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1	Oleksandrenko, A., Appleby, P.G., Duke, M.J.M., Noernberg, T., and Shotyky, W. Americium-241 in peat bogs as a marker of the beginning of the Anthropocene: examples from Europe and North America.						
2	Supporting Information. Appendix H. Bibliography of fallout radionuclides in peat bogs studies.						
3	Authors	Year	Title	Journal	Summary	Findings	Citation
4	Oldfield, F., Richardson, N., & Appleby, P. G.	1995	Radiometric dating (210Pb, 137Cs, 241Am) of recent ombrotrophic peat accumulation and evidence for changes in mass balance	Holocene	The paper summarizes and evaluates the results of 210Pb, 137Cs and 241Am analysis on 37 ombrotrophic peat profiles.	Authors concluded that radiometric measurements alone cannot be relied on to give an accurate chronology of peat accumulation. Where constrained by profiles of 241Am activity in the upper part and one or more pollen dated horizons below this, 210Pb can provide good chronologies of peat accumulation provided the constraint does not displace the calculated 210Pb dates by more than c. 10%. Profiles of 137Cs activity, in most cases, fail to contribute significantly to dating recent peat. At somewhat degraded sites, the residual dry mass of peat representing the last c. 150 years is reduced. Further analysis of well-dated profiles suggests that this may reflect loss of catotelm peat newly exposed to aerobic decomposition processes after a fall in water table. Several mechanisms are proposed for the displacement and net loss of lead (including 210Pb) from peat profiles.	Oldfield, F., Richardson, N., & Appleby, P. G. (1995). Radiometric dating (210Pb, 137Cs, 241Am) of recent ombrotrophic peat accumulation and evidence for changes in mass balance. <i>Holocene</i> , 5, 141-148.
5	Piotrowska N., Blaauw M., Mauquoy D., and Chambers F.M.	2011	Constructing deposition chronologies for peat deposits using radiocarbon dating	Mires and Peat	This article reviews the basis of the radiocarbon dating method and its application to dating of peat deposits	Provided some recommendations for peat researchers on how to improve method. These recommendations are similar to the ones, provided by Givélet et al. (2004) and Turetsky et al. (2004).	Piotrowska N., Blaauw M., Mauquoy D., and Chambers F.M. 2011. Constructing deposition chronologies for peat deposits using radiocarbon dating. <i>Mires and Peat</i> , 7(10), 1-14.
6	Le Roux G. and Marshall W.A.	2011	Constructing recent peat accumulation chronologies using atmospheric fall-out radionuclides	Mires and Peat	This article reviews the production of 'fall-out' radionuclides and the concepts underlying the dating method. Some inherent problems such as the issues surrounding reduced natural radionuclide deposition, e.g. 'continentality', are highlighted. The common radionuclide analysis methods, their application to peat studies, and the production of 210Pb activity inventories are described. To illustrate the radionuclide dating method the case studies were used to demonstrate how these data can be used to derive peat accumulation rates during the last 100–150 years at contrasting sites using 210Pb supported by anthropogenic radionuclides.	In their example: at Sifton Bog in Canada, the 241Am data supports the CRS ages, and is in reasonable agreement with the CRS model at Outokumpu in Finland.	Le Roux G. 2011. Constructing recent peat accumulation chronologies using atmospheric fall-out radionuclides. <i>Mires and Peat</i> , 7(08), 1-14.
7	Piotrowska, N., Vleeschouwer, F. D., Sikorski, J., Pawlyta, J., Fagel, N., Roux, G. L., & Pazdur, A.	2010	Intercomparison of radiocarbon bomb pulse and 210Pb age models. A study in a peat bog core from North Poland.	Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms	The study analyzed radiocarbon and 210Pb in the uppermost 40 cm of a Wardenaar peat core from a Baltic raised bog in North Poland. The research aimed to construct an age model for the last 1300 years using AMS dates on Sphagnum spp. fragments and compare it with the age model obtained from 210Pb measurements using the CRS model.	The radiocarbon age model constructed using AMS dates on Sphagnum spp. fragments provided a reliable chronological framework for the peat core. The comparison with the age model based on 210Pb measurements using the CRS model showed good agreement, validating the reliability of both models. The study demonstrates the effectiveness of combining radiocarbon and 210Pb dating methods to establish accurate chronologies for peat cores, essential for understanding past environmental changes.	Piotrowska, N., Vleeschouwer, F. D., Sikorski, J., Pawlyta, J., Fagel, N., Roux, G. L., & Pazdur, A. (2010). Intercomparison of radiocarbon bomb pulse and 210Pb age models. A study in a peat bog core from North Poland. <i>Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms</i> , 268(7-8), 1163–1166. doi:10.1016/j.nimb.2009.10.124

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8	Gallagher, D., McGee, E. J., & Mitchell, P. I.	2001	A Recent History of 14C, 137Cs, 210Pb, and 241Am Accumulation at Two Irish Peat Bog Sites: an East Versus West Coast Comparison.	Radiocarbon	Data on radiocarbon (14C), 137Cs, 210Pb, and 241Am levels in an ombrotrophic peat sequence from a montane site on the east coast of Ireland are compared with data from a similar sequence at an Atlantic peatland site on the west coast.	The 14C profiles from the west and east coasts show a broadly similar pattern. Significantly, peak levels at the east coast site are considerably higher than corresponding levels at the west coast site, though both are lower than reported peak values for continental regions. The 210Pb inventory at the east coast site (6500 Bq m ⁻²) is significantly higher than at the west coast (5300 Bq m ⁻²) and is consistent with the difference in rainfall at the two sites. Finally, 137Cs and 241Am inventories at the east coast site also exceed those at the west coast site by similar proportions (east:west ratio of approximately 1:1.2).	Gallagher, D., McGee, E. J., & Mitchell, P. I. (2001). A Recent History of 14C, 137Cs, 210Pb, and 241Am Accumulation at Two Irish Peat Bog Sites: an East Versus West Coast Comparison. Radiocarbon, 43(2B), 517–525. doi:10.1017/s0033822200041175
9	Kilian, M. R., van Geel, B., & van der Plicht, J.	2000	14C AMS wiggle matching of raised bog deposits and models of peat accumulation.	Quaternary Science Reviews	High-resolution Accelerator Mass Spectrometer (AMS) dates of selected plant macrofossils from the raised bog Engbertsdijkvenen (Eastern Netherlands) show century-scale wiggles analogous to the radiocarbon calibration curve. This paper used three relative time scales, viz., based on depth, mass, and pollen concentration, respectively, to match the peat AMS dates to the calibration curve.	Depth appears to be the best time scale for certain stratigraphical units of a core. This justifies using depth for wiggle matching conventionally dated mire cores published by others, even when 14C errors are larger. Our evidence shows four major sources of 14C variation for mire deposits compared to tree-rings: (1) dating error, due to sample composition. This includes a reservoir effect demonstrated for many bulk peat samples; (2) hiatuses, causing a sudden 'leap' of peat 14C age; (3) changing accumulation rates, apparent from a break in the slope of the peat 14C ages; (4) sampling error.	Kilian, M. R., van Geel, B., & van der Plicht, J. (2000). 14C AMS wiggle matching of raised bog deposits and models of peat accumulation. Quaternary Science Reviews, 19(10), 1011–1033. doi:10.1016/s0277-3791(99)00049-9
10	Mauquoy, D., van Geel, B., Blaauw, M., Speranza, A., & van der Plicht, J.	2004	Changes in solar activity and Holocene climatic shifts derived from 14C wiggle-match dated peat deposits.	The Holocene	The study focuses on the use of accelerator mass spectrometer (AMS) 14C dates of peat deposits to generate high-precision calendar age chronologies. By wiggle-matching these sequences, the study identifies changes in mire surface wetness during key historical periods, such as the Bronze Age/Iron Age transition and the 'Little Ice Age'. Replicate evidence from peat-based proxy climate indicators suggests these changes may be linked to declines in solar activity.	Century-scale wiggles in AMS 14C dates of peat deposits can be fitted to the radiocarbon calibration curve, allowing for the creation of high-precision calendar age chronologies. Changes in mire surface wetness during the Bronze Age/Iron Age transition and the 'Little Ice Age' corresponded to periods of suddenly increasing atmospheric concentration of 14C, suggesting a link to solar activity. Carbon-accumulation rates in raised peat bogs in the UK and Denmark show reduced primary productivity of peat-forming vegetation during the 'Little Ice Age', indicating climatic deterioration during this period.	Mauquoy, D., van Geel, B., Blaauw, M., Speranza, A., & van der Plicht, J. (2004). Changes in solar activity and Holocene climatic shifts derived from 14C wiggle-match dated peat deposits. The Holocene, 14(1), 45–52. doi:10.1191/0959683604hl688rp
11	Blaauw, M., & Christen, J. A.	2005	Radiocarbon peat chronologies and environmental change.	Journal of the Royal Statistical Society	This study proposes improved methods for constructing age models from radiocarbon-dated peat cores, specifically for raised bog peat deposits. The methods are based on Markov chain Monte Carlo techniques and assume piecewise linear accumulation. The approach includes automatic section selection, a measure of goodness of fit, and outlier downweighting.	The proposed methods aim to enhance the precision and reliability of age models for interpreting past climate changes using raised bog peat deposits. By using Markov chain Monte Carlo techniques and assuming piecewise linear accumulation, the methods offer a more robust approach to constructing age models compared to traditional methods. The approach was successfully applied to a peat core from the Netherlands, demonstrating its effectiveness in improving age modeling for raised bog peat deposits.	Blaauw, M., & Christen, J. A. (2005). Radiocarbon peat chronologies and environmental change. Journal of the Royal Statistical Society: Series C (Applied Statistics), 54(4), 805–816. doi:10.1111/j.1467-9876.2005.00516.x
12	Blaauw, M., Christen, J. A., Mauquoy, D., van der Plicht, J., & Bennett, K. D.	2007	Testing the timing of radiocarbon-dated events between proxy archives.	The Holocene	This study addresses the issue of chronological uncertainties in interpreting past climate changes using proxy data from multiple locations. The authors propose a Bayesian framework to construct millions of plausible age models, quantifying uncertainties within and between proxy archives. The technique is tested on 14C-dated peat cores from the 'Little Ice Age' period, revealing inconsistencies in recording decadal climate changes due to internal variability in proxy data and age-model uncertainties.	The study highlights the importance of considering chronological uncertainties in interpreting proxy data and multisite comparisons. The Bayesian framework provides a systematic approach to quantify and account for these uncertainties, enhancing the reliability of interpretations. Results suggest that while the technique can provide valuable insights into long-term climate trends, chronological uncertainties remain too large for answering decadal timescale questions.	Blaauw, M., Christen, J. A., Mauquoy, D., van der Plicht, J., & Bennett, K. D. (2007). Testing the timing of radiocarbon-dated events between proxy archives. The Holocene, 17(2), 283–288. doi:10.1177/0959683607075857

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13	Peters, A.J., Hamilton-Taylor, J., Tipping, E.	2001	Americium binding to humic acid.	Environmental Science and Technology	This paper investigated the binding of americium (Am) by peat humic acid (PHA) under different conditions.	Am was not observed to bind to high-affinity, low-concentration binding sites. When Fe(III) was assumed to be present, improved descriptions of the data by model VI were obtained by assuming that all of the metals [Am, Cu, and Fe(III)] undergo strong binding. This highlights the importance of Fe(III) competition in metal-PHA binding studies and possible shortcomings in the extraction procedure used to extract PHA.	Peters, A.J., Hamilton-Taylor, J., Tipping, E. (2001). Americium binding to humic acid. <i>Environ Sci Technol</i> , 35(17), 3495-500 p. doi: 10.1021/es000295g.
14	Appleby, P.G., Richardson, N., and Nolan, P.J.	1991	241Am dating of lake sediments	Hydrobiologia	Comparison of 241Am and 137Cs peaks in over 70 lake sediment cores with 210Pb age models.	Results from this paper suggest that 241Am is significantly less mobile in lake sediments than 137Cs, and that its distribution in cores reflects more closely the fallout record. Since further decay of existing weapons debris will increase 241Am concentrations by about 24% over the next 40 years, 241Am is likely to play an increasingly important role in assessing the validity of 210Pb dates at sites with varying sediment accumulation rates.	Appleby, P.G., Richardson, N., and Nolan, P.J. (1991). 241Am dating of lake sediments. <i>Hydrobiol.</i> , 214, 35-42 pp.
15	Lee, S.-H., Povinec, P.P., Wyse, E., Pham, M.K., Hong, G.-H., Chung, C.-S., Kim, S.-H., and Lee, H.-J.	2005	Distribution and inventories of 90Sr, 137Cs, 241Am and Pu isotopes in sediments of the Northwest Pacific Ocean	Marine Geology	In 1997, bottom sediments from the NW Pacific Ocean were analyzed for 90Sr, 137Cs, 239,240Pu, and 241Am to determine their distribution and sources.	The study revealed differing radionuclide distribution patterns in NW Pacific Ocean sediments. Enhanced 239,240Pu and 241Am inventories suggest varied contamination sources. Discrepancies in activity ratios highlight complex fallout sources and processes. Mixing models indicated a significant local fallout contribution near the Bikini Atoll. Dating using 241Am and 241Pu explained sediment accumulation hiatuses in the deep seafloor.	Lee, S.-H., Povinec, P.P., Wyse, E., Pham, M.K., Hong, G.-H., Chung, C.-S., Kim, S.-H., and Lee, H.-J. (2005). Distribution and inventories of 90Sr, 137Cs, 241Am and Pu isotopes in sediments of the Northwest Pacific Ocean. <i>Marine Geology</i> , 216,4, 249-263 pp.
16	Mitchell, P.I., Schell, W.R., McGarry, A., Ryan, T.P., Sanchez-Cabeza, J.A., and Vidal-Quadras, A.	1991	Studies of the vertical distribution of 134Cs, 137Cs, 238Pu, 239, 240Pu, 241Pu, 241Am and 210Pb in ombrogenous mires at mid-latitude	Journal of Radioanalytical and Nuclear Chemistry	Six peat cores from unmodified bogs in Ireland were analyzed for radionuclides including 134Cs, 137Cs, 238Pu, 239Pu, 241Am, and 210Pb. Radionuclide measurements were conducted using gamma-spectrometry and alpha-spectrometry. Core chronologies were established using 210Pb dating. The study examined relaxation depths, migration rates, and isotopic ratios of Pu. The contribution of Chernobyl fallout to radiocaesium inventory was also determined.	The analysis of peat cores from Irish bogs revealed important insights into radionuclide behavior. The relaxation depths and migration rates of radionuclides varied, suggesting differences in their mobility and retention within the peat. Isotopic ratios of 238Pu/239,240Pu and 241Pu/239,240Pu were carefully examined, providing valuable information on their sources and processes. Furthermore, the study successfully quantified the contribution of Chernobyl fallout to the radiocaesium inventory in each core, highlighting the impact of this event on the Irish environment.	Mitchell, P.I., Schell, W.R., McGarry, A., Ryan, T.P., Sanchez-Cabeza, J.A., and Vidal-Quadras, A. (1991). Studies of the vertical distribution of 134Cs, 137Cs, 238Pu, 239, 240Pu, 241Pu, 241Am and 210Pb in ombrogenous mires at mid-latitudes. <i>J. of Radional. And Nuc. Chem.</i> , 156, 2, 361-387 pp.
17	Bunzl, K., Kracke, W., and Schimmack, W.	1992	Vertical Migration of Plutonium-239 + -240, Americium-241 and Caesium-137 Fallout in a Forest Soil Under Spruce	Analyst	Vertical activity distributions of 239+240Pu, 241Am, 134Cs, and 137Cs in a forest soil were determined based on their origin (global fallout or Chernobyl fallout). Migration rates were calculated for each soil horizon using a compartment model. In the organic horizons, migration rates for all radionuclides from both sources were above 0.5 cm per year. In the Oh horizon, migration rates were 0.2-0.4 cm per year for global fallout Pu, Am, and Cs, with Cs from Chernobyl exhibiting the highest rate (2 cm per year). In the mineral horizon, migration rates were similar for global fallout Pu and Am (0.08-2 cm per year), with Cs showing about half the rate. Chernobyl-derived Cs had the highest rate (0.5-3 cm per year).	The study revealed significant differences in the migration rates of radionuclides in forest soil based on their origin. In organic horizons, all radionuclides exhibited high migration rates, indicating their mobility within these layers. In the Oh horizon, global fallout Pu, Am, and Cs showed similar migration rates, with Chernobyl-derived Cs migrating the fastest. In the mineral horizon, global fallout Pu and Am had similar migration rates, while global fallout Cs had a lower rate. Chernobyl-derived Cs again showed the highest migration rate in this layer. These findings provide valuable insights into the behavior and mobility of radionuclides in forest soils, particularly in relation to different fallout sources.	Bunzl, K., Kracke, W., and Schimmack, W. (1992). Vertical Migration of Plutonium-239 + -240, Americium-241 and Caesium-137 Fallout in a Forest Soil Under Spruce. <i>Analyst</i> , 117, 469-474 pp.
18	Hedwal, R., and Erlandsson, B.	1992	Radioactivity in Peat Fuel and Ash from a Peat-Fired Power Plant	Journal of Environmental Radioactivity	This study investigates radioactivity concentrations in biomass fuel and the resulting radiation dose to the population from burning this fuel. Samples from a district heating plant in central Sweden were analyzed for natural and artificial radionuclides from 1984 to 1990. Despite increased fallout after the Chernobyl accident, the majority of the calculated annual effective dose equivalent from internal irradiation is due to naturally occurring radionuclides, with an equivalent of about 6 uSv.	In spite of a "high" fall-out after the Chernobyl accident, more than 99% of the calculated annual effective dose equivalent from internal irradiation is due to naturally occurring radionuclides, which is equivalent to about 6 uSv. The maximum 137Cs concentration found in peat fly-ash was 100 kBq/kg. Estimates per caput annual effective dose equivalent from natural sources in areas of normal background is 2400 uSv.	Hedwal, R., and Erlandsson, B. (1992). Radioactivity in Peat Fuel and Ash from a Peat-Fired Power Plant. <i>J. Environ. Radioactivity</i> , 16, 205-228 pp.

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19	Ali, A.A., Ghaleb, B., Garneau, M., Asnong, H., and Loisel, J.	2008	Recent peat accumulation rates in minerotrophic peatlands of the Bay James region, Eastern Canada, inferred by 210Pb and 137Cs radiometric techniques	Applied Radiation and Isotopes	This study uses 210Pb and 137Cs dating techniques to assess recent peat accumulation rates in minerotrophic peatlands in the La Grande Riviere watershed, James Bay region, Canada. The peatlands are experiencing erosion due to a rise in water table induced by increased humidity since the last century. The objectives are to evaluate the applicability of 210Pb and 137Cs dating techniques in these environments and to detect changes in peat accumulation rates in response to increased humidity.	Cores collected in 2005 show that 210Pb decreases exponentially with depth, allowing reconstruction of peat accumulation rates since around 1855 AD. However, 137Cs data indicates mobility and diffusion, making it unsuitable for establishing a chronology. Peat accumulation rates inferred from 210Pb chronologies range from 0.005 to 0.038 g /cm ² /yr. Despite the recent rise in water table, peat accumulation rates have not yet been significantly affected.	Ali, A.A., Ghaleb, B., Garneau, M., Asnong, H., and Loisel, J. (2008). Recent peat accumulation rates in minerotrophic peatlands of the Bay James region, Eastern Canada, inferred by 210Pb and 137Cs radiometric techniques. Applied Radiation and Isotopes, 66, 10, 1350–1358. doi:10.1016/j.apradiso.2008.02.091
20	Mohammed, A., Le Roux, G., De Vleeschouwer, F., Bindler, R., Blaauw, M., Piotrowska, N., Sikorski, J., and Fagel, N.	2013	High-resolution reconstruction of atmospheric deposition of trace metals and metalloids since AD 1400 recorded by ombrotrophic peat cores in Hautes-Fagnes, Belgium.	Environmental Pollution	The study in Misten bog, Belgium, analyzed trace metals in peat sections spanning 600 years. It found peak metal fluxes between AD 1930 and 1990, attributed to coal and metallurgical pollution. The findings highlight long-term human impacts on trace metal accumulation.	The study revealed significant temporal variations in trace metal accumulation rates, with peak values occurring between AD 1930 and 1990, indicating increased atmospheric emissions during this period. The cluster analysis, coupled with Pb isotopic composition, provided insights into the main sources of pollution in the Misten bog, attributing them primarily to coal consumption and metallurgical activities over the past 600 years. These findings highlight the long-term impact of human activities on trace metal accumulation in peat bogs.	Mohammed, A., Le Roux, G., De Vleeschouwer, F., Bindler, R., Blaauw, M., Piotrowska, N., Sikorski, J., and Fagel, N. (2013). High-resolution reconstruction of atmospheric deposition of trace metals and metalloids since AD 1400 recorded by ombrotrophic peat cores in Hautes-Fagnes, Belgium. Environmental Pollution, 178(1), 381–394. doi:10.1016/j.envpol.2013.03.018
21	Appleby, P.G.	1998	Dating recent sediments by 210Pb: problems and solutions	2nd NKS/EKO-1 Seminar, Helsinki: STUK.	This study explains the main principles of 210Pb dating of sediment cores and provides a few solutions to the most common problems.	The paper suggests that while the CRS model may provide more robust dating parameters due to its integration procedure, it can also smooth out minor irregularities and may yield nonsensical results in sediment records with gaps. The CIC model, on the other hand, is prone to large errors in sediment mixing scenarios. Routine calculation and comparison of 210Pb dates using both models are recommended to identify and address potential dating problems, ultimately requiring a good understanding of the transport processes affecting 210Pb supply to sediment records.	Appleby, P.G. (1998). Dating recent sediments by 210Pb: problems and solutions. In 2nd NKS/EKO-1 Seminar (pp. 7-24). Helsinki: STUK.
22	Appleby, P.G., Nolan, P.J., Oldfield, F., Richardson, N., and Higgitt, S.R.	1988	210Pb dating of lake sediments and ombrotrophic peats by gamma essay	The Science of the Total Environment	The paper discusses the measurement of 210Pb levels in lake sediments and ombrotrophic peats using gamma assay techniques. It also describes the measurement of associated 226Ra concentrations and the comparison of 137Cs emissions to determine self-absorption effects in lake sediment samples. Attenuation factors to correct for self-absorption have been determined, and results from multiple sites are presented.	The study found that self-absorption in lake sediment samples is significant at lower energy levels, requiring correction factors. Ashing peat samples at 450°C prior to measurement facilitated their analysis. The results provide insights into the distribution and behavior of 210Pb and 226Ra in lake sediments and peats, contributing to a better understanding of these environments.	Appleby, P.G., Nolan, P.J., Oldfield, F., Richardson, N., and Higgitt, S.R. (1988). 210Pb dating of lake sediments and ombrotrophic peats by gamma essay. The Science of the Total Environment, 69, 157-177.
23	Appleby, P.G., Shoty, W., and Fankhauser, A.	1997	Lead-210 dating of three peat cores in the Jura Mountains, Switzerland.	Water, Air, and Soil Pollution	Peat cores from the Jura region of Switzerland were analyzed for radionuclides. The cores retained atmospheric flux, but showed significant losses of 137Cs. 210Pb dates were validated by 241Am and pollen stratigraphy. Deviations in 210Pb profiles indicate variations in accumulation rates during specific periods.	Cores retained atmospheric flux, with consistent 210Pb inventories. Significant losses of 137Cs compared to earlier cores were observed. 210Pb dates were validated by 241Am and pollen stratigraphy. Deviations in 210Pb profiles suggest variations in accumulation rates during specific periods.	Appleby, P.G., Shoty, W., and Fankhauser, A. (1997). Lead-210 dating of three peat cores in the Jura Mountains, Switzerland. Water, Air, and Soil Pollution, 100, 223-231.

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24	Biester, H., Bindler, R., Martinez-Cortizas, A., and Engstrom, D. R.	2007	Modeling the Past Atmospheric Deposition of Mercury Using Natural Archives.	Environmental Science & Technology	This study compared published data of background and modern mercury accumulation rates derived from globally distributed lake sediments and peat bogs and discuss reasons for the differences observed in absolute values and in the relative increase in the industrial age. Historical mercury accumulation in lake sediments and peat bogs reflects human impacts on mercury cycling. Studies show varying estimates of modern mercury deposition rates, with peat bogs suggesting higher increases compared to lake sediments. Direct measurements of modern wet mercury deposition rates are closer to estimates from lake sediments than from peat bogs, indicating potential overestimation in peat bogs due to smearing of 210Pb.	Lake sediments and peat bogs show different estimates of modern mercury deposition rates. Direct measurements of modern wet mercury deposition rates are closer to estimates from lake sediments than peat bogs. Peat bogs may overestimate mercury deposition rates due to smearing of 210Pb in uppermost sections. Lake sediments may be more reliable than peat bogs for estimating historical mercury accumulation rates.	Biester, H., Bindler, R., Martinez-Cortizas, A., and Engstrom, D. R. (2007). Modeling the Past Atmospheric Deposition of Mercury Using Natural Archives. <i>Environmental Science & Technology</i> , 41(14), 4851–4860. doi:10.1021/es0704232
25	Boulyga, S.F., Zoriy, M., Ketterer, M.E., and Becker, J.S.	2003	Depth profiling of Pu, 241Am and 137Cs in soils from southern Belarus measured by ICP-MS and a and c spectrometry.	Journal of Environmental Monitoring	The study investigates the depth distribution of plutonium, americium, and 137Cs from the 1986 Chernobyl accident in soil profiles in Belarus. Using various spectrometry techniques, it finds that transuranic elements migrate slowly in turf-podzol soil but more rapidly in peat-marsh soil. Specific activity concentrations of 239+240Pu range from 24–2400 Bq/kg, and 241Am from 23–2000 Bq/kg, with most radionuclides found in the upper soil layers.	Transuranic elements in turf-podzol soils are mostly concentrated in the 0–3 cm intervals, with slow migration to deeper layers. In peat-marsh soils, migration is faster, with maximum concentrations found below the surface (down to 3–6 cm). Depth distributions of Pu and Am are similar within a soil profile. Activity ratios of 239+240 and 241Am/137Cs vary by up to a factor of 5 at some sites, suggesting different behavior of 137Cs near and far from Chernobyl.	Boulyga, S.F., Zoriy, M., Ketterer, M.E., and Becker, J.S. (2003). Depth profiling of Pu, 241Am and 137Cs in soils from southern Belarus measured by ICP-MS and a and c spectrometry. <i>J. Environ. Monit.</i> , 5, 661-666.
26	Bunzl, K., Kracke, W., Agapkina, G.I., Tikhomirov, A., and Schheglov, A.I.	1998	Association of Chernobyl-derived 239+240Pu, 241Am, 90Sr and 137Cs with different molecular size fractions of organic matter in the soil solution of two grassland soils	Radiation and Environmental Biophysics	The study investigates the association of fallout radionuclides (137Cs, 90Sr, 238Pu, 239+240Pu, and 241Am) with various size fractions of dissolved organic matter (DOM) in soil solutions from grassland soils near the Chernobyl nuclear reactor. It builds on previous findings that radiocesium in soil solution was associated mainly with one size fraction of humic substances in a forest soil. The results show that Pu and Am are primarily associated with high molecular weight fractions of well-humified DOM, while Sr is found only in the inorganic fraction. In contrast, radiocesium is present in all size fractions, indicating a different binding behavior compared to Pu, Am, and Sr.	Pu and Am are mainly associated with high molecular weight fractions of well-humified DOM. Sr is found only in the inorganic fraction of DOM. Radiocesium is present in all size fractions of DOM, indicating a different binding behavior compared to Pu, Am, and Sr. The findings support previous observations in forest soil, suggesting that the binding behavior of radiocesium differs between well-humified organic matter and slightly decomposed plant material. Total radionuclide concentration in soil solution alone is insufficient to predict its fate in soil, highlighting the importance of understanding its association with DOM size fractions.	Bunzl, K., Kracke, W., Agapkina, G.I., Tikhomirov, A., and Schheglov, A.I. (1998). Association of Chernobyl-derived 239+240Pu, 241Am, 90Sr and 137Cs with different molecular size fractions of organic matter in the soil solution of two grassland soils. <i>Radiat Environ Biophys</i> , 37, 195-200.

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27	Chamizo, E., Raaf, C., Lopez-Lora, M., Garcia-Tenorio, R., Holm, E., Rabesiranana, N., and Padehontaa-Hiaa, G.	2020	Insights into the Pu isotopic composition (239Pu, 240Pu, and 241Pu) and 236U in marshlands from Madagascar. Science of The Total Environment,	Science of The Total Environment	This study examines peat bog cores from Madagascar to assess the presence of 239Pu, 240Pu, 241Pu, and 236U in the Southern Hemisphere. Using Accelerator Mass Spectrometry, they analyzed 10 cores to complete the isotopic composition of Pu. The results show a heterogeneous distribution of 239Pu and 240Pu, with ratios varying around the fallout average for the region. However, 241Pu/239Pu ratios consistently remained below the regional fallout ratio. The 236U/239Pu ratio was notably lower than global fallout values. The study suggests that stratospheric fallout is the main source of 236U and 241Pu, while 239Pu and 240Pu reflect tropospheric fallout from nuclear tests in Australia and French Polynesia. The findings emphasize the need for multiple samples to assess Pu contamination in the Southern Hemisphere.	Integrated 240Pu/239Pu atom ratios in the peat bog cores ranged above and below the fallout average ratio for 0-30°S, indicating a heterogeneous distribution of 239Pu and 240Pu. 241Pu/239Pu ratios consistently remained below the fallout ratio for the same region, suggesting a different behavior for 241Pu compared to 239Pu and 240Pu. The study highlights the importance of analyzing a representative number of samples to assess Pu contamination and its various origins in a specific region in the Southern Hemisphere, due to its heterogeneous distribution. Results based on single sample analysis should be interpreted with caution. The integrated 236U/239Pu atom ratio in the studied core was significantly lower than values reported for global fallout in the Northern Hemisphere, indicating a different source or transport mechanism for 236U. The results suggest that stratospheric fallout is the main source of both 236U and 241Pu at the studied site, while 239Pu and 240Pu show the influence of tropospheric fallout from low-yield tests conducted in Australia and French Polynesia. The study highlights the importance of analyzing a representative number of samples to assess Pu contamination and its various origins in a specific region in the Southern Hemisphere, due to its heterogeneous distribution. Results based on single sample analysis should be interpreted with caution.	Chamizo, E., Raaf, C., Lopez-Lora, M., Garcia-Tenorio, R., Holm, E., Rabesiranana, N., and Padehontaa-Hiaa, G. (2020). Insights into the Pu isotopic composition (239Pu, 240Pu, and 241Pu) and 236U in marshlands from Madagascar. Science of The Total Environment. doi:10.1016/j.scitotenv.2020.139993
28	Clymo, R.S., Oldfield, F., Appleby, P.G., Pearson, G.W., Ratnesar, P., and Richardson, N.	1990	The record of atmospheric deposition on a rainwater-dependant peatland	Philosophical Transactions of the Royal Society B: Biological Sciences	This study focuses on rainwater-dependent peatlands in Southwest Scotland as archives of atmospheric deposition, offering advantages over lake sediments. Various dating methods were used to establish core timescales. Element retention varied, with hummocks retaining more than hollows. Profiles were reconstructed using cumulative dry mass or decay-corrected dry mass for linear age scales.	Rainwater-dependent peatlands in Southwest Scotland provide a record of atmospheric deposition. Cores were dated using a combination of methods, including 14C 'wiggles matching', pollen events, 210Pb dating, and the 241Am event. Element retention varied, with some elements like Na showing less than 1% retention, while N showed complete retention. Hummocks retained more elements than hollows, with higher quotients observed for Al, Mn, Fe, and Zn. Profiles were reconstructed using cumulative dry mass or decay-corrected dry mass for linear age scales, reflecting variations in element influx and relocation in the peat.	Clymo, R.S., Oldfield, F., Appleby, P.G., Pearson, G.W., Ratnesar, P., and Richardson, N. (1990). The record of atmospheric deposition on a rainwater-dependant peatland. Phil. Trans. R. Soc. Lond. B., 327, 331-338.
29	Coggins, A.M., Jennings, S.G., and Ebinghaus, R.	2006	Accumulation rates of the heavy metals lead, mercury and cadmium in ombrotrophic peatlands in the west of Ireland.	Atmospheric environment	This study in Irish bogs examined the vertical distribution of heavy metals (Hg, Pb, Cd) using 210Pb dating. Metal accumulation rates peaked between 1950 and 1970. Pb and Hg rates were lower than in Europe but similar to North America, suggesting long-range metal transport. Letterfrack showed higher metal concentrations possibly due to local sources.	Metal accumulation rates peaked between 1950 and 1970. Pb and Hg rates were lower than in Europe but similar to North America. Cd rates at Letterfrack were lower than in Eastern Europe. Letterfrack had higher metal concentrations possibly due to local sources	Coggins, A.M., Jennings, S.G., and Ebinghaus, R. (2006). Accumulation rates of the heavy metals lead, mercury and cadmium in ombrotrophic peatlands in the west of Ireland. Atmospheric environment, 40, 260-278.

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30	Cwanek, A., and Lokas, E.	2022	Deposition chronologies in a peat bog from Spitsbergen (High Arctic) using the 210Pb dating method.	Polish polar research	This study investigates peat accumulation rates and 210Pb fluxes in wetlands in Spitsbergen, Svalbard. Six peat cores collected in the Hornsund region were analyzed using 210Pb dating techniques. The study aims to understand the factors influencing peat accumulation rates in this Arctic region.	The study found that 210Pb flux values in the examined peat cores ranged from 28 to 50 Bq m ² /y, consistent with levels of 222Rn emanation estimated for northern latitudes. The vertical and mass accumulation rates were slightly lower than reference data for peatlands of 50°–70°N. The highest peat accumulation rates were observed in the upper part of the cores, possibly due to low compaction and decomposition in the youngest peat layers. Positive correlations were found between peat accumulation rate and organic matter content, as well as negative correlations with bulk density. The study suggests that recent air temperature and precipitation gradients may have affected peat growth rates, indicating the need for further investigation. Overall, the findings contribute valuable data to the understanding of recent peat deposits in Spitsbergen.	Cwanek, A., and Lokas, E. (2022). Deposition chronologies in a peat bog from Spitsbergen (High Arctic) using the 210Pb dating method. Polish polar research, 43, 4, 291-310. DOI: 10.24425/ppr.2022.143310
31	Davies, L. J., Appleby, P.G., Jensen, B.J.L., Magnan, G., Mullan-Boudreau, G., Noernberg, T., Shannon, B., Shotyk, W., van Bellen, S., Zaccone, C., Froese, D. G.	2018	High-resolution age modelling of peat bogs from northern Alberta, Canada, using pre- and post-bomb 14C, 210Pb and historical cryptotephra	Quaternary Geochronology	The study examines age dating techniques in peat profiles from six peat bogs in Alberta to investigate offsets and biases in commonly used methods. It integrates data using Bayesian age models and compares dates produced by various techniques to understand environmental changes.	The study reveals consistent offsets between 14C and 210Pb dates pre-1960s at five sites, but tephra-corrected 210Pb data improves coherence at three sites. Environmental histories highlight periods of significant changes in accumulation rate due to fire events, permafrost development, and surficial drying. Using any single method to date peat profiles with non-uniform accumulation over time may be unreliable, but a multi-method approach with Bayesian statistics can produce more robust chronologies. New cryptotephra data for the Alberta region, including historical eruptions, are also reported.	Davies, L. J., Appleby, P.G., Jensen, B.J.L., Magnan, G., Mullan-Boudreau, G., Noernberg, T., Shannon, B., Shotyk, W., van Bellen, S., Zaccone, C., Froese, D. G. (2018). High-resolution age modelling of peat bogs from northern Alberta, Canada, using pre- and post-bomb 14 C, 210 Pb and historical cryptotephra. Quaternary Geochronology. doi:10.1016/j.quageo.2018.04.008
32	Donnelly, C.M.	2013	Testing recent chronological techniques for peat sites with contrasting chronological influences.	MSc(R) Thesis	The thesis explores recent radionuclide dating techniques in ombrotrophic peat bogs in West Central Scotland, comparing undisturbed and previously forested sites. It demonstrates that 210Pb dating using CIC or CRS methods and 241Am dating provide consistent chronologies with rigorous sampling techniques and high resolution sampling increments.	The study shows that 137Cs and 32Si are not reliable for deriving chronologies in peat. Temporal variations in deposition of anthropogenic species (ash, Pb, Pb isotopes) align with historical variations. Metal inventories are consistently higher in the unforested site compared to the previously forested site, suggesting long-term differences rather than short-term effects of the forest. This highlights the limitations of extrapolating information on regional contaminant deposition from a single core.	Donnelly, C.M. (2013). Testing recent chronological techniques for peat sites with contrasting anthropogenic influences. MSc(R) Thesis, University of Glasgow, Scottish Universities Environmental Research Centre East Kilbride, UK.
33	Farmer, J.G., Graham, M.C., Yafa, C., Cloy, J.M., Freeman, A.J., and MacKenzie, A.B.	2006	Use of 206Pb/207Pb ratios to investigate the surface integrity of peat cores used to study the recent depositional history and geochemical behaviour of inorganic elements in peat bogs.	Global and Planetary change	The study examines the surface integrity of peat bog cores from Flanders Moss, central Scotland, collected during 1996–2001. Using the 206Pb/207Pb atom ratio trend, missing material equivalent to 25±7 years was identified in one core, indicating potential issues with core collection methods. After correcting for vertical offset, profiles of various elements in three cores showed excellent matching, underscoring the importance of reliable core sampling and lead isotope ratio profiles for accurate environmental record interpretation.	One core showed missing material equivalent to 25±7 years, suggesting issues with core collection methods. However, after correcting for vertical offset, profiles of various elements in three cores matched well. This highlights the importance of reliable core sampling and lead isotope ratio profiles, supplemented by radionuclide data, for ensuring accurate interpretation of environmental records.	Farmer, J.G., Graham, M.C., Yafa, C., Cloy, J.M., Freeman, A.J., and MacKenzie, A.B. (2006). Use of 206Pb/207Pb ratios to investigate the surface integrity of peat cores used to study the recent depositional history and geochemical behaviour of inorganic elements in peat bogs. Global and Planetary change, 53, 240-248.

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34	Farmer, J.G., MacKenzie, A.B., Graham, M.C., Macgregor, K., and Kirika, A.	2015	Development of recent chronologies and evaluation of temporal variations in Pb fluxes and sources in lake sediment and peat cores in a remote, highly radiogenic environment, Cairngorm Mountains, Scottish Highlands.	Geochimica et Cosmochimica Acta	Stable Pb isotope analyses combined with ²¹⁰ Pb and anthropogenic radionuclide chronologies are used to assess historical Pb fluxes and sources in lake sediments or peat cores. However, areas with high natural radioactivity can pose challenges due to complex disequilibrium in the ²³⁸ U decay series and anomalous stable isotope ratios from radiogenic Pb. A study of Loch Einich in Scotland's Cairngorm Mountains reveals recent diagenetic re-deposition of U and ²²⁶ Ra, requiring a modified ²¹⁰ Pb chronology. The indigenous Pb characteristics were established using ²³⁰ Th, ²³² Th, and stable Pb isotope ratios, showing complications in source apportionment due to multiple natural and anthropogenic sources.	The study found recent diagenetic re-deposition of U and ²²⁶ Ra in Loch Einich sediment, impacting the ²¹⁰ Pb chronology, but the ²⁴¹ Am chronology provided confidence in the results. Mobility of ¹³⁷ Cs in the sediment was observed. The abundance of radiogenic, indigenous Pb complicates source apportionment, particularly in the 20th century. Historical trends in indigenous and anthropogenic Pb fluxes were established using Scottish moss samples. Comparison with nearby peat cores showed agreement in anthropogenic Pb deposition trends, suggesting significant catchment-derived Pb fluxes to Loch Einich sediment in the late 20th century.	Farmer, J.G., MacKenzie, A.B., Graham, M.C., Macgregor, K., and Kirika, A. (2015). Development of recent chronologies and evaluation of temporal variations in Pb fluxes and sources in lake sediment and peat cores in a remote, highly radiogenic environment, Cairngorm Mountains, Scottish Highlands. <i>Geochimica et Cosmochimica Acta</i> , 156, 25-49.
35	Fialkiewicz-Koziel, B., Kolaczek, P., Piotrowska, N., Michczynski, A., Lokas, A., Wachniew, P., Woszczyk, M., and Sensula, B.	2014	High-resolution age-depth model of a peat bog in Poland as an important basis for paleoenvironmental studies	Radiocarbon	This study develops a high-resolution age-depth model for the Puścizna Mała peat bog in southern Poland using ²¹⁰ Pb and ¹⁴ C measurements, confirmed by pollen diagrams and peat bulk composition. The peat profile spans nearly 2000 years, revealing anthropogenic and climatic changes, including events like the Roman period, Migration period, Medieval times, and the Industrial Revolution. However, discrepancies arise in dating results for certain core segments, challenging the model's accuracy.	The age-depth model reflects major historical events, but discrepancies occur in dating results for the core segment between 22–45 cm, posing challenges. The highest peat accumulation rate of 2 mm yr ⁻¹ during AD 1300–1400 conflicts with the section of highest peat decomposition. Similarly, the onset of a drastic forest decline around AD 1280–1340 is hard to explain based on historical data. Validation using lithology, bulk density, and pollen data suggests external factors like agricultural activity, water-level fluctuations, and natural climate variations may have influenced peat formation, leading to discrepancies in accumulation rates.	Fialkiewicz-Koziel, B., Kolaczek, P., Piotrowska, N., Michczynski, A., Lokas, A., Wachniew, P., Woszczyk, M., and Sensula, B. (2014). High-resolution age-depth model of a peat bog in Poland as an important basis for paleoenvironmental studies. <i>Radiocarbon</i> , 56, 1, 109-125.
36	Fialkiewicz-Koziel, B., Kolaczek, P., Michczynski, A., and Piotrowska, N.	2015	The construction of a reliable absolute chronology for the last two millennia in an anthropogenically disturbed peat bog: Limitations and advantages of using a radioisotopic proxy and age-depth modelling.	Quaternary Geochronology	This paper examines the challenges in constructing reliable chronologies for anthropogenically disturbed peatlands over the last two millennia using ²¹⁰ Pb and ¹⁴ C dating. It explores scenarios based on dating from a peat core in the Puscizna Krauszowska bog, southern Poland, to test hypotheses related to mechanical disturbances and misleading chronologies. The study highlights the importance of considering all available information in radionuclide date inversions to avoid incorrect interpretations of biota proxy records.	The study reveals marked ¹⁴ C date inversions in the peat core, indicating mechanical disturbances. Failure to appropriately interpret these inversions before age-depth modeling can lead to misleading chronologies. Sections of peat profiles with prominent age inversions or strong discrepancies between peat accumulation rate and bulk density should be rejected from age-depth modeling, even if interpretable chronologies can be obtained. This underscores the need for careful consideration of all data in constructing chronologies for anthropogenically disturbed peatlands.	Fialkiewicz-Koziel, B., Kolaczek, P., Michczynski, A., and Piotrowska, N. (2015). The construction of a reliable absolute chronology for the last two millennia in an anthropogenically disturbed peat bog: Limitations and advantages of using a radioisotopic proxy and age-depth modelling. <i>Quaternary Geochronology</i> , 25, 83-95.
37	Gaca, P., Tomankiewicz, E., Mietelski, J.W., Grabowska, S., and Kubica, B.	2006	Radionuclides in two rised peat profiles collected from Ko cieliska Valley in the Tatra Mountains.	Journal of Radioanalytical and Nuclear Chemistry	This study investigated the distribution of various radionuclides in peat profiles from Koscieliska Valley in the Western Tatra Mountains. The analysis revealed differences in the vertical distribution of radionuclides and calculated cumulated depositions, indicating partial removal of radiostrontium. The peat growth rate was estimated using different methods, showing discrepancies likely due to the solubility of lead.	The study found that the vertical distribution of radionuclides varied between the two peat profiles, suggesting differences in deposition and migration processes. The calculated cumulated depositions showed partial removal of radiostrontium in the examined part of the profile, indicating possible post-depositional processes affecting the radionuclide distribution. The estimated peat growth rate based on the position of maxima of radionuclide distributions differed from that based on the distribution of ²¹⁰ Pb, highlighting the complexity of interpreting peat profiles and the need for careful consideration of various factors.	Gaca, P., Tomankiewicz, E., Mietelski, J.W., Grabowska, S., and Kubica, B. (2006). Radionuclides in two rised peat profiles collected from Ko cieliska Valley in the Tatra Mountains. <i>Journal of Radioanalytical and Nuclear Chemistry</i> , 267, 2, 443–448.

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38	Hansson, S., Kaste, J., and Bindler, R.	2012	Re-thinking the record: accumulation of radiometric tracers and other atmospherically supplied elements in peatlands.	Proceedings of the 14th International Peat Congress	This study focuses on understanding the biogeochemical processes and trace element distributions in peat archives, specifically looking at carbon dynamics and environmental changes. By analyzing radiometric isotopes and various elements in surface peat cores from a raised bog, the study aims to determine the representativity of single cores and the reliability of dating decadal scale changes within them.	The research highlights the challenges in interpreting peat cores as absolute or relative records and determining the realistic temporal resolution for analysis. By analyzing radiometric isotopes and a range of major, minor, and trace elements, the study aims to improve our understanding of the basic biogeochemical processes preserved in peat archives. The findings will contribute to a better understanding of past environmental changes and carbon dynamics, providing valuable insights into the reliability of using peat cores for interpreting decadal scale changes.	Hansson, S.V., Kaste, J.M., and Bindler, R. (2012). Re-thinking the record: accumulation of radiometric tracers and other atmospherically supplied elements in peatlands. Proceedings of the 14th International Peat Congress, Stockholm. Extended abstract No. 449.
39	Hansson, S.V., Kaste, J.M., Olid, C., and Bindler, R.	2014	Incorporation of radiometric tracers in peat and implications for estimating accumulation rates.	Science of the Total Environment	This study focuses on accurately dating peat accumulation to reconstruct past changes in atmospheric metal deposition and carbon burial. By analyzing fallout radionuclides and total Pb and Hg in peat cores from Swedish peatlands, the study addresses the consequence of estimating accumulation rates due to downwashing of atmospherically supplied elements within peat.	The research reveals the presence of ⁷ Be down to 18–20 cm in some cores and a broad vertical distribution of ²⁴¹ Am without a well-defined peak, suggesting downward transport of atmospherically deposited elements in the uppermost peat layers. The application of the CRS age–depth model leads to unrealistic peat mass accumulation rates, while the newly proposed IP-CRS model, which accounts for potential downward transport of ²¹⁰ Pb, yields more realistic rates. This approach provides better calibration of peat records with monitoring data and more accurate estimates of peat accumulation and past deposition, although further research is needed to understand variations in downwashing over time.	Hansson, S.V., Kaste, J.M., Olid, C., and Bindler, R. (2014). Incorporation of radiometric tracers in peat and implications for estimating accumulation rates. Science of the Total Environment, 493, 170–177. http://dx.doi.org/10.1016/j.scitotenv.2014.05.088
40	Hayward, P.M. and Clymo, R.S.	1982	Profiles of water content and pore size in Sphagnum and peat, and their relation to peat bog chronology.	Proceedings of the Royal Society, series: B: Life sciences	This study investigates the growth rate of bog mosses (Sphagnum) in relation to water supply, focusing on two species, <i>S. papillosum</i> and <i>S. capillifolium</i> , which occupy different habitats in relation to the water table. Non-destructive measurements of water content in cores were used to infer the size and distribution of spaces around the plants, revealing differences between the two species in water-fillable spaces and water content at different depths of the water table.	The study finds that <i>S. capillifolium</i> , found on hummocks well above the water table, has smaller water-fillable spaces around it compared to <i>S. papillosum</i> , which is usually found not far above the water table. The water content in the apical tuft of branches, where growth occurs, is greater in <i>S. capillifolium</i> than in <i>S. papillosum</i> for a given depth of the water table. Additionally, the water table is at a greater depth below <i>S. capillifolium</i> than below <i>S. papillosum</i> for a given water content in the apex. The study highlights the ecological significance of these differences and the importance of measuring water content while water is flowing.	Hayward, P.M. and Clymo, R.S. (1982). Profiles of water content and pore size in Sphagnum and peat, and their relation to peat bog chronology. Proc. R. Soc. Lond. B., 215, 299-325. https://doi.org/10.1098/rspb.1982.0044
41	Pendea, I. F. and Chmura, G. L.	2012	A high-resolution record of carbon accumulation rates during boreal peatland initiation.	Biogeosciences	This study investigates the role of boreal peatlands in the global carbon cycle and their feedbacks to climate. It focuses on a fen in James Bay, Quebec, undergoing transformation from a salt marsh, providing a decadal-scale carbon accumulation record. The research aims to unravel the links between peatland dynamics, carbon storage, and climate, particularly during the early Holocene when atmospheric CO ₂ concentrations decreased.	The study provides a detailed record of carbon accumulation rates in the fen, revealing high rates during different stages of wetland development. Short-term carbon accumulation rates during various stages of wetland evolution were significantly higher than the long-term average for northern peatlands, suggesting rapid carbon sequestration during early stages of peatland development. The research highlights the potential impact of future climate warming, which may decrease rates of land emergence and formation of new coastal wetlands, leading to decreased carbon storage in these ecosystems.	Pendea, I. F. and Chmura, G. L. (2012). A high-resolution record of carbon accumulation rates during boreal peatland initiation. Biogeosciences, 9, 2711–2717. https://doi.org/10.5194/bg-9-2711-2012 .
42	Kelemen, S., Savin, C.-F., Timar-Gabor, A., and Begy, R.-C.	2023	A comparative study on digestion methods for ²¹⁰ Po determinations by alpha spectrometry on peat bog samples.	Journal of Radioanalytical and Nuclear Chemistry	This study compares four acid digestion techniques with a control procedure for determining ²¹⁰ Po activities in peat bog samples using alpha spectrometry. The results show that method I yielded similar results to the reference values with a slight positive variance, while method II had a significant positive deviation. Methods III and IV had negative deviations. Method II, which reduces digestion time significantly while providing similar results to the control method, is considered more suitable for fast determinations.	Method I (reduced reagents) yielded results similar to reference values with a positive variance of 0.5%. Method II (dripping 10 mL of H ₂ O ₂ on the samples) had a significant positive deviation of 2.1% but reduced digestion time by 94%. Method II provides similar ²¹⁰ Po activity results and ²⁰⁹ Po yield to the control method, making it suitable for fast determinations. Methods III (adding 6 mL 65% HNO ₃) and IV (porcelain crucibles) had negative deviations from the reference value.	Kelemen, S., Savin, C.-F., Timar-Gabor, A., and Begy, R.-C. (2023). A comparative study on digestion methods for ²¹⁰ Po determinations by alpha spectrometry on peat bog samples. Journal of Radioanalytical and Nuclear Chemistry. https://doi.org/10.1007/s10967-023-09157-z

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43	Le Roux, G., Aubert, D., Stille, P., Krachler, M., Kober, B., Cheburkin, A., Bonani, G., and Shotyky, W.	2005	Recent atmospheric Pb deposition at a rural site in southern Germany assessed using a peat core and snowpack, and comparison with other archives.	Atmospheric Environment,	This study quantifies the rate of atmospheric lead (Pb) accumulation in a peat bog in the Black Forest, Southern Germany, using a peat core dated by 210Pb and 14C. The most recent Pb accumulation rate in the peat is similar to that obtained from a snowpack on the bog surface, and both are in agreement with published values of direct atmospheric Pb fluxes in the region. The isotopic composition of Pb in the peat samples shows that recent inputs are dominated by anthropogenic Pb, and the chronology and isotopic composition of atmospheric Pb accumulation in the peat are similar to records from other peat bogs and herbarium samples of Sphagnum.	The recent Pb accumulation rate in the peat bog (2.5 mg/m ² /y) is similar to that obtained from a snowpack on the bog surface (1 to 4 mg/m ² /y). The Pb accumulation rates recorded by the peat in the last 25 years are 50 to 200 times greater than the 'natural' average background rate of atmospheric Pb accumulation. The isotopic composition of Pb in the peat shows that recent inputs are dominated by anthropogenic Pb. The chronology and isotopic composition of atmospheric Pb accumulation in the peat are similar to records from other peat bogs and herbarium samples of Sphagnum, pointing to a common Pb source to the region for the past 150 years. Pb contamination occurring before 1850 in southwestern Germany differs from the record in Switzerland, mainly due to mining activity in the Black Forest. Peat cores from ombrotrophic bogs can yield accurate records of atmospheric Pb deposition with careful collection, handling, preparation, and analysis.	Le Roux, G., Aubert, D., Stille, P., Krachler, M., Kober, B., Cheburkin, A., Bonani, G., and Shotyky, W. (2005). Recent atmospheric Pb deposition at a rural site in southern Germany assessed using a peat core and snowpack, and comparison with other archives. <i>Atmospheric Environment</i> , 39, 6790–6801. doi:10.1016/j.atmosenv.2005.07.026
44	Li, C., Le Roux, G., Sonke, J., van Beek, P., Souhaut, M., Van der Putten, N., and De Vleeschouwer, F.	2017	Recent 210Pb, 137Cs and 241Am accumulation in an ombrotrophic peatland from Amsterdam Island (Southern Indian Ocean).	Journal of Environmental Radioactivity	This study examines the use of 210Pb, 137Cs, and 241Am radionuclides in sediment and peat chronologies, focusing on global aerosol-climate interactions. Analyzing a peat core from Amsterdam Island (AMS), researchers found that the 210Pb flux at AMS (98 ± 6 Bq/m ² /y) is higher than in coastal areas of Argentina and Chile, likely due to enhanced 222Rn activity from continental air masses passing over southern Africa and/or Madagascar. The 137Cs inventory at AMS is 144 ± 13 Bq/m ² (corrected to 1969), contributing to data coverage in the Southern Hemisphere.	The 210Pb flux at AMS is 98 ± 6 Bq/m ² /y, agreeing with data from Madagascar and South Africa. The elevated 210Pb flux at AMS may result from enhanced 222Rn activity and frequent rainfall. The 210Pb flux at AMS is higher than those in coastal areas in Argentina and Chile, which are dominated by marine westerly winds with low 222Rn activities. The 137Cs inventory at AMS is 144 ± 13 Bq/m ² (corrected to 1969). The study contributes to underrepresented data coverage in the mid-latitudes of the Southern Hemisphere, particularly in the South Indian Ocean.	Li, C., Le Roux, G., Sonke, J., van Beek, P., Souhaut, M., Van der Putten, N., and De Vleeschouwer, F. (2017). Recent 210Pb, 137Cs and 241Am accumulation in an ombrotrophic peatland from Amsterdam Island (Southern Indian Ocean). <i>Journal of Environmental Radioactivity</i> , 175-176, 164-169.
45	Lokas, E., Mietelski, J.W., Ketterer, M.E., Kleszcz, K., Wachniew, P., Michalska, S., and Miecznik, M.	2013	Sources and vertical distribution of 137Cs, 238Pu, 239+240Pu and 241Am in peat profiles from southwest Spitsbergen.	Applied Geochemistry	This study investigates man-made radionuclide activities in peat deposits in SW Spitsbergen, using gamma spectrometry, alpha spectrometry, and ICPMS. The peat cores show maximum activities corresponding to the 1963/1964 global maximum fallout from nuclear weapons testing, with some profiles altered by water infiltration post-deposition. Activity ratios indicate a mix of global and regional sources of radionuclides in the Svalbard area, with Pu dominated by global fallout and Cs showing post-depositional mobility.	The 238Pu/239+240Pu activity ratios varied from 0.02 ± 0.01 to 0.09 ± 0.03, suggesting global fallout as the dominant source of Pu. The 239+240Pu/137Cs activity ratios varied from 0.01 ± 0.01 to 0.42 ± 0.11, which apparently arises from the post-depositional mobility of 137Cs. The 241Am/239+240Pu activity ratios ranged between 0.10 ± 0.02 and 1.5 ± 0.3 and exceed the published global fallout ratio for Svalbard of 0.37 due to the relatively higher geochemical mobility of Pu vs. Am and/or ingrowth of Am from the decay of 241Pu. The atom ratio 240Pu/239Pu ranged from 0.142 ± 0.006 to 0.241 ± 0.027; however, the vast majority of peat samples exhibited 240Pu/239Pu atom ratios similar to the stratospheric fallout (~0.18).	Lokas, E., Mietelski, J.W., Ketterer, M.E., Kleszcz, K., Wachniew, P., Michalska, S., and Miecznik, M. (2013). Sources and vertical distribution of 137Cs, 238Pu, 239+240Pu and 241Am in peat profiles from southwest Spitsbergen. <i>Applied Geochemistry</i> , 28, 100–108. http://dx.doi.org/10.1016/j.apgeochem.2012.10.027
46	Lujanienė, G., Sapolaite, J., Remeikis, V., Lujanas, V., and Jermolajev, A.	2006	Cesium, americium and plutonium isotopes in ground level air of Vilnius	Czechoslovak Journal of Physics	This study presents systematic observations of radionuclide composition and concentration in the atmosphere in Vilnius since 1963. The radiation situation in Lithuania is currently determined by forest fires and resuspension products from the Ukraine and Belarus. Activity concentrations of 137Cs were measured in short-term samples, while plutonium and americium were measured in monthly samples.	After nuclear weapon tests and the Chernobyl NPP accident, increases in radionuclide activity concentration in the atmosphere were observed. The high activity concentrations of 238Pu, 239,240Pu, 241Am during the Chernobyl accident were attributed to transport of "hot particles." Activity concentrations in 1995–2003 of 241Am and 239,240Pu isotopes ranged from 0.3 to 500 and from 1 to 500 nBq/m ³ , respectively. The 238Pu/239,240Pu activity ratio in measured samples differed from 0.03 to 0.45, and a decrease in 240Pu/239Pu atomic ratio from 0.30 to 0.19 was observed in 1995–2003.	Lujanienė, G., Sapolaite, J., Remeikis, V., Lujanas, V., and Jermolajev, A. (2006). Cesium, americium and plutonium isotopes in ground level air of Vilnius. <i>Czechoslovak Journal of Physics</i> , 56, Suppl. D 55-61.

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47	Magnan, G., van Bellen, S., Davies, L., Froese, D., Garneau, M., Mullan-Boudreau, G., Zaccone, C., Shoty, W.	2018	Impact of the Little Ice Age cooling and 20th century climate change on peatland vegetation dynamics in central and northern Alberta using a multi-proxy approach and high-resolution peat chronologies.	Quaternary Science Reviews	This study investigates the impact of climate change over the last 1000 years on peatland vegetation dynamics in the boreal region of Alberta, Canada. By analyzing peat cores from several bogs, the research reconstructs past changes in vegetation communities using plant macrofossil analyses and high-resolution peat chronologies. Additional analyses of peat properties and environmental conditions provide further insights into these vegetation changes.	The study reveals significant changes in peatland vegetation and physical/chemical properties during the Little Ice Age (LIA) cooling period around 1700 CE and the subsequent 20th-century warming. During the LIA, some bogs recorded permafrost aggradation, resulting in drier conditions, increased peat humification, and a higher abundance of ericaceous shrubs and black spruce. Subsequent permafrost thaw led to wetter conditions, characterized by a shift towards Sphagnum sect. Cuspidata and a decline in black spruce. In the 20th century, a dominance of Sphagnum sect. Acutifolia (mainly Sphagnum fuscum) indicates the establishment of dry ombrotrophic conditions under warmer and drier climate conditions.	Magnan, G., van Bellen, S., Davies, L., Froese, D., Garneau, M., Mullan-Boudreau, G., Zaccone, C., Shoty, W. (2018). Impact of the Little Ice Age cooling and 20th century climate change on peatland vegetation dynamics in central and northern Alberta using a multi-proxy approach and high-resolution peat chronologies. <i>Quaternary Science Reviews</i> , 185, 230-243. https://doi.org/10.1016/j.quascirev.2018.01.015
48	Mazeika, J.	2006	Use of lead-210 and carbon-14 in investigations of peat accumulation in Aukštumala raised bog, western Lithuania	Baltica	The study focuses on two peat cores from the Aukštumala raised bog in Lithuania, dated using 210Pb and 14C methods. The research calculates net and linear peat accumulation rates, showing relatively constant rates over the last two hundred years, indicating a relatively undisturbed condition of the bog.		Mazeika, J. (2006). Use of lead-210 and carbon-14 in investigations of peat accumulation in Aukštumala raised bog, western Lithuania. <i>Baltica</i> , 19, 1, 30-37.
49	Mithcell, P.I., Schell, W.R., McGarry, A., Ryan, T.P., Sanchez-Cabeza, J.A., and Vidal-Quadras, A.	1992	Studies of the vertical distribution of 134Cs, 137Cs, 238Pu, 239,240Pu, 241Pu, 241Am, and 210Pb in ombrogenous mires at mid-latitudes.	Journal of Radioanalytical and Nuclear Chemistry, Articles	The study analyzed six peat cores from three unmodified bogs in Ireland for various radionuclides, including Cs, Pu, Am, and Pb. The cores were sectioned and analyzed to establish core chronologies and determine migration rates and relaxation depths of the radionuclides. The study also examined the contribution of Chernobyl fallout to the total radiocaesium inventory in each core.	The analysis revealed relaxation depths and migration rates for the radionuclides, providing insights into their behavior in the peat cores. The examination of Pu isotopic ratios (238Pu/239,240Pu and 241Pu/239,240Pu) shed light on their sources and distribution. The study also determined the contribution of Chernobyl fallout to the radiocaesium inventory in each core, demonstrating the impact of this event on the bogs in Ireland.	Mithcell, P.I., Schell, W.R., McGarry, A., Ryan, T.P., Sanchez-Cabeza, J.A., and Vidal-Quadras, A. (1992). Studies of the vertical distribution of 134Cs, 137Cs, 238Pu, 239,240Pu, 241Pu, 241Am, and 210Pb in ombrogenous mires at mid-latitudes. <i>Journal of Radioanalytical and Nuclear Chemistry, Articles</i> , 156, 2, 361-387.
50	Mroz, T., Lokas, E., Kocurek, J., and Gasiorek, M.	2017	Atmospheric fallout radionuclides in peatland from Southern Poland	Journal of Environmental Radioactivity	The study focused on two peat profiles from a Southern Polish bog, determining their geochronology using 210Pb, 238,239+240Pu, and 137Cs radiometric techniques. The 210Pb chronologies, established using the constant rate of supply model (CRS), were in good agreement with Pu isotopes and 137Cs time markers, indicating the accuracy of the 210Pb method for determining peat age and accumulation rate.	Maximum activities of Pu isotopes corresponded to the early 1960s, coinciding with the peak of nuclear weapon tests. Linear accumulation rates calculated from 238,239+240Pu and 137Cs vertical distributions showed variations in fallout isotopes' activities in different plant samples, with the highest activities of 137Cs and 210Pb found in <i>Calluna vulgaris</i> samples. Only two samples (<i>C. vulgaris</i> and leaves of <i>Oxycoccus quadripelatus</i>) contained 239p240Pu, indicating its limited presence in the peatland.	Mroz, T., Lokas, E., Kocurek, J., and Gasiorek, M. (2017). Atmospheric fallout radionuclides in peatland from Southern Poland. <i>Journal of Environmental Radioactivity</i> , 175-176, 25-33.

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51	Nowlan, N.V., Mitchell, P.I., Murray, D.A., Leon Vintro, L. and Seymour, E.M.	2000	Measurement and interpretation of ²¹⁰ Pb, ¹³⁷ Cs, ¹³⁴ Cs and ²⁴¹ Am profiles in relation to sedimentation in some Irish lakes.	Internationale Vereinigung für theoretische und angewandte Limnologie: Verhandlungen	Sediment cores from ten different lakes were retrieved and analyzed for ²¹⁰ Pb, ²¹⁴ Pb, ²¹⁴ Bi, ¹³⁴ Cs, ¹³⁷ Cs, and ²⁴¹ Am content. The cores were divided into sections, and the sediment chronologies were established using the constant rate of supply (CRS) and constant initial concentration (CIC) hypotheses. Accumulation rates in the lakes ranged from 0.02 to 0.18 g cm ⁻² year ⁻¹ , with significant changes in sedimentation regime detected in some lakes due to recent afforestation and/or improved drainage.	The ²¹⁰ Pb dating chronologies were confirmed by ¹³⁷ Cs, ¹³⁴ Cs, and ²⁴¹ Am dating, with the CRS hypothesis showing the best agreement with the anthropogenic tracers. Some limited vertical mobility of ¹³⁷ Cs and ²⁴¹ Am was observed, but this did not significantly impact the positions of the Chernobyl and weapons fallout peaks.	Nowlan, N.V., Mitchell, P.I., Murray, D.A., Leon Vintro, L. and Seymour, E.M. (2000). Measurement and interpretation of ²¹⁰ Pb, ¹³⁷ Cs, ¹³⁴ Cs and ²⁴¹ Am profiles in relation to sedimentation in some Irish lakes. Internationale Vereinigung für theoretische und angewandte Limnologie: Verhandlungen, 27,4, 2303-2306. DOI: 10.1080/03680770.1998.11901650
52	Odintsov, A.A., Sazhenyuk, A.D., and Satsyuk, V.A.	2004	Association of ⁹⁰ Sr, ¹³⁷ Cs, ²³⁹ , ²⁴⁰ Pu, ²⁴¹ Am, and ²⁴⁴ Cm with Soil Absorbing Complex in Soils Typical of the Vicinity of the Chernobyl NPP.	Radiochemistry	The study investigated the association of long-lived radionuclides with soil absorbing complexes in areas affected by radioactive fallout from the Chernobyl Nuclear Power Plant accident. Samples were collected along the western, northwestern, and northern tracks of the fallout. Sequential leaching was used to analyze the association of radionuclides with soil components.	In sandy soil samples from the northwestern track, a significant portion of ⁹⁰ Sr, ²³⁹ , ²⁴⁰ Pu, ²⁴¹ Am, and ²⁴⁴ Cm was associated with soil components, indicating potential mobility. Along the narrow western track, most of the radionuclides were incorporated in hot particles. The association of radionuclides with soil components varied depending on the radionuclide type and soil characteristics, highlighting the importance of these factors in determining radionuclide mobility.	Odintsov, A.A., Sazhenyuk, A.D., and Satsyuk, V.A. (2004). Association of ⁹⁰ Sr, ¹³⁷ Cs, ²³⁹ , ²⁴⁰ Pu, ²⁴¹ Am, and ²⁴⁴ Cm with Soil Absorbing Complex in Soils Typical of the Vicinity of the Chernobyl NPP. Radiochemistry, 46, 1, 95-101. Translated from Radiokhimiya, 46, 1, 87-92.
53	Odintsov, A.A., Pazukhin, E.M., and Sazhenyuk, A.D.	2005	Distribution of ¹³⁷ Cs, ⁹⁰ Sr, ²³⁹ + ²⁴⁰ Pu, ²⁴¹ Am, and ²⁴⁴ Cm among Components of Organic Matter of Soils in Near Exclusion Zone of the Chernobyl NPP.	Radiochemistry	The study investigated the distribution of Chernobyl-derived radionuclides among organic fractions of different soil types collected from the Chernobyl Exclusion Zone along the North-Western radioactive fallout track. The soil types included soddy-podzolic, sandy, soddy-meadow, and peat soils.	The results showed that regardless of the soil type, a significant portion (80-85%) of ¹³⁷ Cs is tightly fixed on the mineral fraction of the soil. Depending on the soil type, 50-70% of ⁹⁰ Sr and 15-45% of ²⁴¹ Am are associated with fulvic acid fractions. ²⁴¹ Am and ²⁴⁴ Cu were similarly distributed among the organic acid fractions. In all soil types, ²³⁹ + ²⁴⁰ Pu is associated primarily with humic acid fractions. Natural ²³⁰ , ²³² Th, and technogenic ²³⁹ + ²⁴⁰ Pu were similarly distributed among the organic fractions. These findings highlight the different behavior and associations of radionuclides with organic fractions in various soil types.	Odintsov, A.A., Pazukhin, E.M., and Sazhenyuk, A.D. (2005). Distribution of ¹³⁷ Cs, ⁹⁰ Sr, ²³⁹ + ²⁴⁰ Pu, ²⁴¹ Am, and ²⁴⁴ Cm among Components of Organic Matter of Soils in Near Exclusion Zone of the Chernobyl NPP. Radiochemistry, 47, 1, 96-101. Translated from Radiokhimiya, 47, 1, 91-96.
54	Oldfield, F., Thompson, R., Crooks, P. R. J., Gedye, S. J., Hall, V. A., Harkness, D. D., Housley, R. A., McCormac, F. G., Newton, A., Pilcher, J. R., Renberg, I., and Richardson, N.	1997	Radiocarbon dating of a recent high-latitude peat profile: Stor Åmyran, northern Sweden.	The Holocene	The study explores the use of high-precision (HP) and AMS ¹⁴ C determinations in dating recent peat at Stor Åmyran, near Umeå, northern Sweden. A detailed chronology of accumulation, based on ¹⁴ C dating, the occurrence of the Askja AD 1875 tephra, and ²⁴¹ Am measurements, has been derived for the last 700 years.	The results reveal significant changes in the mass balance of the peat profile, with minimum rates of net carbon sequestration overlapping with a period of minimum spring and summer temperatures documented by tree-ring evidence. The paper presents a methodology for calculating past changes in the rate of net carbon sequestration in boreal peatlands and for exploring the effects of climatic variations, including possible future global warming, on these rates.	Oldfield, F., Thompson, R., Crooks, P. R. J., Gedye, S. J., Hall, V. A., Harkness, D. D., Housley, R. A., McCormac, F. G., Newton, A., Pilcher, J. R., Renberg, I., and Richardson, N. (1997). Radiocarbon dating of a recent high-latitude peat profile: Stor Åmyran, northern Sweden. The Holocene, 7, 3, 283-290.
55	Oldfield, F., Gedye, S.A., Hunt, A., Jones, J.M., Jones, M.D.H., and Richardson, N.	2015	The magnetic record of inorganic fly ash deposition in lake sediments and ombrotrophic peats.	The Holocene	The study investigates the use of magnetic measurements of recent lake sediments and ombrotrophic peats to reconstruct the history of deposition of inorganic fly-ash spheres, primarily from industrial activities. The research focuses on sites in the United Kingdom, Scandinavia, and North America, using various chronologies based on moss-increment counting, radioisotope dating, and pollen analysis.	The results suggest that magnetic concentration-linked measurements accurately capture the record of industrial development, dating back to the 16th century in some peat profiles in North-West England and to the mid-20th century in Arctic Scandinavia. Lake sediment profiles mainly from the United Kingdom indicate increases in fly-ash deposition dating to the late 19th or early 20th century. However, the study notes the need for caution in using magnetic records of fly-ash deposition as a marker for the onset of the Anthropocene, due to potential selective dissolution of magnetic minerals.	Oldfield, F., Gedye, S.A., Hunt, A., Jones, J.M., Jones, M.D.H., and Richardson, N. (2015). The magnetic record of inorganic fly ash deposition in lake sediments and ombrotrophic peats. The Holocene, 25, 1, 215-225. DOI: 10.1177/0959683614556379

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56	Olid, C., Garcia-Orellana, J., Martinez-Cortizas, A., Masque, P., Peiteado, E., and Sanchez-Cabeza, J.-A.	2008	Role of Surface Vegetation in 210Pb-Dating of Peat Cores	Environmental Science and Technology	The study evaluates the radionuclide and lead (Pb) content of the biologically active layer (overlying vegetation compartment) in ombrotrophic peat bogs to assess its impact on total inventories and 210Pb-derived chronology. Two short peat cores from a bog in Galicia, Spain, were analyzed for 210Pb, 137Cs, 241Am, and Pb.	The total Pb inventory was underestimated by approximately 12% when the plant material was not included in the record. Activities of 210Pb and 137Cs in the upper layers were significant due to their atmospheric origin and root uptake, leading to potential underestimations of total inventories by 25-36% for 137Cs and 39-49% for 210Pb when excluding plant material. Including the surface vegetation in the chronology resulted in a better agreement between the 210Pb chronology and artificial radionuclide dating, highlighting the importance of considering the biologically active layer in peat chronology for accurate reconstruction of atmospheric pollutant fluxes.	Olid, C., Garcia-Orellana, J., Martinez-Cortizas, A., Masque, P., Peiteado, E., and Sanchez-Cabeza, J.-A. (2008). Role of surface vegetation in 210Pb-dating of peat cores. <i>Environmental Science & Technology</i> , 42, 23, 8858-8864. DOI: 10.1021/es801552v
57	Olid, C., Garcia-Orellana, J., Martinez-Cortizas, A., Masque, P., Peiteado-Varela, E., and Sanchez-Cabeza, J.-A.	2010	Multiple site study of recent atmospheric metal (Pb, Zn and Cu) deposition in the NW Iberian Peninsula using peat cores.	Science of The Total Environment	The study investigates atmospheric metal deposition in Southern Europe since the Industrial Period using (210)Pb-dated peat cores from ombrotrophic bogs in Galicia, NW Iberian Peninsula. Concentration profiles of Pb, Zn, and Cu were analyzed, revealing variations in metal concentrations and cumulative inventories among the cores.	Maximum metal concentrations varied among the cores, with Pb ranging from 70 to 128 µg/g, Zn from 128 to 231 µg/g, and Cu from 11 to 37 µg/g. Cumulative metal inventories varied by a factor of 3 among the cores, with Pb ranging from 132 to 329 µg/cm ² , Zn from 198 to 625 µg/cm ² , and Cu from 22 to 69 µg/cm ² . Enhanced (210)Pb accumulation suggested variations in net accumulation rates among peatlands. Corrections applied to the profiles showed increasing concentrations and atmospheric fluxes of Pb, Zn, and Cu since the mid-20th century, with maximum Pb fluxes observed in 1955-1962, two orders of magnitude higher than in the pre-industrial period. Peaks in Pb fluxes before the maximum consumption of leaded petrol in Europe suggest the influence of local pollutant sources, such as coal mining and burning.	Olid, C., Garcia-Orellana, J., Martinez-Cortizas, A., Masque, P., Peiteado-Varela, E., and Sanchez-Cabeza, J.-A. (2010). Multiple site study of recent atmospheric metal (Pb, Zn and Cu) deposition in the NW Iberian Peninsula using peat cores. <i>Sci Total Environ.</i> , 408, 22, :5540-5549. DOI: 10.1016/j.scitotenv.2010.07.058.
58	Olid, C., Garcia-Orellana, J., Masque, P., Cortizas, A.M., Sanchez-Cabeza, J.-A.	2013	Improving the 210Pb-chronology of Pb deposition in peat cores from Chao de Lamoso (NW Spain).	Science of The Total Environment	The study focuses on using the (210)Pb-dating model, Constant Rate of Supply (CRS), to establish chronologies for peat deposits from Chao de Lamoso, an ombrotrophic mire in Galicia (NW Spain). It evaluates the accuracy of the CRS model by comparing Pb concentrations, enrichment factors (EFs), and fluxes with historical Pb use and atmospheric deposition.	The CRS-chronologies showed maximum Pb concentrations and EFs in the 1960s and late 1970s, consistent with historical Pb use. However, maximum Pb fluxes were dated earlier, in the 1940s and late 1960s. Principal component analysis (PCA) suggested that about 20% of the (210)Pb flux variability was due to atmospheric metal pollution, challenging the CRS model's assumption of a constant Pb supply. After correcting for this extra (210)Pb input, Pb flux variations aligned with historical atmospheric Pb deposition, confirming the validity of the CRS model. The study highlights the need for verifying dating model assumptions and the importance of a comprehensive geochemical interpretation of peat bog records.	Olid, C., Garcia-Orellana, J., Masque, P., Cortizas, A.M., and Sanchez-Cabeza, J.-A. (2013). Improving the 210Pb-chronology of Pb deposition in peat cores from Chao de Lamoso (NW Spain). <i>Sci Total Environ.</i> , 15, 443, 597-607. doi: 10.1016/j.scitotenv.2012.10.107. Epub 2012 Dec 7.
59	Olid, C., Diego, D., Garcia-Orellana, J., Cortizas, A.M., and Klaminder, J.	2016	Modeling the downward transport of (210)Pb in Peatlands: Initial Penetration-Constant Rate of Supply (IP-CRS) model.	Science of The Total Environment	The study introduces the Initial Penetration-Constant Rate of Supply (IP-CRS) model for dating peat deposits using (210)Pb profiles, considering an initial migration of the radionuclide. The model accounts for the incorporation of (210)Pb into peat as well as an initial flushing through upper peat layers, addressing concerns about post-depositional mobility of (210)Pb.	The IP-CRS model was tested in four anomalous (210)Pb peat records, showing deviations from typical exponential decay profiles. Unlike the Constant Rate of Supply (CRS) model, the IP-CRS model estimated peat accumulation rates consistent with typical growth rates for peatlands in the same areas. The IP-CRS chronology also agreed well with independent chronological markers ((241)Am and (137)Cs), demonstrating its reliability in providing chronologies for peat records where (210)Pb mobility is evident. The study highlights the IP-CRS model as a valuable tool for reconstructing past environmental changes using peat archives during the Anthropocene.	Olid, C., Diego, D., Garcia-Orellana, J., Cortizas, A.M., and Klaminder, J. (2016). Modeling the downward transport of (210)Pb in Peatlands: Initial Penetration-Constant Rate of Supply (IP-CRS) model. <i>Sci Total Environ.</i> , 15, 541, 1222-1231. DOI: 10.1016/j.scitotenv.2015.09.131.

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60	Parry, L.E., Charman, D.J., and Blake, W.H.	2013	Comparative dating of recent peat deposits using natural and anthropogenic fallout radionuclides and Spheroidal Carbonaceous Particles (SCPs) at a local and landscape scale.	Quaternary Geochronology	This study compares different dating techniques (Spheroidal Carbonaceous Particles, 210Pb, 137Cs, and 241Am) used to date recent peat cores from three sites to assess their consistency and accuracy. The aim is to improve the understanding of the validity of peatland chronologies and the impact of local conditions on geochronological results.	The results show broad consistency in dating results, but also significant disagreement within and between sites. A relatively dry site affected by past burning and erosion exhibited the greatest consistency between methods and replicate cores, while wetter, less degraded sites showed less consistency. The study suggests that 210Pb is mobile in wetter conditions, and 241Am can be considered an increasingly valuable radionuclide for dating. The data also indicate that current estimates for SCP-based ages in the region may be incorrect and require further calibration. Using multiple dating techniques on replicate cores improves the reliability of peatland chronologies, especially in wetter locations.	Parry, L.E., Charman, D.J., and Blake, W.H. (2013). Comparative dating of recent peat deposits using natural and anthropogenic fallout radionuclides and Spheroidal Carbonaceous Particles (SCPs) at a local and landscape scale. <i>Quaternary Geochronology</i> , 15, 11-19. http://dx.doi.org/10.1016/j.quageo.2013.01.002
61	Pontevedra-Pombal, X., Castro, D., Souto, M., Fraga, I., Blake, W. H., Blaauw, M., Lopez-Saez, J. A., PerezDiaz, S., Valcarcel, M., and Garcia-Rodeja, E.	2019	10,000 years of climate control over carbon accumulation in an Iberian bog (southwestern Europe).	Geoscience Frontiers	This study analyzes the rate of carbon accumulation in Chao de Veiga Mol, an intact raised bog in the northwest region of the Iberian Peninsula, which is sensitive to climate change. The research determines changes in accumulation rate over the past 10,000 years using a peat core and generates an age-depth model from 14C dates and fallout radionuclides.	The study confirms a single cycle of peat formation throughout the Holocene, with ombrotrophic peat formation starting 9,500 years ago. The total mean carbon content was 50.2%, and over 10 millennia, 583 kg C m ⁻² accumulated at a mean rate of 35.3 g C m ⁻² yr ⁻¹ . The long-term rate of carbon accumulation in the catotelm was 59.9 g C m ⁻² yr ⁻¹ , much higher than reported for other Iberian peatlands and amongst the highest documented for peatlands in the northern hemisphere. The dynamics of carbon accumulation and other parameters show important variations throughout the Holocene, associated with major climatic events in the northern hemisphere and consistent with models for northern latitudes. The Chao de Veiga Mol raised bog is unique and valuable for high-resolution palaeoenvironmental studies in southern Europe.	Pontevedra-Pombal, X., Castro, D., Souto, M., Fraga, I., Blake, W. H., Blaauw, M., Lopez-Saez, J. A., PerezDiaz, S., Valcarcel, M., and Garcia-Rodeja, E. (2019). 10,000 years of climate control over carbon accumulation in an Iberian bog (southwestern Europe). <i>Geoscience Frontiers</i> , 10, 4, 1521-1533. https://doi.org/10.1016/j.gsf.2018.09.014
62	Poto, L., Gabrieli, J., Crowhurst, S.J., Appleby, P.G., Ferretti, P., Surian, N., Cozzi, G., Zaccone, C., Turetta, C., Pini, R., Kehrwald, N., and Barbante, C.	2013	The first continuous Late Glacial – Holocene peat bog multi proxy record from the Dolomites (NE Italian Alps).	Quaternary International	This paper presents the first complete Late Glacial to Holocene peat succession from the Dolomites in the north-eastern Italian Alps, providing a high-resolution record of environmental and climate change. The peat core from Val di Ciampo covers more than 13,200 cal BP, extending to the end of the Late Glacial, and is dated using independent 14C and 210Pb dates. Changes in bulk density, inorganic matter content, pore water pH, conductivity, Ca/Mg ratios, and Ca, Sr, and Ti trends reveal shifts in trophic conditions in the bog.	The core represents the longest Eastern Alpine ombrotrophic record, spanning 7000 years, with the boundary between ombrotrophic and minerotrophic conditions occurring at approximately 400 cm below the surface. The high-resolution chemical data from this peat archive improve understanding of European Alpine Holocene climate variability and the relationship between natural and anthropogenic climate change during the present interglacial in the Dolomites.	Poto, L., Gabrieli, J., Crowhurst, S.J., Appleby, P.G., Ferretti, P., Surian, N., Cozzi, G., Zaccone, C., Turetta, C., Pini, R., Kehrwald, N., and Barbante, C. (2013). The first continuous Late Glacial – Holocene peat bog multi proxy record from the Dolomites (NE Italian Alps). <i>Quaternary International</i> , 306, 71-79. https://doi.org/10.1016/j.quaint.2013.05.011
63	Pratte, S., Bao, K., Shen, J., Mackenzie, L., Klamt, A.M., Wang, G., and Xing, W.	2018	Recent atmospheric metal deposition in peatlands of northeast China: A review.	Science of The Total Environment	This review focuses on the history of atmospheric metal pollution in NE China over the last two centuries, as reconstructed from peat records. It also evaluates the ecological risk posed by accumulated metals and their potential eco-toxicological effects.	Peat records indicate an increase in pollution loads compared to the pre-industrial level, particularly pronounced in the last 60 years. The records generally align with other studies in China, but discrepancies, especially in Hg records from lake sediments, suggest the influence of post-depositional processes or dating method uncertainties. The ecological risk of heavy metals is relatively weak in remote, high-altitude areas of NE China, but Pb concentrations are approaching probable effect concentrations, indicating increasing risks. The study highlights the need for more long-term studies and Pb isotopic records to better understand the region's metal deposition history and spatial variability.	Pratte, S., Bao, K., Shen, J., Mackenzie, L., Klamt, A.M., Wang, G., and Xing, W. (2018). Recent atmospheric metal deposition in peatlands of northeast China: A review. <i>Sci Total Environ.</i> , 1, 626, 1284-1294. doi: 10.1016/j.scitotenv.2018.01.183

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64	Quinto, F., Hrnccek, E., Krachler, M., Shotyky, W., Steier, P., and Winkler, S.R.	2013	Measurements of ²³⁶ U in ancient and modern peat samples and implications for postdepositional migration of fallout radionuclides.	Environmental Science and Technology	This study analyzes ²³⁶ U in an ombrotrophic peat core spanning 80 years and a minerotrophic peat sample from the last interglacial period. Using ultraclean methods and accelerator mass spectrometry, they observe the first ²³⁶ U bomb peak in a terrestrial environment, find a constant level of anthropogenic ²³⁶ U, and compare post-depositional migration rates of plutonium and uranium.	The study successfully detected the ²³⁶ U bomb peak in an ombrotrophic peat core, indicating constant anthropogenic ²³⁶ U levels with a specific isotopic ratio. Comparison with ²³⁹ Pu migration revealed greater post-depositional mobility for plutonium than uranium. Additionally, they established an upper limit for natural ²³⁶ U abundance in interglacial peat samples, providing crucial background data for the ombrotrophic peat core.	Quinto, F., Hrnccek, E., Krachler, M., Shotyky, W., Steier, P., and Winkler, S.R. (2013). Measurements of ²³⁶ U in ancient and modern peat samples and implications for postdepositional migration of fallout radionuclides. <i>Environ Sci Technol.</i> , 47, 10, 5243-5250. DOI: 10.1021/es400026m.
65	Quinto, F., Hrnccek, E., Krachler, M., Shotyky, W., Steier, P., and Winkler, S.R.	2013	Determination of (²³⁹)Pu, (²⁴⁰)Pu, (²⁴¹)Pu and (²⁴²)Pu at femtogram and attogram levels - evidence for the migration of fallout plutonium in an ombrotrophic peat bog profile.	Environmental Science: Processes and Impacts	The study investigated the isotopic composition of plutonium in a peat core from an ombrotrophic bog in the Black Forest, Germany, using advanced analytical techniques. The aim was to detect Pu concentrations at femtogram and attogram levels. The findings reveal the presence of Pu isotopes characteristic of global fallout in the peat layers, indicating migration of Pu within the peat profile.	The mean (²⁴⁰)Pu/(²³⁹)Pu isotopic ratio in the peat layers was 0.19 ± 0.02, consistent with the global fallout value of 0.18 in the Northern Hemisphere. The (²⁴¹)Pu/(²³⁹)Pu and (²⁴²)Pu/(²³⁹)Pu ratios were relatively constant, further supporting the global fallout signature. Pu isotopes from global fallout were found in peat samples predating atmospheric bomb testing, suggesting Pu migration within the peat profile. The study highlights the mobility of Pu in peat bogs, which has implications for Pu migration in other organic-rich environments. The calculated date of Pu irradiation (AD 1956, correctable to AD 1964) based on the Pu isotope ratios aligns with historical records, indicating downward migration of Pu in the peat column.	Quinto, F., Hrnccek, E., Krachler, M., Shotyky, W., Steier, P., and Winkler, S.R. (2013). Determination of (²³⁹)Pu, (²⁴⁰)Pu, (²⁴¹)Pu and (²⁴²)Pu at femtogram and attogram levels - evidence for the migration of fallout plutonium in an ombrotrophic peat bog profile. <i>Environ Sci Process Impacts</i> , 15, 4, 839-847. DOI: 10.1039/c3em30910j.
66	Roos-Barracloough, F., Martinez-Cortizas, A., Garcia-Rodeja, E., and Shotyky, W.	2002	A 14 500 year record of the accumulation of atmospheric mercury in peat: volcanic signals, anthropogenic influences and a correlation to bromine accumulation.	Earth and Planetary Science Letters	A 14,500-year record of mercury accumulation rates from a peat bog in the Swiss Jura mountains reveals natural and anthropogenic influences on mercury deposition. Natural mercury accumulation rates varied over time, with climatic and volcanic signals evident in the record. During historical times, mercury accumulation rates exceeded natural levels, indicating pollution, with different sources dominating at different periods.	Natural mercury accumulation rates ranged from 0.3 to 8.0 µg m ⁻² yr ⁻¹ , with notable increases during the Younger Dryas cold period. Short-term spikes in mercury accumulation rates corresponded to known volcanic eruptions, particularly during the late Boreal and Older Atlantic periods. Mercury accumulation was correlated with bromine accumulation during the pre-anthropogenic period, except for short periods of elevated mercury deposition linked to volcanic eruptions. Since ca 1330 AD, mercury accumulation rates exceeded natural levels, indicating pollution. Industrial mercury accumulation rates reached 107.6 µg m ⁻² yr ⁻¹ , with 84% of this excess. Early 20th century pollution was primarily from non-Swiss emissions, while Swiss emissions dominated pollution in the mid to late 20th century. Current mercury accumulation rates are about 15 times higher than prehistorical averages, with anthropogenic emissions likely contributing to increased deposition.	Roos-Barracloough, F., Martinez-Cortizas, A., Garcia-Rodeja, E., and Shotyky, W. (2002). A 14 500 year record of the accumulation of atmospheric mercury in peat: volcanic signals, anthropogenic influences and a correlation to bromine accumulation. <i>Earth and Planetary Science Letters</i> , 202, 435-451.
67	Roos-Barracloough, F., Givélet, N., Cheburkin, A.K., Shotyky, W., Norton, S.A.	2006	Use of Br and Se in peat to reconstruct the natural and anthropogenic fluxes of atmospheric Hg: A 10000-year record from Caribou Bog, Maine.	Environmental Science and Technology	A study reconstructed natural and anthropogenic atmospheric mercury (Hg) fluxes over the past 10,000 years using peat cores from Caribou Bog, ME. Natural Hg accumulation rates (AR) were comparable to rates reported in other studies, with slight increases in preindustrial samples possibly due to changes in plant communities or climatic factors. Anthropogenic Hg deposition began around 1840 A.D., becoming the dominant component by 1961 A.D., before declining to 25% of peak values by 2000 A.D.	Average background Hg AR in ombrotrophic peat layers was 1.7 +/- 1.3 microg m(-2) year(-1), similar to natural rates reported elsewhere. Average Hg AR in all preindustrial peat samples, including minerotrophic peat, was slightly higher (3.1 +/- 2.3 microg m(-2) year(-1)), possibly due to changes in plant communities or climatic factors. Maximum Hg AR (32 microg m(-2) year(-1)) occurred around 1961 A.D. Anthropogenic Hg deposition began around 1840 A.D., with Hg(ex) (Hg AR in excess of background) becoming the dominant component by 1961 A.D., comprising >90% of total atmospheric Hg deposition. By 2000 A.D., the Hg AR in the uppermost peat had decreased to 25% of peak values.	Roos-Barracloough, F., Givélet, N., Cheburkin, A.K., Shotyky, W., Norton, S.A. (2006). Use of Br and Se in peat to reconstruct the natural and anthropogenic fluxes of atmospheric Hg: A 10000-year record from Caribou Bog, Maine. <i>Environ Sci Technol.</i> , 15, 40, 10, 3188-3194. DOI: 10.1021/es051945p.

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68	Rosca, C., Tomlinson, E.L., Geibert, W., McKenna, C.A., Babechuk, M.G., and Kamber, B.S.	2018	Trace element and Pb isotope fingerprinting of atmospheric pollution sources: A case study from the east coast of Ireland.	Applied Geochemistry	The study combines new trace metal concentrations and lead (Pb) isotope data from a peat core in eastern Ireland to reconstruct the contribution of different pollution sources over the past century. Heavy metal enrichments and a specific Pb isotope composition indicate significant aerial influx from local mining and smelting activities until the 1940s. A shift towards unradiogenic Pb values from the 1940s to 2000 is attributed to fossil fuels, especially leaded petrol, contributing 6-78% of total Pb pollution. Since 2000, a more radiogenic Pb isotope signature reflects the abolishment of leaded petrol, but pollution from fossil fuels (peat, coal, heating oil, and unleaded vehicle fuels) persists and even increases for some metals.	Heavy metal enrichments and specific Pb isotope composition indicate significant pollution from local mining and smelting activities until the 1940s. A shift towards unradiogenic Pb values from the 1940s to 2000 is attributed to fossil fuels, especially leaded petrol, contributing 6-78% of total Pb pollution. Since 2000, a more radiogenic Pb isotope signature reflects the abolishment of leaded petrol. Pollution from fossil fuels (peat, coal, heating oil, and unleaded vehicle fuels) persists and even increases for some metals, illustrating continued anthropogenic influence despite the phase-out of leaded petrol.	Rosca, C., Tomlinson, E.L., Geibert, W., McKenna, C.A., Babechuk, M.G., and Kamber, B.S. (2018). Trace element and Pb isotope fingerprinting of atmospheric pollution sources: A case study from the east coast of Ireland. Applied Geochemistry, 96, 302-326. DOI: 10.1016/j.apgeochem.2018.07.003.
69	Rosen, K., Vinichuk, M., and Johanson, K.J.	2009	¹³⁷ Cs in a raised bog in central Sweden.	Journal of Environmental Radioactivity	The study investigated the vertical distribution of (¹³⁷ Cs) activity in peat soil profiles and (¹³⁷ Cs) activity concentration in plants at two sites on a raised bog in central Sweden: an open bog with few plant species and a low pine site with Scots pine and ericaceous plants. Ground deposition of (¹³⁷ Cs) was similar at both sites in 2005, but the distribution differed. In the open bog, (¹³⁷ Cs) activity peaked in the uppermost 1-4 cm of Sphagnum layers, indicating upward transport, while at the low pine site, (¹³⁷ Cs) was mainly found in deeper layers. Migration rates were calculated for both sites, with the open bog site showing a rate of 0.57 cm/yr and the low pine site showing a rate of 0.78 cm/yr.	Ground deposition of (¹³⁷ Cs) in 2005 was similar at both sites, 23,000 Bq/m ² . In the open bog, (¹³⁷ Cs) activity peaked in the uppermost 1-4 cm of Sphagnum layers, indicating upward transport, while at the low pine site, (¹³⁷ Cs) was mainly found in deeper layers. Migration rates were calculated as 0.57 cm/yr at the open bog site and 0.78 cm/yr at the low pine site. Heather (<i>Calluna vulgaris</i>) had the highest (¹³⁷ Cs) activity concentrations at both sites, with transfer factors varying between 0.88 and 1.35 on the open bog and between 0.48 and 0.69 m ² /kg DM at the low pine site.	Rosen, K., Vinichuk, M., and Johanson, K.J. (2009). ¹³⁷ Cs in a raised bog in central Sweden. J Environ Radioact., 100, 7, 534-539. DOI: 10.1016/j.jenvrad.2009.03.005.
70	Salminen, S., Paatero, J., Jaakkola, T. and Lehto, J.	2005	Americium and curium deposition in Finland from the Chernobyl accident.	Radiochimica Acta	The study analyzed ²⁴¹ Am and ²⁴⁴ Cm in peat samples collected in Finland immediately after the Chernobyl accident using a separation method involving co-precipitation, anion exchange, and extraction chromatography, with activities measured by alpha spectrometry. The activity of Chernobyl-derived ²⁴¹ Am varied between 0.0115 and 9.32 Bq/m ² , while that of ²⁴⁴ Cm ranged from < 0.002 to 1.97 Bq/m ² (reference date 1.5.1986). The origin of ²⁴¹ Am in Finland is mainly from atmospheric nuclear tests, but the geographical distribution of Chernobyl- ²⁴¹ Am is uneven, with some locations showing 100% of ²⁴¹ Am originating from the Chernobyl accident.	Activities of Chernobyl-derived ²⁴¹ Am in peat varied widely, from 0.0115 to 9.32 Bq/m ² , with ²⁴⁴ Cm ranging from < 0.002 to 1.97 Bq/m ² (reference date 1.5.1986). The origin of ²⁴¹ Am in Finland is predominantly from atmospheric nuclear tests, but the Chernobyl- ²⁴¹ Am contribution varies by location, with some areas showing 100% of ²⁴¹ Am originating from the Chernobyl accident. The deposition pattern of Chernobyl-derived ²⁴¹ Am and ²⁴⁴ Cm resembles that of other refractory nuclides, such as ⁹⁵ Zr, ¹⁴¹ Ce, and ^{239,240} Pu.	Salminen, S., Paatero, J., Jaakkola, T. and Lehto, J. (2005). Americium and curium deposition in Finland from the Chernobyl accident. Radiochimica Acta. 93, 12, 771-779. https://doi.org/10.1524/ract.2005.93.12.771
71	Salminen, S., Paatero, J., Roos, P., and Helariutta, K.	2009	²³⁷ Np in peat and lichen in Finland.	Journal of Radioanalytical and Nuclear Chemistry	The study determined activity concentrations of ²³⁷ Np in peat and lichen samples in Finland, estimating contributions from nuclear weapons testing in the 1950s-1960s and the Chernobyl accident. ²³⁷ Np was measured with ICP-MS using ²³⁵ Np as a tracer, with activity concentrations in peat samples ranging from 1.98 ± 0.05 to 14.1 ± 0.3 mBq/m ² .	The contribution from the Chernobyl accident to total ²³⁷ Np deposition in peat was estimated to be 0.1-13%, indicating a relatively low impact compared to other radionuclides. The Chernobyl-derived fraction of total ²³⁷ Np in peat was found to be much lower than the corresponding fractions of ²³⁹⁺²⁴⁰ Pu, ²⁴¹ Pu, ²⁴¹ Am, and ²⁴⁴ Cm, suggesting different behavior or sources for these radionuclides.	Salminen, S., Paatero, J., Roos, P., and Helariutta, K. (2009). ²³⁷ Np in peat and lichen in Finland. Journal of Radioanalytical and Nuclear Chemistry , 281, 405-413. https://doi.org/10.1007/s10967-009-0007-9
72	Salminen-Paatero, S., Paatero, J., and Jaakkola, T.	2014	Pu-241 and Pu-241/Pu ²³⁹⁺²⁴⁰ activity ratio in environmental samples from Finland as evaluated by the ingrowth of Am-241.	Boreal Environment Research	This study focused on determining the activity concentrations of ²⁴¹ Pu and the ²⁴¹ Pu/ ²³⁹⁺²⁴⁰ Pu activity ratios in environmental samples in Finland to understand the distribution of transuranium nuclides in the environment. The activity of ²⁴¹ Pu was measured indirectly by detecting its decay product, ²⁴¹ Am, using α-spectrometry. The results showed varying activity concentrations of ²⁴¹ Pu in lichens from different time periods and in different sample types, with corresponding ²⁴¹ Pu/ ²³⁹⁺²⁴⁰ Pu activity ratios ranging from 4.1 to 167.	Activity concentrations of ²⁴¹ Pu in lichens from 1967–1976 ranged from 2.3 to 93 mBq/g, while in samples from 1986 (on 1 May 1986), they ranged from < 0.7 to 686 mBq/g in lichen, peat, and grass samples. Comparison with earlier analyses using liquid scintillation counting showed good agreement for ²⁴¹ Pu results. Regression analysis indicated significant correlations between the activity concentrations of Chernobyl-derived nuclides ²³⁸ Pu, ²⁴¹ Pu, and ²⁴² Cm in samples from 1986.	Salminen-Paatero, S., Paatero, J., and Jaakkola, T. (2014). Pu-241 and Pu-241/Pu ²³⁹⁺²⁴⁰ activity ratio in environmental samples from Finland as evaluated by the ingrowth of Am-241. Boreal Environment Research, 19, 1, 51-65.

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73	Sanders, G., Jones, K.C., Hamilton-Taylor, J., and Dorr, H.	1995	PCB and PAH fluxes to a dated UK peat core.	Environmental Pollution	This study investigated concentrations of PCBs and PAHs in peat cores from an ombrotrophic bog in rural north-west England, using both radiometric and non-chemical characteristics to determine chronological intervals. Net fluxes of PCB congeners and PAH compounds were calculated to assess historical contamination levels. PCB inputs were detected from the late-1930s/early-1940s, with peak fluxes around 1964, followed by a decrease and subsequent surface enrichment. PAH loadings increased since the Industrial Revolution, peaking in the early-1930s, but have since decreased by 80% due to emission controls and industrial decline.	PCB inputs were observed from the late-1930s/early-1940s, with maximum fluxes around 1964 and a subsequent decrease by 65% over the next 15 years, followed by surface enrichment. PAH loadings increased since the Industrial Revolution, peaking in the early-1930s, and have since decreased by 80% over the last three to four decades due to emission controls and industrial decline. The study considered potential effects of postdepositional diagenesis on contaminant chronologies in the peat cores.	Sanders, G., Jones, K.C., Hamilton-Taylor, J., and Dorr, H. (1995). PCB and PAH fluxes to a dated UK peat core. <i>Environmental Pollution</i> , 89, 1, 17-25. https://doi.org/10.1016/0269-7491(94)00048-1
74	Schleich, N., Degering, D., and Unterricker, S.	2000	Natural and artificial radionuclides in forest and bog soils: Tracers for migration processes and soil development.	Radiochimica Acta	The study investigated the distribution of radionuclides in forest and bog soils in Saxony, Germany, using various analytical methods. Low concentrations of natural and artificial radionuclides were determined, and dating methods were used to establish the chronology of soil profiles.	Radionuclides exhibited characteristic depth distributions in forest and bog soil horizons. ¹²⁵ Sb, ²⁴¹ Am, ²³⁸ Pu, and ^{239,240} Pu were strongly associated with soil organic matter. In spruce forest soils, different soil horizons influenced the vertical distribution of radionuclides. In ombrotrophic bogs, peak positions of radionuclides correlated with the year of maximum input. Cs showed mobility in forest soil horizons but was enriched in organic material. Cs was highly mobile in peat deposits, being continuously translocated towards growing Sphagnum mosses and accumulated at the moss apices.	Schleich, N., Degering, D., and Unterricker, S. (2000). Natural and artificial radionuclides in forest and bog soils: Tracers for migration processes and soil development. <i>Radiochim. Acta</i> , 88, 803-808.
75	Segnana, M., Gabrieli, G., Barbante, C., and Poto, L.	2016	Climatic variability and human impact during the Holocene from an Alpine peat bog	PhD thesis	The study focuses on the Coltrondo peat bog in the Eastern Italian Alps, aiming to reconstruct climate and environmental changes over the past 7900 years using a multi-proxy approach. The research combines physical, chemical, and biological analyses to provide insights into past climate variations and human activities in the region.	A multi-proxy approach, including ²¹⁰ Pb and ¹⁴ C dating techniques, provided a robust chronology for interpreting data accurately. Lead isotope ratios reflected natural and anthropogenic sources of lead, showing pre anthropogenic periods followed by human impacts, particularly during the Middle Ages and industrialization. Pollen, non-pollen palynomorphs (NPPs), and micro-charcoal analyses provided insights into climatic and human history, indicating major climatic events and human land-use changes over time.	Segnana, M., Gabrieli, G., Barbante, C., and Poto, L. (2016). Climatic variability and human impact during the Holocene from an Alpine peat bog. PhD thesis, University Ca'Foscari, Venezia, Italy, 59-65 pp.
76	Smith, J. T., Appleby, P. G., Hilton, J., and Richardson, N.	1997	Inventories and fluxes of ²¹⁰ Pb, ¹³⁷ Cs and ²⁴¹ Am determined from the soils of three small catchments in Cumbria, UK.	Journal of Environmental Radioactivity	The study focused on measuring inventories and vertical profiles of fallout ²¹⁰ Pb, ¹³⁷ Cs (from weapons tests and Chernobyl), and ²⁴¹ Am in soils of three catchments in Cumbria, UK, with varying soil types from mineral to peat bog. The research aimed to understand the distribution and mobility of these radionuclides in the environment.	Uniform ²¹⁰ Pb inventories were observed in different cores within the same catchment, with a standard deviation of around 30%. Mean annual fluxes of ²¹⁰ Pb were estimated for each catchment. ¹³⁷ Cs inventories (from weapons tests and Chernobyl) showed more variability, but mean values for each catchment were consistent with independent studies, indicating relatively stable deposition. The mean weapons test deposition of ¹³⁷ Cs was 2790 Bq m ⁻² per metre of rainfall, compared to a UK average of 3160 Bq m ⁻² , derived from national surveys. ²⁴¹ Am levels in Brotherswater soils were comparable to those expected from weapons test fallout, but significantly higher levels were recorded at Blelham Tarn and Devoke Water, suggesting varying deposition patterns. Well-resolved peaks in ²⁴¹ Am activity below the surface indicated its relative immobility within the soil column, with similar depth penetration for ²¹⁰ Pb, ¹³⁷ Cs (weapons), and ²⁴¹ Am, all greater than Chernobyl ¹³⁷ Cs. Vertical profiles of ¹³⁷ Cs (weapons) suggested little mobility in the 15 years since a previous study, indicating a stable distribution of this radionuclide in the environment.	Smith, J. T., Appleby, P. G., Hilton, J., and Richardson, N. (1997). Inventories and fluxes of ²¹⁰ Pb, ¹³⁷ Cs and ²⁴¹ Am determined from the soils of three small catchments in Cumbria, UK. <i>Journal of Environmental Radioactivity</i> , 37, 2, 127-142. https://doi.org/10.1016/S0265-931X(97)00003-9

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77	Sokolik, G.A., Ovsyannikova, S.V., and Kimlenko, I.M.	2003	Effect of Humic Substances on Plutonium and Americium Speciation in Soils and Soil Solutions.	Radiochemistry	The study investigated the molecular-weight distribution of humic substances (HSs) in organic and mineral soils, as well as their distribution over fractions of humus acids using gel chromatography and the Ponomareva-Plotnikova fractionation technique. It also examined the distribution of ^{239,240} Pu and ²⁴¹ Am over HS fractions of different dispersity, highlighting their association with different mineral components and their solubility and mobility characteristics.	Plutonium and americium were found to be more strongly associated with humic substances in organic soils compared to mineral soils, indicating decreased migration ability of radionuclides from mineral to organic soils. The difference in association was attributed to a qualitative difference in the chemical composition of HSs in organic and mineral soils. Americium was found to enter the composition of poorly soluble organomineral complexes to a smaller extent compared to plutonium, forming more mobile anionic complexes in soil solutions. The enhanced mobility of americium and its easier availability to plants compared to plutonium could be attributed to these differences in association and complex formation.	Sokolik, G.A., Ovsyannikova, S.V., and Kimlenko, I.M. (2003). Effect of Humic Substances on Plutonium and Americium Speciation in Soils and Soil Solutions. <i>Radiochemistry</i> , 45, 2, 176-181. Translated from <i>Radiokhimiya</i> , 45, 2, 160-164.
78	Sokolik, G.A., Ovsyannikova, S.V., Ivanova, T.G., and Leinova, S.L.	2004	Soil-plant transfer of plutonium and americium in contaminated regions of Belarus after the Chernobyl catastrophe.	Environment International	The study examined plutonium and americium transfer from soil to plants in Belarusian grasslands post-Chernobyl. It assessed radionuclide content in soil pore solutions and their availability in different soil types. Distribution coefficients between solid and pore waters were evaluated, alongside migration and availability in soils with varying absorbing complex structures. Organic matter and soil characteristics influenced radionuclide transfer.	Distribution coefficients of ^{239,240} Pu and ²⁴¹ Am were evaluated, indicating their mobility in diverse soils. Soil structure affected radionuclide migration and availability, with implications for soil-to-plant transfer. Predictions of ²⁴¹ Am contamination levels in grass species based on soil characteristics were made, aiding Chernobyl impact assessment.	Sokolik, G.A., Ovsyannikova, S.V., Ivanova, T.G., and Leinova, S.L. (2004). Soil-plant transfer of plutonium and americium in contaminated regions of Belarus after the Chernobyl catastrophe. <i>Environment International</i> , 30, 939-947.
79	Solovitch-Vella, N., Pourcelot, L., Chen, V.T., Froidevaux, P., Gauthier-Lafaye, F., Stille, P., and Aubert, D.	2007	Comparative migration behaviour of ⁹⁰ Sr, ²³⁹⁺²⁴⁰ Pu and ²⁴¹ Am in mineral and organic soils of France.	Applied Geochemistry	The study investigated the vertical migration of ⁹⁰ Sr, ²³⁹⁺²⁴⁰ Pu, and ²⁴¹ Am in acid forest soil (Vosges Mountains) and organic-rich alkaline wetland soil (Mercantour area) in France. Two approaches were used: a statistical analysis of radionuclide ratios and calculation of migration rates. Findings revealed significant differences in radionuclide migration behavior between the two soil types.	In Mercantour soil, ²⁴¹ Am was less mobile than ²³⁹⁺²⁴⁰ Pu, while in both soils, ⁹⁰ Sr was more mobile than ²³⁹⁺²⁴⁰ Pu. The Vosges soil, with high sand content and weathering processes, showed larger migration rates, especially in depth. The Mercantour soil, with high organic matter content, exhibited stronger retention of ²⁴¹ Am in the top 10 cm. Differences in soil composition influenced the mobility and retention of radionuclides, highlighting the importance of soil characteristics in radionuclide migration.	Solovitch-Vella, N., Pourcelot, L., Chen, V.T., Froidevaux, P., Gauthier-Lafaye, F., Stille, P., and Aubert, D. (2007). Comparative migration behaviour of ⁹⁰ Sr, ²³⁹⁺²⁴⁰ Pu and ²⁴¹ Am in mineral and organic soils of France. <i>Applied Geochemistry</i> , 22, 11, 2526-2535.
80	Testa, C., Jia, G., Degetoo, S., Desideri, D., Guerra, F., Meli, M.A., and Roselli, C.	1999	Vertical profiles of ^{239,240} Pu and ²⁴¹ Am in two sphagnum mosses of Italian peat	The Science of the Total Environment	A collaboration between Urbino University and Padua ICTIMA CNR focused on studying the retention behavior of Pu and Am in Sphagnum peat in the Alps region of northern Italy. The study involved separating and determining various isotopes of Pu and Am, using ²⁴² Pu and ²⁴³ Am as yield tracers. Results focused on vertical profiles of radionuclides in Sphagnum compactum and S. nemoreum, with dating done using ²¹⁰ Pb determination.	Concentration peaks for Pu and Am were found in the early 1960s, corresponding to the period of maximum nuclear weapon tests, indicating the presence of fallout from these tests in the peat. The study demonstrates the usefulness of Sphagnum peat as a natural archive for studying the historical deposition of radionuclides, providing valuable insights into past environmental contamination events.	Testa, C., Jia, G., Degetoo, S., Desideri, D., Guerra, F., Meli, M.A., and Roselli, C. (1999). Vertical profiles of ^{239,240} Pu and ²⁴¹ Am in two sphagnum mosses of Italian peat. <i>The Sci. of the Tot. Env.</i> , 232, 27-31.
81	Thuens, S., Blodau, C., and Radke, M.	2013	How suitable are peat cores to study historical deposition of PAHs?	Science of The Total Environment	Ombrotrophic peat bogs serve as natural archives of atmospheric pollution, allowing for the study of deposition chronology of harmful contaminants. A study in Ontario, Canada, examined 12 peat profiles in 4 bogs to assess the suitability of peat archives for polycyclic aromatic hydrocarbons (PAHs). Laboratory experiments showed no degradation of PAHs over a 3-year period, indicating their persistence in peat. PAH concentrations in surface peat were higher in hollows than in hummocks, and no mobility of PAHs was observed in peat.	PAH concentrations in surface peat showed standard deviations of approximately 30%, indicating some variability in PAH distribution. Temporal deposition trends inferred from peat cores were generally consistent with trends from nearby sediment cores, but deposition rates to sediment were higher. Coarse vertical sampling resolution of 5 cm in peat cores introduced uncertainty in dating and identification of deposition peaks, highlighting the need for higher resolution sampling methods. The study concludes that while peat cores are suitable for inferring atmospheric deposition trends, improvements in sampling methods to allow higher vertical resolution would enhance their performance.	Thuens, S., Blodau, C., and Radke, M. (2013). How suitable are peat cores to study historical deposition of PAHs? <i>Sci. of the Tot. Env.</i> , 450-451, 271-279. http://dx.doi.org/10.1016/j.scitotenv.2013.01.091

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82	Tillman, P.K., Holzkamper, S., Kuhry, P., Sannel, A.B.K., Loader, N.J., and Robertson, I.	2010	Stable carbon and oxygen isotopes in Sphagnum fuscum peat from subarctic Canada: Implications for palaeoclimate studies.	Chemical geology	Stable carbon and oxygen isotope ratios in single plant components of Sphagnum peat can reveal environmental changes. A study in west central Canada examined two peat profiles and a Sphagnum hummock to evaluate the impact of decomposition rate on isotope records and determine the most suitable plant components for climate reconstructions. Results showed that $\delta^{13}\text{C}$ values in α -cellulose from Sphagnum fuscum stems correlated well with summer temperatures, while $\delta^{18}\text{O}$ values were influenced by summer precipitation, temperature, and evaporation. Decomposition did not significantly affect the isotope values, but there were consistent offsets between isotope values of different plant components, emphasizing the importance of selecting specific moss fractions for climate and environmental reconstructions.	$\delta^{13}\text{C}$ values in α -cellulose from Sphagnum fuscum stems showed a strong correlation with summer temperatures. $\delta^{18}\text{O}$ values in the plant tissues were influenced by summer precipitation, temperature, and evaporation. Decomposition did not significantly affect the oxygen and carbon isotope values of α -cellulose from Sphagnum fuscum peat. There were consistent offsets between isotope values of branches and stems, and between whole plant material and α -cellulose, highlighting the need for careful selection of moss fractions for climate and environmental reconstructions.	Tillman, P.K., Holzkamper, S., Kuhry, P., Sannel, A.B.K., Loader, N.J., and Robertson, I. (2010). Stable carbon and oxygen isotopes in Sphagnum fuscum peat from subarctic Canada: Implications for palaeoclimate studies. <i>Chemical Geology</i> , 270, 216–226. doi:10.1016/j.chemgeo.2009.12.001
83	Tositti, L., Mingozzi, M., Sandrini, S., Forlani, L., Buoso, M.C., De Poli, M., Ceccato, D., and Zafiroopoulos, D.	2006	A multitracer study of peat profiles from Tunguska, Siberia.	Global and Planetary Change	Peat columns from Tunguska, Siberia, were analyzed to study the 1908 Tunguska Cosmic Body (TCB) event's impact and environmental pollution. Heavy metals suggest mining influence, while ^{137}Cs levels indicate global fallout. The TCB event is identifiable by a palynological discontinuity, but elemental analysis requires more sensitive techniques for extraterrestrial material detection.	Heavy metal distributions in the peat suggest a connection with mining and metal smelting activity in the north of the region via atmospheric circulation. The ^{137}Cs inventory (4.6 kBq/m ²) indicates global scale contamination from Cold War nuclear weapon testing. The ^{210}Pb flux (200 Bq/m ² /yr) is typical of continental regions.	Tositti, L., Mingozzi, M., Sandrini, S., Forlani, L., Buoso, M.C., De Poli, M., Ceccato, D., and Zafiroopoulos, D. (2006). A multitracer study of peat profiles from Tunguska, Siberia. <i>Global and Planetary Change</i> , 53, 4, 278-289. https://doi.org/10.1016/j.gloplacha.2006.03.010
84	Toth, P. and Fazakas, J.	2020	Investigation of the fingerprint of climate changes in the Tinovul Apa Roşie peat bog (central Romania) by using ^{210}Pb dating method.	Global Journal of Ecology	The study aimed to investigate peat accumulation mechanisms reflecting wetter, warmer periods stimulating peat bog growth and colder, drier periods causing stagnation. ^{210}Pb dating was used to correlate peat growth with climate changes in the Red Water valley, Romania. Gamma spectrometry, ^{210}Po , and ^{137}Cs measurements were employed.	Peat accumulation reflects climate changes, with periods of growth and stagnation. Peat accumulation in Core A peaked between 1930-1960, with an average growth rate of 0.04 ± 0.008 g/cm ² /y. Inorganic sediment accumulation peaked in 1830 and 1930, with 0.03 ± 0.009 g/cm ² /y. Core C shows a warming trend from 1900, with peat growth increasing from 0.01 ± 0.0009 to 0.04 ± 0.008 g/cm ² /y.	Toth, P. and Fazakas, J. (2020). Investigation of the fingerprint of climate changes in the Tinovul Apa Roşie peat bog (central Romania) by using ^{210}Pb dating method. <i>Global Journal of Ecology</i> . Available online: [https://www.peertechzpublications.org/articles/GJE-5-114.php]. Accessed on December 20, 2023.
85	Turetsky, M.R., Weider, R.K., Williams, C.J., and Vitt, D.H.	2000	Organic matter accumulation, peat chemistry, and permafrost melting in peatlands of boreal Alberta.	Ecoscience	The study focuses on peatlands in boreal western continental Canada, where permafrost is limited to ombrotrophic peatlands and has been degrading. The objectives are to quantify differences in peat chemistry and rates of organic matter accumulation between sites with permafrost, degraded permafrost, and no permafrost over the past 200 years.	Peat chemistry varies based on permafrost presence, absence, or degradation. Rates of organic matter accumulation in sites with degraded permafrost are 60% higher than in sites with intact permafrost. Recent rates of organic matter accumulation follow similar trends in permafrost and continental bogs over the past 100-200 years. Peat chemistry plays a critical role in the carbon balance response of boreal peatlands to climate change.	Turetsky, M.R., Weider, R.K., Williams, C.J., and Vitt, D.H. (2000). Organic matter accumulation, peat chemistry, and permafrost melting in peatlands of boreal Alberta. <i>Ecoscience</i> , 7, 3, 379-392. DOI: 10.1080/11956860.2000.11682608
86	Vaasma, T., Karu, H., Kiisk, M., Pensa, M., Isakar, K., Realo, E., Alliksaar, T., and Tkaczyk, A.H.	2017	Pb-210 and fly ash particles in ombrotrophic peat bogs as indicators of industrial emissions.	Journal of Environmental Radioactivity	The study investigates the impact of oil shale-fired power plants (PPs) on a nearby ombrotrophic peat bog in Estonia. Peat cores were collected and analyzed for gamma spectrometry and spherical fly ash particles (SFAP) to assess atmospheric pollution from the PPs. Results indicate that while there are noticeable differences in radionuclide concentration distribution between the two peat cores, the radiological burden from the PPs at the studied distances is negligible.	SFAP concentrations in peat cores reflect the combustion and emission history of the nearby power plants. Pb-210 activity concentrations in peat cores indicate a maximum deposition flux of 133 Bq/m ² /y. The ^{210}Pb deposition flux via fly ash from the power plants remains between 0.2 and 2.2 Bq/m ² /y, which is negligible compared to natural background values. SFAP can provide additional parameters to improve the validity of results obtained from radiometric methods in chronological studies and estimate radionuclide deposition rates via fly ash.	Vaasma, T., Karu, H., Kiisk, M., Pensa, M., Isakar, K., Realo, E., Alliksaar, T., and Tkaczyk, A.H. (2017). Pb-210 and fly ash particles in ombrotrophic peat bogs as indicators of industrial emissions. <i>J Environ Radioact.</i> , 174, 78-86. doi: 10.1016/j.jenvrad.2016.07.027.

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87	van Bellen, S., Magnan, G., Davies, L., Froese, D., Mullan-Boudreau, G., Zacccone, C., Garneau, M., Shotyky, W.	2018	Testate amoeba records indicate regional 20th-century lowering of water tables in ombrotrophic peatlands in central-northern Alberta, Canada.	Global Change Biology	The study reconstructs water-table depth (WTD) dynamics in peatlands near the Athabasca bituminous sands (ABS) region in western Canada using testate amoebae analysis. It combines amoeba assemblages with plant macrofossils, acid-insoluble ash (AIA) fluxes, and climate data to understand environmental change drivers. The analysis suggests recent drying of peatlands, potentially impacting vulnerability to future burning and CO2 emissions.	Testate amoeba assemblages indicate a significant lowering of water tables after 1960 CE, with a mean drop of ~15 cm in four out of five cores. The shift towards more xerophilous amoeba taxa over the last 50 years is attributed to increasing Sphagnum s. Acutifolia and mean summer temperatures, especially in peatlands farther from the ABS region. Permafrost development likely influenced amoeba assemblages in two peatlands, but the most important shift occurred after 1960 CE, driven by regional warming and S. s. Acutifolia establishment. AIA flux variations did not significantly affect mineral-agglutinating taxa or S. s. Acutifolia presence, indicating a drying trend unrelated to mineral matter.	van Bellen, S., Magnan, G., Davies, L., Froese, D., Mullan-Boudreau, G., Zacccone, C., Garneau, M., Shotyky, W. (2018). Testate amoeba records indicate regional 20th-century lowering of water tables in ombrotrophic peatlands in central-northern Alberta, Canada. <i>Glob Chang Biol.</i> , 24, 7, 2758-2774. doi: 10.1111/gcb.14143.
88	van der Plicht, J., Yeloff, D., van der Linden, M., van Geel, B., Brain, S., Chambers, F.M., Webb, J., and Toms, P.	2016	Dating Recent Peat Accumulation in European Ombrotrophic Bogs.	Radiocarbon	The study compares age estimates of recent peat deposits in 10 European ombrotrophic bogs using multiple dating methods. While the 14C bomb peak dating method proves reliable when dating aboveground plant material, discrepancies are found in 210Pb age estimates, suggesting caution in relying solely on 210Pb dating.	At 3 sites, dating methods including 14C bomb peak, 210Pb, 137Cs, SCPs, and pollen show good agreement. In 5 cores, there is a clear discrepancy between 14C bomb peak and 210Pb age estimates, with increasing differences with depth. Evidence suggests that the 14C bomb peak dating method is reliable for aboveground plant material, unaffected by old carbon sources. 210Pb age estimates may be too old due to 210Pb enrichment in surface layers, possibly caused by rapid infilling of hollows scavenging 210Pb from dissolved organic matter. The study advises caution in using 210Pb dating alone until further research resolves the cause of inaccuracy.	van der Plicht, J., Yeloff, D., van der Linden, M., van Geel, B., Brain, S., Chambers, F.M., Webb, J., and Toms, P. (2016). Dating Recent Peat Accumulation in European Ombrotrophic Bogs. <i>Radiocarbon</i> , 55, 3: Proceedings of the 21st International Radiocarbon Conference (Part 2 of 2) , 1763 - 1778. DOI: https://doi.org/10.1017/S0033822200048670
89	Yakovlev, E., Spirov, R., Druzhinin, S., Ocheretenko, A., Druzhinina, A., Mishchenko, E., and Zhukovskaya, E.	2021	Atmospheric fallout of radionuclides in peat bogs in the Western Segment of the Russian Arctic.	Environmental Science and Pollution Research International	The study investigates radionuclide activity in peat-bog profiles in the European subarctic of Russia, focusing on 210Pb, 137Cs, 241Am, 239Pu, 240Pu, 238U, and 234U. Two peat profiles from the Arkhangelsk region were analyzed for radionuclide content and physicochemical parameters. The study used various methods including ICP-MS, gamma spectrometry, and alpha spectrometry to measure radionuclide concentrations and establish 210Pb chronology.	Radionuclide activity concentrations were measured using ICP-MS, gamma spectrometry, and alpha spectrometry, providing comprehensive data on radionuclide distribution in peat profiles. 210Pb dating revealed a shift in the position of maximum activity peaks of anthropogenic radionuclides along the peat profile, suggesting relative mobility of different radionuclides in the peat massif. The study identified global fallout from atmospheric tests in the 1950s-1980s and fallout from the Chernobyl nuclear accident in 1986 as the main sources of pollution in the peatlands of the European subarctic of Russia. The research demonstrates that analysis of radioactive isotopes in peat deposits can provide valuable insights into environmental pollution loads in subarctic territories.	Yakovlev, E., Spirov, R., Druzhinin, S., Ocheretenko, A., Druzhinina, A., Mishchenko, E., and Zhukovskaya, E. (2021). Atmospheric fallout of radionuclides in peat bogs in the Western Segment of the Russian Arctic. <i>Environ Sci Pollut Res Int.</i> , 28, 20, 25460-25478. doi: 10.1007/s11356-020-12224-7.
90	Zacccone, C., Cocozza, C., Cheburkin, A.K., Shotyky, W., and Miano, T.M.	2007	Enrichment and depletion of major and trace elements, and radionuclides in ombrotrophic raw peat and corresponding humic acids.	Geoderma	A study analyzed an ombrotrophic peat core from Switzerland to evaluate the abundance and distribution of major and trace elements and radionuclides in raw peat and corresponding humic acids (HAs). The research used X-ray fluorescence, fluorescence spectroscopy, and low background γ -spectrometry to analyze samples from different depth slices of the peat core.	Raw peat samples showed higher concentrations of Fe, Mn, Pb, Sr, Ti, and Ca compared to corresponding HAs, while Cu was more abundant in HAs. Zinc concentrations were higher in raw peat in the first 24 cm of depth. Elements, except for Fe, were found to be bound stably to HAs, albeit to varying degrees. The activity of 241Am was limited to a specific section of raw peat, while 137Cs was detected in both HAs and raw peat, suggesting differences in mobility and environmental impact of these radionuclides.	Zacccone, C., Cocozza, C., Cheburkin, A.K., Shotyky, W., and Miano, T.M. (2007). Enrichment and depletion of major and trace elements, and radionuclides in ombrotrophic raw peat and corresponding humic acids. <i>Geoderma</i> , 141, 3-4, 235-246. https://doi.org/10.1016/j.geoderma.2007.06.007
91	Cwanek, A., Lokas, E., Mitchell, E. A. D., Mazei, Y., Gaca, P., & Milton, J. A.	2021	Temporal variability of Pu signatures in a 210Pb-dated Sphagnum peat profile from the Northern Ural, Russian Federation.	Chemosphere	This study focuses on a peat profile from the Northern Ural region, Russia, aiming to identify and understand the levels and origins of anthropogenic radionuclides, specifically 238, 239, 240Pu, in a 210Pb-dated peat core. The research aims to elucidate the impact of nuclear weapon testing history on the region and assess peat accumulation rates compared to adjacent areas.	The study found that the vertical variability of ²⁴⁰ Pu/ ²³⁹ Pu isotopic compositions in the peat profile reflects the nuclear weapon testing history, with a peak in the 1960s and a smaller impact from high-yield tests in the 1950s and Chinese detonations in the 1970s. Peat accumulation rates in the studied area were similar to those in adjacent regions, suggesting a consistent pattern of peat growth. The ²¹⁰ Pb flux slightly exceeded the reference level established for the latitude belt, indicating potential additional sources of lead in the environment.	Cwanek, A., Lokas, E., Mitchell, E. A. D., Mazei, Y., Gaca, P., & Milton, J. A. (2021). Temporal variability of Pu signatures in a 210Pb-dated Sphagnum peat profile from the Northern Ural, Russian Federation. <i>Chemosphere</i> , 281, 130962.

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92	Zhang, H., Hou, X., Qiao, J., and Lin, J.	2022	Determination of 241Am in Environmental Samples: A Review.	Molecules	This paper provides an overview of recent developments and state-of-the-art analytical methods for determining 241Am in environmental samples. It discusses sample pre-treatment, pre-concentration, chemical separation techniques, source preparation, radiometric and mass spectrometric measurement techniques, speciation analyses, and tracer applications.	The paper highlights the use of hyphenated separation methods based on different chromatographic resins for efficient 241Am determination. It evaluates and compares the performance of various radiometric and mass spectrometric measurement techniques for 241Am. The paper also discusses tracer applications of 241Am in environmental speciation analyses and nuclear forensics, demonstrating the versatility and importance of 241Am analysis in environmental monitoring and radiological risk assessment.	Zhang, H., Hou, X., Qiao, J., and Lin, J. (2022). Determination of 241Am in Environmental Samples: A Review. <i>Molecules</i> , 27,14.
93	Stivrvins, N., Ozolova, I., Galka, M., Kuske, E., Alliksaar, T., Andersen, T.J., Lamentowicz, M., Wulf, S., and Reitalu, T.	2017	Drivers of peat accumulation rate in a raised bog: impact of drainage, climate, and local vegetation composition.	Mires and Peat	This study examines the development of a raised bog in Teiči Bog, Latvia, using variation partitioning to assess the relative importance of drainage, climate, and local vegetation composition. The results show that local vegetation composition and dominant Sphagnum species significantly influence peat accumulation rates. Drainage, even minor or strong, is associated with a positive growth balance under natural conditions, but drainage systems can impact peatland ecosystems farther away.	Explanatory variables explain 74% of the variation in peat accumulation, with 26% remaining unexplained. The average peat accumulation rate in Teiči Bog over the last 150 years was 3.5 mm per year, with a slight decrease to 2.8 mm per year due to drainage over the last half-century. There was no strong correlation with the historical climate record, indicating that the bog has buffered the influence of climate change over the last century and a half.	Stivrvins, N., Ozolova, I., Galka, M., Kuske, E., Alliksaar, T., Andersen, T.J., Lamentowicz, M., Wulf, S., and Reitalu, T. (2017). Drivers of peat accumulation rate in a raised bog: impact of drainage, climate, and local vegetation composition. <i>Mires and Peat</i> , 19, 8.
94	Gallagher, D., McGee, E.G., Mitchell, P.I., Alfimov, V., Aldahan, A., and Possnert, G.	2005	Retrospective Search for Evidence of the 1957 Windscale Fire in NE Ireland Using 129I and Other Long-Lived Nuclides.	Environmental Science and Technology	This study investigates the impact of the 1957 Windscale accident on the northeastern region of Ireland by analyzing sediment cores from a lake near the coast. Using high-resolution techniques, the researchers reconstructed the history of radionuclide input, focusing on 137Cs, 239,240Pu, 241Am, and 129I. Despite the large release of radioactivity from the Windscale accident, the study found no evidence of contamination in the northeastern region of Ireland, with any potential contamination overwritten by nuclear weapons testing fallout.	Sediment cores from a lake in northeastern Ireland were analyzed to reconstruct the history of radionuclide input. Concentration profiles for 137Cs, 239,240Pu, and 241Am reflected known historical fallout trends from nuclear weapons testing. The study found no evidence of enhanced radionuclide concentrations from the Windscale accident in 1957, indicating negligible impact on the region. Recent increases in 129I concentrations in lake sediment are attributed to increased emissions from the nuclear industry, not the Windscale accident.	Gallagher, D., McGee, E.G., Mitchell, P.I., Alfimov, V., Aldahan, A., and Possnert, G. (2005). Retrospective Search for Evidence of the 1957 Windscale Fire in NE Ireland Using 129I and Other Long-Lived Nuclides. <i>Environ. Sci. Technol.</i> , 39, 9, 2927–2935. https://doi.org/10.1021/es049049I
95	Bowen, V.T. and Livingston, H.D.	1975	Americium 242m in nuclear test debris.	Nature	The paper describes a radiochemical method for analyzing 241Pu in environmental samples. It discusses the 241Pu/239,240Pu ratios in fallout-contaminated marine samples and their similarities to those in fallout-contaminated soils. The paper also highlights the distinct ratios found in samples from planned or accidental Pu releases, indicating that 241Pu can be a useful tracer for tracking released Pu. Additionally, the data suggest implications for the source and growth of environmental 241Am.	The radiochemical method described is effective for analyzing 241Pu in environmental samples. Fallout-contaminated marine samples show slightly higher 241Pu/239,240Pu ratios compared to fallout-contaminated soils. Samples from planned or accidental Pu releases have significantly different 241Pu/239,240Pu ratios. 241Pu can serve as a useful tracer for tracking the spread of released Pu. The data suggest insights into the source and growth of environmental 241Am.	Bowen, V.T. and Livingston, H.D. (1975). Americium 242m in nuclear test debris. <i>Nature</i> 256, 482. https://doi.org/10.1038/256482a0
96	Diamond, H., Fields, P.R., Stevens, C.S., Studier, M.H., Fried, S.M., Inghram, M.G., Hess, D.C., Pyle, G.L., Mech, J.F., Manning, W.M., Ghiorso, A., Thompson, S.G., Higgins, G.H., Seaborg, G.T., Browne, C.I., Smith, H.L., and Spence, R.W.	1960	Heavy Isotope Abundances in Mike Thermonuclear Device.	Physical Review	The abstract discusses the production of uranium isotopes from U-239 to U-255 during the November 1, 1952, thermonuclear explosion ("Mike") through multiple neutron capture by U-238. The long-lived products of successive β^- decays from these isotopes were measured using mass spectrometry and radiometric techniques. The abundances of these isotopes decline smoothly with increasing mass number, with even-mass abundances slightly exceeding the geometric mean of adjacent odd-mass abundances. This study provides insights into nuclear properties of neutron-rich heavy nuclides that are not ordinarily investigated.	The "Mike" thermonuclear explosion produced uranium isotopes ranging from U-239 to U-255 through multiple neutron capture by U-238. The abundances of these isotopes decline smoothly with increasing mass number. Even-mass abundances slightly exceed the geometric mean of adjacent odd-mass abundances, indicating a unique distribution pattern. The study provides insights into the nuclear properties of neutron-rich heavy nuclides, offering valuable information not typically explored through ordinary investigation methods.	Diamond, H., Fields, P.R., Stevens, C.S., Studier, M.H., Fried, S.M., Inghram, M.G., Hess, D.C., Pyle, G.L., Mech, J.F., Manning, W.M., Ghiorso, A., Thompson, S.G., Higgins, G.H., Seaborg, G.T., Browne, C.I., Smith, H.L., and Spence, R.W. (1960). Heavy Isotope Abundances in Mike Thermonuclear Device. <i>Phys. Rev.</i> 119, 6, 2000-2004. doi/10.1103/PhysRev.119.2000

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97	Mackenzie, A.B., Farmer, J.G., and Sugden, C.L.	1997	Isotopic evidence of the relative retention and mobility of lead and radiocaesium in Scottish ombrotrophic peats.	Science of The Total Environment	This study examines the use of peat deposits to reconstruct historical trends in atmospheric deposition of contaminant metals, focusing on 210Pb, Pb, stable Pb isotopes, and radiocaesium in ombrotrophic peat deposits in Scotland. The research assesses the potential post-depositional mobility of these elements and their suitability for chronological reconstruction. Results indicate that while 210Pb-derived chronologies align well with historical trends in contaminant Pb deposition, radiocaesium is highly mobile in organic soils, limiting its use for chronological information.	Concentration profiles of 210Pb, Pb, stable Pb isotopes, and radiocaesium in peat deposits were studied in three locations in Scotland. The study found that 210Pb-derived chronologies aligned with known historical trends in contaminant Pb deposition, suggesting post-depositional immobility of Pb. Radiocaesium was found to be highly mobile in organic soils, limiting its use for chronological information. The presence of small amounts of mineral matter in peat deposits may restrict the mobility of radiocaesium, potentially providing some chronological information.	Mackenzie, A.B., Farmer, J.G., and Sugden, C.L. (1997). Isotopic evidence of the relative retention and mobility of lead and radiocaesium in Scottish ombrotrophic peats. <i>Sci. of the Tot. Env.</i> , 203, 2, 115-127. https://doi.org/10.1016/S0048-9697(97)00139-3
98	McGee, E.J., Gallagher, D., Mitchell, P.I., Baillie, M., Brown, D., and Keogh, S.M.	2004	Recent chronologies for tree rings and terrestrial archives using 14C bomb fallout history	Geochimica et Cosmochimica Acta	Tree rings from <i>Pinus sylvestris</i> trees in Ireland were studied to investigate anthropogenic radionuclide input to terrestrial systems. The study compared tree ring sequences from the east and west coasts of Ireland and analyzed them relative to the radionuclide content of nearby peat profiles.	Tree ring sequences from the east and west coasts of Ireland showed virtually identical 14C concentrations, indicating uniform atmospheric levels of 14C. The maximum 14C concentrations in the tree rings corresponded closely with atmospheric levels during the peak of nuclear weapons testing (1945–1980). Dendrodating techniques using the 14C bomb fallout curve were crucial for accurate chronology construction, as simple ring counting of the west coast tree was inaccurate. The data did not show enhanced uptake of radionuclides on the east coast, suggesting no significant influence from the Sellafield nuclear complex or the 1957 fire at the plant.	McGee, E.J., Gallagher, D., Mitchell, P.I., Baillie, M., Brown, D., and Keogh, S.M. (2004). Recent chronologies for tree rings and terrestrial archives using 14C bomb fallout history. <i>Geochim. Et Cosm. Act.</i> , 68, 11, 2509-2516. https://doi.org/10.1016/j.gca.2003.07.020
99	Chambers, D.M., Crowle, A., Daniell, J.R., Mauquoy, D., McCarroll, J., Sanderson, N., Thom, T., Toms, P., and Webb, J.C.	2017	Ascertaining the nature and timing of mire degradation: using palaeoecology to assist future conservation management in Northern England.	AIMS Environmental Science	The study aimed to use palaeoecological techniques to understand the timing and nature of degradation in upland mire and moorland areas in Northwest Europe. Multiple techniques were applied to establish vegetation history and guide conservation management, including pollen analysis, plant macrofossil and charcoal analyses, peat humification and mineral magnetic susceptibility determination, and dating methods. The research focused on sites in northern England and highlighted the value of palaeoecology in extending long-term monitoring and informing conservation strategies.	Palaeoecological data from case-study sites indicated that the major vegetation changes occurred after the start of the Industrial Revolution. The current landscape appearance, including valued aspects like extensive heather moorland, has no long history and features only recently in the cultural landscape. Data from a site within a National Nature Reserve showed that its current valued vegetation may have established after a major fire, and its pre-degradation state is not captured in half-centennial ecological monitoring. The study suggests that palaeoecological data can provide valuable information and insights to aid practical conservation efforts, especially in degraded landscapes like mires and moorlands, and potentially in other degraded landscapes internationally.	Chambers, D.M., Crowle, A., Daniell, J.R., Mauquoy, D., McCarroll, J., Sanderson, N., Thom, T., Toms, P., and Webb, J.C. (2017). Ascertaining the nature and timing of mire degradation: using palaeoecology to assist future conservation management in Northern England. <i>AIMS Environmental Science</i> , 4, 1, 54-82. doi:10.3934/environsci.2017.1.54
100	Lokas, E., Zwolinski, Z., Rachlewicz, G., Gasiorek, M., Wilkosz, G., and Samolej, K.	2017	Distribution of anthropogenic and naturally occurring radionuclides in soils and lakes of Central Spitsbergen (Arctic).	Journal of Radioanalytical and Nuclear Chemistry	The study presents the first results on activity concentrations, inventories, and activity ratios of artificial and natural radionuclides in soils and lake sediments of inland Spitsbergen. The depth of activity peaks of artificial radionuclides indicates up to 10 cm thick deposits accumulated over the last 50 years. The activity ratios suggest global fallout as the source, and despite low annual precipitation, the inventories of fallout radionuclides in unaffected sites align with those from more humid areas of Spitsbergen.	First results on activity concentrations, inventories, and activity ratios of various radionuclides in soils and lake sediments of inland Spitsbergen are presented. Depth analysis of artificial radionuclide activity peaks suggests significant accumulation of up to 10 cm thick deposits over the last 50 years. Activity ratios of the radionuclides indicate global fallout as the primary source. Despite low annual precipitation, the inventories of fallout radionuclides in sites unaffected by secondary deposition are consistent with those reported from more humid areas of Spitsbergen, suggesting a widespread distribution of fallout radionuclides in the region.	Lokas, E., Zwolinski, Z., Rachlewicz, G., Gasiorek, M., Wilkosz, G., and Samolej, K. (2017). Distribution of anthropogenic and naturally occurring radionuclides in soils and lakes of Central Spitsbergen (Arctic). <i>Journal of Radioanalytical and Nuclear Chemistry</i> , 311, 707-717.

	A	B	C	D	E	F	G
101	Drexler, J.Z., Fuller, C.C., and Archfield, S.	2018	The approaching obsolescence of ¹³⁷ Cs dating of wetland soils in North America.	Quaternary Science Reviews	The study addresses the use of ¹³⁷ Cs peak fallout from 1963 to date sedimentary deposits in wetlands, crucial for projecting their ability to mitigate carbon pollution and adapt to sea level rise. However, the reliability of ¹³⁷ Cs dating in wetland soils is declining, with 25% of recently collected soil cores showing no identifiable ¹³⁷ Cs peaks, and less than 40% of ¹³⁷ Cs ages aligning with ²¹⁰ Pb dating. The study introduces a new measure, τ , to quantify the deterioration in ¹³⁷ Cs peak clarity, showing an approximate tenfold increase in τ for observed cores compared to ideal cores.	¹³⁷ Cs peak fallout from 1963 is used to date sedimentary deposits in wetlands for carbon sequestration and sea level rise adaptation. Reliability of ¹³⁷ Cs dating in wetland soils is decreasing, with 25% of recently collected cores showing no identifiable ¹³⁷ Cs peaks. Less than 40% of ¹³⁷ Cs ages align with ²¹⁰ Pb dating, indicating a significant discrepancy between the two dating methods. The study introduces a new measure, τ , to quantify the deterioration in ¹³⁷ Cs peak clarity, showing a tenfold increase in τ for observed cores compared to ideal cores. The deterioration in ¹³⁷ Cs peak clarity is attributed to radionuclide decay, ¹³⁷ Cs migration in situ, and ¹³⁷ Cs amendments from surface waters, likely affecting Mexican and Canadian wetlands as well. The study recommends continued use of ¹³⁷ Cs for dating only if the full dating uncertainty for both ¹³⁷ Cs and an additional method such as ²¹⁰ Pb is considered in estimates of wetland vertical accretion and carbon sequestration.	Drexler, J.Z., Fuller, C.C., and Archfield, S. (2018). The approaching obsolescence of ¹³⁷ Cs dating of wetland soils in North America. <i>Quaternary Science Reviews</i> , 199, 83-96.
102	Fialkiewicz-Koziel, B., Lokas, E., Smieja-Krol, B., Turner, S., De Vleeschouwer, F., Woszczyk, M., Marcisz, K., Galka, M., Lamentowicz, M., Kolaczek, P., Hajdas, I., Karpinska-Kolaczek, M., Koltonik, K., Mroz, T., Roberts, S., Rose, N., Krzykaswki, T., Boom, A., and Yang, H.	2022	The Śnieżka peatland as a candidate Global boundary Stratotype Section and Point for the Anthropocene series.	The Anthropocene Review	The Śnieżka peatland in the Sudetes is a candidate for the Global Boundary Stratotype Section and Point (GSSP) of the Anthropocene. Data from two profiles, Sn1 and Sn0, along with core Sn2, provide critical markers for distinguishing the Anthropocene, including plutonium, radiocarbon, fly ash particles, mercury, and stable isotopes for distinguishing the proposed epoch. The Sn0 archive is consistent with the well-documented Sn1 profile, containing a comprehensive database of trace elements, rare earth elements, lead isotopes, pollen, and testate amoebae. The 1952 worldwide appearance of plutonium is proposed as a primary marker of the Anthropocene, supported by other chemostratigraphic and biostratigraphic indicators.	The Śnieżka peatland in the Sudetes is a candidate for the GSSP of the Anthropocene. Data from profiles Sn1 and Sn0, along with core Sn2, provide critical markers for distinguishing the Anthropocene, including plutonium, radiocarbon, fly ash particles, mercury, and stable isotopes. The Sn0 archive is consistent with the well-documented Sn1 profile, containing a comprehensive database of trace elements, rare earth elements, lead isotopes, pollen, and testate amoebae. The 1952 worldwide appearance of plutonium is proposed as a primary marker of the Anthropocene, supported by other chemostratigraphic and biostratigraphic indicators. The study highlights the importance of these markers in identifying and defining the Anthropocene epoch.	Fialkiewicz-Koziel, B., Lokas, E., Smieja-Krol, B., Turner, S., De Vleeschouwer, F., Woszczyk, M., Marcisz, K., Galka, M., Lamentowicz, M., Kolaczek, P., Hajdas, I., Karpinska-Kolaczek, M., Koltonik, K., Mroz, T., Roberts, S., Rose, N., Krzykaswki, T., Boom, A., and Yang, H. (2022). The Śnieżka peatland as a candidate Global boundary Stratotype Section and Point for the Anthropocene series. <i>The Anthropocene Review</i> , 10, 1. https://doi.org/10.1177/2053019622113642
103	Bland, C.J.	1985	Radiometric determination of ²¹⁰ Pb in powder samples by the method of standard additions.	The International Journal of Applied Radiation and Isotopes	This paper discusses the use of the standard additions method in the radiometric determination of ²¹⁰ Pb activity in chemistry. This method involves adsorbing ²¹⁰ Pb activity onto an anion exchange resin, mixing it with the sample, and extracting the area of the γ -ray at 46.5 keV emitted during decay. Results from four standard ore samples indicate that this method provides accurate results comparable to β -ray spectrometry of the prompt ²¹⁰ Bi daughter, but without the need for complex chemical separations.	The standard additions method is effective for measuring trace substances like ²¹⁰ Pb activity. The method involves adsorbing ²¹⁰ Pb activity onto an anion exchange resin and mixing it with the sample. Results from four standard ore samples show that this method yields accurate results similar to β -ray spectrometry of the prompt ²¹⁰ Bi daughter. The method avoids the need for labor-intensive chemical separations.	Bland, C.J. (1985). Radiometric determination of ²¹⁰ Pb in powder samples by the method of standard additions. <i>The International Journal of Applied Radiation and Isotopes</i> , 36, 9, 733-738. https://doi.org/10.1016/0020-708X(85)90045-6
104	Bland, C.J. and Chiu, N.W.	1996	Accumulation of ²¹⁰ Pb activity on particulate matter in LPG rail cars.	Applied Radiation and Isotopes	The paper discusses the presence of radon in petroleum natural gas, known for over 90 years, with typical activity concentrations in Western Canada ranging from 5 to 20 Bq/L. It describes the transportation of liquefied natural gas (LNG) by rail cars in Canada, which are tested hydrostatically every 10 years, revealing the accumulation of fine ferric dust inside the vessels. This dust, consisting of flakes approximately 200 μ in size, has been found to accumulate ²¹⁰ Pb and daughter activities, with specific activities similar to those reported for interior surfaces of valves and separators in natural gas processing plants.	Radon is present in petroleum natural gas, with typical activity concentrations in Western Canada ranging from 5 to 20 Bq/L. Liquefied natural gas is transported by rail cars in Canada, which are tested every 10 years, revealing the accumulation of fine ferric dust inside the vessels. The dust, consisting of flakes approximately 200 μ in size, accumulates ²¹⁰ Pb and daughter activities. Specific activities of the dust are similar to those reported for interior surfaces of valves and separators in natural gas processing plants.	Bland, C.J. and Chiu, N.W. (1996). Accumulation of ²¹⁰ Pb activity on particulate matter in LPG rail cars. <i>Applied Radiation and Isotopes</i> , 47, 9-10, 925-926. https://doi.org/10.1016/S0969-8043(96)00088-7