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Natural and man-made radioactivity: Chernobyl soils.

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In 1986 a reactor at the Chernobyl Nuclear Plant suffered a large explosion. The result had wide-ranging impacts. 31 severely exposed emergency workers died from acute radiation syndrome and 19 more later died from different causes. The perhaps controversial prediction by some authors is that around 4,000 will eventually die as a result of the increased cancer risk. A 19-mile restriction zone exists around the former reactor, but during the past 25 years radiation levels have fallen and it is now possible to take part in conducted tours of the deserted city of Pripyat, and the Chernobyl reactor site. Soil levels, however, remain highly radioactive, particularly in the restricted area. Kingston University holds:-

- Soil profile sets from 3 locations in Belarus, with repeats at same location 1996 and 2000.
- Lake sediment core samples.
- Soil profiles at forestry sites.
- Surface samples in a region suspected to have actinide content at 200km from Chernobyl.

In addition to the above the impact of naturally occurring radon on human health around Chernobyl should not be ignored. About 23 per cent of homes in Ukraine are estimated to have radon levels above 100 Bq m-3, whilst concentrations of 10,000 Bq m-3 or more are known to exist in public water supplies. Some researchers have also suggested that mean annual doses of irradiation of the population caused by radon and it's progeny in air in buildings exceeds the doses received now by inhabitants of settlements located in the territories polluted by Chernobyl-derived nuclides in the Mogilev and Gomel regions in Belarus.

This project incorporates a temporal comparison of transport results in undisturbed soils variously over a number of years, demonstrating relative measurements using both the original and new samples. This project will also focus on lake sediments from Southern Belarus and is a 'work in progress'. However, what we can say at this stage is that it is notable that the long lived isotopes of Cs-137 and Sr-90 strongly chemically bind into both the sandy and clay soils found in Southern Belarus, consequently have low solubility, and hence the temporal radiation levels from soil contamination change only slowly at near the half-life of these isotopes, with weathering being a minor contribution to reducing the radiation dose rates, in regions with such soil chemistry.