eruptions.

For example, in 2010 after Iceland's Eyjafjallajökull volcano erupted, plutonium levels in the lower atmosphere increased.

While scientists say the long-term effects are not clear, the lead author Dr Jose Corcho Alvarado said: "It is important to say that this is not dangerous for the population."

He added that the nuclear debris could be tracked to find out more about how particles in the atmosphere move around.