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Interactive comment on "Comment on "Global risk of radioactive fallout after major nuclear reactor accidents" by J. Lelieveld et al. (2012)" *by* J. Lelieveld et al.

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Short Comment on the "Comment on "Global risk of radioactive fallout after major nuclear reactor accidents" by J.Lelieveld, D.Kunkel and M.G.Lawrence (2012)" published in ACPD 12,19303-19309,2012

In this paper, the authors comment on their own original controversial paper, published in Atmos.Chem.Phys. 12, 4245-4258, 2012. They write answers to their own questions which are not satisfactory. Some of these questions are indeed relevant for the criticism of their paper. In particular questions 1,2 and 3 deserve interest. Indeed, here they assumed in their original publication that the same amount of radioactive material was released into the atmosphere in the Fukushima accident as in the Chernobyl case. This is obviously false, as indicated in their own table 1 where the emissions given differ by a factor of twenty (20) for the two INES7 accidents. Here they ignore the fundamental physical difference between a graphite-moderated reactor of the RBMK type and a water-moderated pressurized reactor. In the Chernobyl case, the reactor was operated in a forbidden mode with all safety systems switched off. As a consequence, the chain reaction went out of control, the graphite burned and there was no containment; even Pu was released from the core. Most of the inventory was released to high altitudes in the atmosphere by the burning graphite. However at Fukushima the reactor was shut-down regularly after the earthquake, and a relatively long time later (45 minutes) the tsunami stopped the external water pumps. The main containment stayed intact, and only a very small fraction of the inventory was released (basically the cooling water contaminants).The radioactivity released to the atmosphere was at the percent level compared to Chernobyl. By ignoring this, the authors increase arbitrarily the radioactive fallout in their calculations by large factors. This is scientifically incorrect. One particular manipulation in the paper is inacceptable: they make the false assumption that the source strength of the Fukushima accident was the same as the one in Chernobyl. Then, they use the strength of Chernobyl and superimpose their model calculation on the map of Fukushima, which magnifies the effect without apparent reason. The authors make their far-reaching conclusions by questioning the well established risk assessment (even experimentally verified) by the US regulatory commission and other world-wide expert organizations.

This has to be seen in the light of the fact that the Fukushima report of 70 specialized scientists of UNSCEAR has been published in Nature 485, p.423-424, 2012, and the independent report of the WHO scientists is ready as a draft. Their conclusions are completely opposite to the ones of the three atmospheric scientists of the Max-Planck Institute: the emission of radioactive material was largely avoided, the risk for the population was minimal, no person died from radiation. The measured doses received by most people were below 10 milliSievert (mSv) per year (for a definition of equivalent

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dose see the textbook of K.Kleinknecht). For comparison, the yearly dose in Menzenschwand, Black Forest, Germany from natural environmental sources is 15 mSv. According to the publication in "Nature" above, the increase of cancer risk in Fukushima, if any, will be below statistical significance. The simulated radioactivity in fig.9 of the paper of Lelieveld et al. is therefore contradicted by experimental measurements.

As a consequence of these facts, it would seem appropriate of the authors withdraw figure 9 from their paper. This figure has no scientific value, but is instrumental in creating unjustified fear in the japanese population.

Ref.: K.Kleinknecht, Detectors for particle radiation, Cambridge university press„1998

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 19303, 2012.