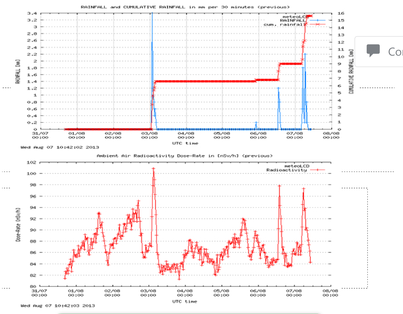
« A new EEA report on bio-energy potential
Klima Angst article in Lëtzebuerger Land weekly »

Ambient air radioactivity peaks due to radon washout?

The last 7 days from 01 to 07 August 2013 give a nice example of the increase of ambient air radioactivity with precipitation. During these days we had at Diekirch 3 very short precipitation events, which leave a visible fingerprint in the data series of the gamma Geiger counter:



Air gamma radiation peaks during short-time rain falls

We see that the short precipitation events (in blue on the top plot) correlate perfectly with activity peaks (in red on the bottom plot). The first event in the night of the 03 August has 3.4mm precipitation and an increase of radioactivity by about 19 nSv/h, to be compared to the "normal" increase for this period of the day of 3 nSv/h. So this rainfall event produced approx. a **500% higher** radioactivity level. The 3 events are too few to look for a relationship; but obviously the greatest precipitation event also produced the highest radioactivity rise.

This phenomenon is well-known and usually attributed to **radon washout**, with radon daughters like the gamma emitter Pb214 gathering on the instrument in the wet rainwater film. After evaporation has removed this wet cover, levels return to normal.

I found some discussions on this effect here:

http://onlinelibrary.wiley.com/doi/10.1111/j.2153-3490.1963.tb01393.x/pdf

http://www.irpa.net/irpa10/cdrom/00586.pdf

http://www.atmos-chem-phys.net/6/2865/2006/acp-6-2865-2006.pdf
If you have more to say on this, thank you for a comment.

---

08 Aug 13: corrected units typing error: activity is nanoSv/h (nSv/h), not microSv/h (uSv/h)

10 Aug 13: Two readers sent me interesting comments (thank you!), and I will summarize these here with their tacit authorization:

Antoine KIES is a friend, emeritus professor of physics of the University of Luxembourg (Laboratoire Physique des Radiations), and a well known radon and ambient radioactivity specialist. He says this (translated from Luxembourgish): *"This is a normal and well-known situation, as a short rain fall deposits the daughter products (as polonium, lead, bismuth) of radon which are attached to aerosols. As the periods of these radioactive daughters are short, the increase in measured gamma activity is a short peak. Precipitation can block the out gassing of radon from the soil, so usually one observes a minimum of activity when the soil is wet. The diurnal variation of ambient air activity is mostly caused by radon."*

Marcel Severijnen is a former head of the Environmental Monitoring Department of the Province of Limburg in the Netherlands and also has a climate blog. He writes (translated from German): *"Twenty years ago I had in my room a terminal from the BMNI (Binnenlandse Zaken Meetnet Nucleaire Incendenten) which is a network with over 300 measuring stations (now integrated into the LMR (Landelijk Meetnet Radioactiviteit, see **http://www.rivm.nl/Onderwerpen/N/Nationaal_Meetnet_Radioactiviteit/Resultaten**). The peaks during heavy rain showers were always very visible, and represented something like a precipitation radar. Today values below 200 nSv/h are considered normal. Above this limit the RVIM makes an analysis of the situation and when 2000 nSv/h is reached, the local fire brigades are set on alert…"*

The link to the Dutch network is very interesting. Luxembourg also has many "official" measuring stations (see **here**) but no website with real-time data (except our "unofficial" meteoLCD). Nevertheless monthly reports are available **here**.

Related

The 6th July 2014 storm… and radioactivity peak.
July 7, 2014
In "1"

22-July-2016 storm-flood and radon washout
July 28, 2016
With 2 comments

Rain and radioactivity: rain-out or wash-out?
August 5, 2016

This entry was posted on August 7, 2013 at 19:31 and is filed under Uncategorized. You can follow any responses to this entry through the RSS 2.0 feed. You can leave a response, or trackback from your own site.

3 Responses to "Ambient air radioactivity peaks due to radon washout?"

Radon washout (2) | meteoLCD Weblog Says:
April 26, 2014 at 08:26 | Reply

[…] August 2013 I wrote a small comment on ambient air radioactivity peaks coincident with a sharp rain fall pulse. Several specialists […]

Radon washout: two consecutive precipitation peaks | meteoLCD Weblog Says:
September 25, 2019 at 17:20 | Reply

[…] Many times I wrote on this blog on radon washout: after a short downpour, we (nearly) always see a visible peak in our gamma radiation, caused by a washout of the daughters of the noble gas radon which is a natural constituent of our atmosphere; to find these comments enter "radon" into the search window on this site or click here , here and here. […]

Radioactivity and precipitation | meteoLCD Weblog Says:
July 27, 2021 at 14:30 | Reply

[…] that due to radon washout, the ambient gamma radiation shows sometimes impressive peaks (see here, here, here, here, here, […]

Leave a comment