

CENTRE FOR ECOLOGY AND HYDROLOGY (NERC-UK)

CURRICULUM VITAE

DAVID FOWLER

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Name of person: Professor David Fowler
Nationality: British
Date of birth: 01.06.1950
Position: Environmental Physicist
Specialisation: Micrometeorology, land atmosphere exchange of trace gases and particles, and effects of pollutants on vegetation
Year joined NERC: 1975

Summary Qualifications

1972 BSc (Hons) Environmental Physics, University of Nottingham
1976 PhD Environmental Physics, University of Nottingham
1988 Honorary Lecturer, University of Edinburgh
1991 Honorary Professorship, University of Nottingham
1999 Fellow of Royal Society of Edinburgh
2002 Fellow of the Royal Society of London
2005 CBE (services to Atmospheric Sciences)

Employment History

1975-1978 HSO Institute of Terrestrial Ecology, Edinburgh

Turbulent (dry) deposition of SO₂

Member of a small research group (4) working on the turbulent deposition of SO₂ to terrestrial surfaces.

1978– 1985 SSO Institute of Terrestrial Ecology, Edinburgh

Acid rain meteorology and wet deposition processes

Expanding the research programme from dry deposition to include precipitation scavenging processes, especially the effects of orography on wet deposition processes and precipitation chemistry and initiating work on effects of pollutants on vegetation.

1986 – 1991 PSO Institute of Terrestrial Ecology, Edinburgh: Section Head (Air Pollution Research)

Surface-Atmosphere exchange, photochemical oxidants and effects of pollutants on vegetation

Research group of 7 ITE staff and 7 postgraduate students studying surface – atmosphere exchange processes of SO₂, NO, NO₂, NH₃, O₃, effects of O₃ and effects of acidic deposition on vegetation.

1991 – 1999 Band 3 (IMP Special Merit): Section Head (Air Pollution research), CEH Edinburgh

Surface-Atmosphere exchange, photochemical oxidants and effects of pollutants on vegetation

As 1986 – 1991, with new areas of research, including surface-atmosphere flux measurement programme for greenhouse gases (CH₄, and N₂O) by micrometeorology. Research group 20 staff and approx 20 PhD students and Post Doc Research Fellows.

1999 – 2003 Band 2 (IMP Special Merit): Section Head (Atmospheric Sciences), CEH Edinburgh

Surface-Atmosphere exchange, photochemical oxidants and effects of pollutants on vegetation

As 1991 – 1999, but with a new programme of aerosol flux measurement. Research group 25 CEH staff and 20 PhD students and Post Doctoral Research Fellows.

2003 – 2008 Band 2 (IMP Special Merit): Science Director of Biogeochemistry Programme, Centre for Ecology & Hydrology, Edinburgh

The new post, based in CEH Edinburgh but with responsibilities throughout CEH, provide leadership of Biogeochemistry research and, with the other four Science Directors, the Head of Administration, and the Director of CEH as the management team, to lead CEH. This responsibility takes approximately 50% of time, the remaining 50% for research. The focus of the research programme is Surface-Atmosphere exchange processes, photochemical oxidants

and effects of pollutants on vegetation. For my personal research I have a small team of 5 staff and 5 PhD students within CEH Edinburgh Atmospheric Sciences, a Research Assistant and a Personal Secretary.

2008 – 2013 Band 2 (IMP Special Merit): Environmental Physicist, Centre for Ecology & Hydrology, Edinburgh

CEH senior scientist with a focus on synthesis and integration activities and publications, Royal Society of Edinburgh and London and two EU projects (ACCENT+, and PEGASOS).

2013 Band 1 (IMP Special Merit): Environmental Physicist, Centre for Ecology & Hydrology, Edinburgh

Committee Activities

1980 - 1995	Committee member Dept Environment Review Group on Acid Deposition (RGAR)
1986 - 1997	Chair of Dept Environment Photochemical Oxidants Review Group
1988 - 1994	Committee member Dept Environment Impacts of Nitrogen on terrestrial ecosystems (INDITE)
1988 - 2004	Member Dept Environment Terrestrial Effects Review Group
1990	Special Prof Environmental Science Nottingham University
1991 - 1993	Committee member Royal Meteorological Society, and Chair Roy Met Soc Scottish Centre
1991 - 1995	Committee member, NERC Terrestrial Initiative in Global Environmental Research (TIGER)
1991 - 2001	Member Dept Environment Critical Loads Advisory Group (CLAG)
1996	Chair of BIAFLUX (Biosphere/Atmosphere) Exchange of Trace Gases within the European Network of Excellence ACCENT
1996 - 2003	Chair of EUROTRAC sub-project BIATEX (Biosphere/Atmosphere) Exchange of Trace Gases European Consortium
1997 - 2004	Member of the European Commission Science Panel for Atmospheric Research
1998 - 2002	Chair UK National Expert Group on Transboundary Air Pollution (NEGTA)
2000 -	Chair NERC Committee for Air Pollution Effects Research (CAPER)
2002	Chair European Academies' Science Advisory Council (EASAC)
2002	Fellow of the Riso National Laboratory, Roskilde, Denmark
2002 - 2003	Member Science Advisory Group for Prof H. Dalton chief scientist DEFRA
2003 - 2007	Member Hadley Centre Science Review Group, for DEFRA
2003 -	Chair of BIAFLUX (Biosphere Atmosphere Exchange of Pollutants) within the Atmospheric Composition Change European Network of Excellence (ACCENT)
2004 - 2006	Member of NERC Peer Review College
2004	Committee member Royal Meteorological Society (Scottish Centre)
2004 - 2007	Member of the Royal Society Research Grants Scheme, Board D
2004 - 2007	Member Royal Society Sectional Committee 9
2006 - 2007	Vice President for Scotland: Royal Meteorological Society Science Conference (Sept 2007)
2007 -	Member of the Royal Society SE Asia Rain Forest Research Programme Committee
2008-	Chair UK Review of Transboundary Air Pollution (RoTAP)
2007-2011	Member of NERC Science & Innovation Strategy Board (SISB)
2011-present	Chair of The Royal Society Global Environmental Research Committee (GERC)

Editorial Boards

Advisory Board: Tellus B

Advisory Board: Boreal Environment Research

Publications

Papers in refereed journals 1973-2015 (247)

Papers including chapters in books and conference proceedings 1973-2015 (176)

Contract reports 1973-2015 (149)

Edited 7 volumes of collected research papers for publication:

H factor (ISI) 56, ~ 8500 citations (excluding self citations), 21 papers >100 citations. April 2015

1970-1980

1. Garland, J.A, Clough, W.S. & Fowler, D. 1973. Deposition of sulphur dioxide on grass. *Nature*, Lond., **242**, 256-257.
2. Fowler, D. & Unsworth, M.H. 1974. Dry deposition of sulphur dioxide on wheat. *Nature*, Lond., **249**, 389-390.
3. Fowler, D. 1978. Dry deposition of SO₂ on agricultural crops. *Atmos. Environ.* **12**, 369-373.
4. Fowler, D. & Unsworth, M.H. 1979. Turbulent transfer of sulphur dioxide to a wheat crop. *Q. Jl. R. Met. Soc.* **105**, 767-783.

1980-1985

5. Cape, J.N. & Fowler, D. 1981. Changes in epicuticular wax of *Pinus sylvestris* exposed to polluted air. *Silva fenn.* **15**, 457-458.
6. Fowler, D., Cape, J.N., Leith, I.D., Paterson, I.S., Kinnaird, J.W. & Nicholson, I.A. 1982. Rainfall acidity in northern Britain. *Nature*, Lond. **297**, 383-386.
7. Cape, J.N., Fowler, D., Kinnaird, J.W., Paterson, I.S., Leith, I.D. & Nicholson, I.A. 1984. Chemical composition of rainfall and wet deposition over northern Britain. *Atmos. Environ.* **18**, 1921-1932.
8. Fowler, D. & Cape, J.N. 1984. The contamination of rain samples by dry deposition on rain collectors. *Atmos. Environ.* **18**, 183-189.
9. Fowler, D. & Cape, J.N. 1984. On the episodic nature of wet deposited sulphate and acidity. *Atmos. Environ.* **18**, 1859-1866.
10. Fowler, D. 1984. Transfer to terrestrial surfaces. *Phil. Trans. R. Soc.B* **305**, 281-297. [Also published in: *The ecological effects of deposited sulphur and nitrogen compounds*, eds J.W.L. Beament and others, 23-39. London: Royal Society.]
11. Last, F.T., Fowler, D. & Freer-Smith, P.H. 1984. Die Postulate von Koch und die Luftverschmutzung. *Forstwiss. Cbl.* **103**, 28-48.

1985-1990

12. Fowler, D., Cape, J.B. & Leith, I.D. 1985. Acid inputs from the atmosphere in the United Kingdom. *Soil Use & Manage.* **1**, 3-5.
13. Fowler, D., Leith, I.D. 1985. Biophysical mechanisms in the uptake of air-pollutants. *Staub Reinhaltung der Luft* **45**, 253-256.
14. Unsworth, M.H. & Fowler, D. 1985. Deposition of sulphur in the UK. *J. Sci. Fd. Agric* **36**, 266-267.
15. Crossley, A. & Fowler, D. 1986. The weathering of Scots pine epicuticular wax in polluted and clean air. *New Phytol.* **103**, 207-218.
16. Cape, J.N. & Fowler, D. 1986. Rainfall acidity in northern Britain - exploring the data. *Water Air Soil Pollut.* **30**, 239-244.
17. Last, F.T., Cape, J.N. and Fowler, D. 1986. Acid Rain or Pollution Climate. *Span*, **29**, 2-4.
18. Leith, I.D. & Fowler, D. 1988. Urban distribution of *Rhytisma acerinum* (Pers.) Fries (tar spot) on sycamore. *New Phytol.* **108**, 175-181.
19. Fowler, D., Cape, J.N., Leith, I.D., Choularton, T.W., Gay, M.J. & Jones, A. 1988. The influence of altitude on rainfall composition at Great Dun Fell. *Atmos. Environ.* **22**, 1355-1362.

20. Choularton, T.W., Gay, M.J., Jones, A., Fowler, D., Cape, J.N. & Leith, I.D. 1988. The influence of altitude on wet deposition. Comparison between field measurements at Great Dun Fell and the predictions of a seeder-feeder model. *Atmos. Environ.* **22**, 1363-1371.
21. Gallagher, M.W., Choularton, T.W., Morse, A.P. & Fowler, D. 1988. Measurements of the size dependence of cloud droplet deposition at a hill site. *Q. J. R. Meteorol. Soc.* **114**, 1291-1303.
22. Cape, J.N., Sheppard, L.J., Leith, I.D., Murray, M.B., Deans, J.D. & Fowler, D. 1988. The effect of acid mist on the frost hardiness of red spruce seedlings. *Aspects of applied biol.* **17**, 141-149.
23. Fowler, D., Cape, J.N., Leith, I.D., Paterson, I.S., Kinnaid, J.W. & Nicholson, I.A. 1988. Effects of air filtration at small SO₂ and NO₂ concentrations on the yield of barley. *Environ. Pollut.* **53**, 135-149.
24. Smith, R.I., Fowler, D. & Cape, J.N. 1989. The statistics of phytotoxic air pollutants. *Jl. R.statist. Soc. A.*, **152**, 183-198.
25. Weston, K.J., Kay, P.J.A., Fowler, D., Martin, A. & Bower, J.S. 1989. Mass budget studies of photochemical ozone production over the UK. *Atmos. Environ.* **23**, 1349-1360.
26. Fowler, D., Cape, J.N. & Unsworth, M.H. 1989. Deposition of atmospheric pollutants on forests. *Phil. Trans. R. Soc. B.*, **324**, 247-265.
27. Eamus, D., Leith, I.D. & Fowler, D. 1989. Water relations of red spruce seedlings treated with acid mist. *Tree Physiol.* **5**, 387-397.
28. Eamus, D., Leith, I.D., Fowler, D. 1989. The influence of acid mist upon transpiration, shoot water potential and pressure volume curves of red spruce seedlings. *Annales des Sciences Forestieres* **46**, 577-580.
29. Fowler, D., Cape, J.N., Deans, J.D., Leith, I.D., Murray, M.B., Smith, R.I., Sheppard, L.J. & Unsworth, M.H. 1989. Effects of acid mist on the frost hardiness of red spruce seedlings. *New Phytol.* **113**, 321-335.
30. Murray, M.B., Cape, J.N. & Fowler, D. 1989. Quantification of frost damage in plant tissues by rates of electrolyte leakage. *New Phytol.* **113**, 307-311.
31. Leith, I.D., Murray, M.B., Sheppard, L.J., Cape, J.N., Deans, J.D., Smith, R.I. & Fowler, D. 1989. Visible foliar injury of red spruce seedlings subjected to simulated acid mist. *New Phytol.* **113**, 313-320.

1990

- 32 Deans, J.D., Leith, I.D., Sheppard, L.J., Cape, J.N., Fowler, D., Murray, M.B. & Mason, P.A. 1990. The influence of acid mists on growth, dry matter partitioning, nutrient concentrations and mycorrhizal fruiting bodies in red spruce seedlings. *New Phytol.* **115**, 459-464.
- 33 Dore, A.J., Choularton, T.W., Fowler, D. & Storeton-West, R. 1990. Field measurements of wet deposition in an extended region of complex topography. *Q.J. Roy. Met. Soc.* **116**, 1193-1212.
- 34 Eamus, D. & Fowler, D. 1990. Photosynthetic and stomatal conductance responses to acid mist of red spruce seedlings. *Plant Cell and Environment* **13**, 349-357.
- 35 Fowler, D., Morse, A.P., Gallagher, M.W. & Choularton, T.W. 1990. Measurements of cloud water deposition on vegetation using a lysimeter and a flux gradient technique. *Tellus* **42**(b), 285-293.

1991

- 36 Beswick, K.M., Hargreaves, K., Gallagher, M.W., Choularton, T.W. & Fowler, D. 1991. Size resolved measurements of cloud droplet deposition velocity to a forest using an eddy correlation technique. *Q. J. Roy. Met. Soc.* **117**, 623-645.
- 37 Cape, J.N., Leith, I.D., Fowler, D., Murray, M.B., Sheppard, L.J., Eamus, D. & Wilson, R.H.F. 1991. Sulphate and ammonium in mist impair the frost hardening of red spruce seedlings. *New Phytologist*, **118**, 119-126.
- 38 Fowler, D., Duyzer, J.H. & Baldocchi, D.D. 1991. Inputs of trace gases, particles and cloud droplets to terrestrial surfaces. *Proceedings of the Royal Society of Edinburgh*, **97B**, 35-39.
- 39 Kramm, G., Muller, H., Fowler, D., Hofken, K.D., Meixner, F.X. & Schaller, E. 1991. A modified profile method for determining the vertical fluxes of NO, NO₂, ozone and HNO₃ in the atmospheric surface layer. *Journal of*

Atmospheric Chemistry, **13**, 265-288.

- 40 Thornley, J.H.M., Fowler, D. & Cannell, M.G.R. 1991. Terrestrial carbon storage resulting from CO₂ and nitrogen fertilization in temperate grasslands. *Plant Cell and Environment*, **14**, 1007-1011.
- 41 Weston, K. & Fowler, D. 1991. The importance of orography in spatial patterns of rainfall acidity in Scotland. *Atmospheric Environment*, **25A**, 1517-1522.

1992

- 42 Cape, J.N., Hargreaves, K.J., Storeton-West, R., Fowler, D., Colville, R.N., Choularton, T.W. & Gallagher, M.W. 1992. Nitrite in orographic cloud as an indicator of nitrous acid in rural air. *Atmospheric Environment*, **26A**, 2301-2307.
- 43 Cape, J.N., Sheppard, L.J., Fowler, D., Harrison, A.F., Parkinson, J.A., Dao, P. & Paterson, I.S. 1992. Contribution of canopy leaching to sulphate deposition in a Scots pine forest. *Environmental Pollution*, **75**, 229-236.
- 44 Cape, J.N. and Fowler, D. 1992. Special Issue: Physical and Chemical Processes in Acidic Deposition 2. Networks, Models and Mechanisms. *Environmental Pollution*, **75**, 109-110.
- 45 Choularton, T.W., Wicks, A.J., Downer, R.M., Gallagher, M.W., Penkett, S.A., Bandy, B.J., Dollard, G.J., Jones, B.H.R., Davies, T.D., Gay, M.J., Tyler, B.J, Fowler, D., Cape, J.N. & Hargreaves, K.J. 1992. A field study of the generation of nitrate in a hill cap cloud. *Environmental Pollution*, **75**, 69-73.
- 46 Dore, A.J., Choularton, T.W. & Fowler, D. 1992. An improved wet deposition map of the United Kingdom incorporating the seeder-feeder effect over mountainous terrain. *Atmospheric Environment*, **26A**, 1375-1381.
- 47 Dore, A.J., Choularton, T.W., Fowler, D. & Crossley, A. 1992. Orographic enhancement of snowfall. *Environmental Pollution*, **75**, 175-180.
- 48 Fowler, D., Cape, J.N. 1992. Physical and chemical processes in acidic deposition – 1 Trace Gases and Clouds. *Environ. Pollut.* **75**, 1-2.
- 49 Gallagher, M.W., Beswick, K., Choularton, T.W., Coe, H., Fowler, D. & Hargreaves, K.J. 1992. Measurements and modelling of cloudwater deposition to moorland and forests. *Environmental Pollution*, **75**, 97-107.
- 50 Hargreaves, K.J., Fowler, D., Storeton-West, R.L. & Duyzer, J.H. 1992. The exchange of nitric oxide, nitrogen dioxide and ozone between pasture and the atmosphere. *Environmental Pollution*, **75**, 53-59.
- 51 Livens, F.R., Fowler, D. & Horrill, A.D. 1992. Wet and dry deposition of ¹³¹I, ¹³⁴Cs and ¹³⁷Cs at an upland site in northern England. *Journal of Environmental Radioactivity*, **16**, 243-254.
- 52 Sutton, M.A., Moncrieff, J.B. & Fowler, D. 1992. Deposition of atmospheric ammonia to moorlands. *Environmental Pollution*, **75**, 15-24.
- 53 Skiba, U., Hargreaves, K.J., Fowler, D. & Smith, K.A. 1992. Fluxes of nitric and nitrous oxides from agricultural soils in a cool temperate climate. *Atmospheric Environment*, **26A**, 2477-2488.

1993

- 54 Sutton, M.A., Pitcairn, C.E.R. & Fowler, D. 1993. The exchange of ammonia between the atmosphere and plant communities. *Advances in Ecological Research*, **24**, 301-393.
- 55 Sutton, M.A., Fowler, D. & Moncrieff, J.B. 1993. The exchange of atmospheric ammonia with vegetated surfaces: unfertilized vegetation. *Quarterly Journal of the Royal Meteorological Society*, **119**, 1023-1046.
- 56 Sutton, M.A., Fowler, D., Moncrieff, J.B. & Storeton-West, R.L. 1993. The exchange of atmospheric ammonia with vegetated surfaces. II: Fertilized vegetation. *Quarterly Journal of the Royal Meteorological Society*, **119**, 1047-1070.
- 57 Skiba, U., Smith, K.A. & Fowler, D. 1993. Nitrification and denitrification as sources of nitric oxide and nitrous oxide in a sandy loam soil. *Soil Biology and Biochemistry*, **25**, 1527-1536.
- 58 Skiba, U.M., Smith, K.A. & Fowler, D. 1993. The effect of fertilizer on NO and N₂O emission from a sandy loam soil. [abstract]. *Soil Use and Management*, **9**, 124-125.

- 59 Arah, J.R.M., Hargreaves, K.J., Skiba, U.M., Clayton, H., Fowler, D. & Smith, K.A. 1993. Micrometeorological measurement of N₂O flux. [abstract]. *Soil Use and Management*, **9**, 124.
- 60 Muller, H., Kramm, G., Meixner, F., Dollard, G.J., Fowler, D. & Possanzini, M. 1993. Determination of HNO₃ dry deposition by modified Bowen ratio and aerodynamic profile techniques. *Tellus*, **45B(4)**, pp.346-367.
- 1994**
- 61 Cape, J.N., Smith, R.I., Fowler, D. 1994. The Influence of ozone chemistry and meteorology on plant-exposure to oxidants. *Proceedings of the Royal Society of Edinburgh (B)* **102**, 11-31.
- 62 Colville, R.N., Choularton, T.W., Gallagher, M.W., Wicks, A.J., Downer, R.M., Tyler, B.J., Hargreaves, K.J., Storeton-West, R.L., Fowler, D., Cape, J.N., Dollard, G.J., Davies, T.J., Jones, B.M.R., Penkett, S.A., Bandy, B.J. & Burgess, R.A. 1994. Observation on Great Dun Fell of the pathways by which oxides of nitrogen are converted to nitrate. *Atmospheric Environment A*, **28**, 397-408.
- 63 Duyzer, J. & Fowler, D. 1994. Modelling land atmosphere exchange of gaseous oxides of nitrogen in Europe. *Tellus*, **46B**, 353-372.
- 64 Gallagher, M.W., Choularton, T.W., Bower, K.N., Stromberg, I.M., Beswick, K.M., Fowler, D. & Hargreaves, K.J. 1994. Measurements of methane fluxes on the landscape scale from a wetland area on north Scotland. *Atmospheric Environment*, **28**, 2421-2430.
- 65 Hargreaves, K.J., Skiba, U., Fowler, D., Arah, J.R.M., Wienhold, F.G., Klemetsson, L. & Galle, B. 1994. Measurements of nitrous oxide emission from fertilised grassland using micrometeorological techniques. *Journal of Geophysical Research*, **99**, 16569-16574.
- 66 Murray, M.B., Smith, R.I., Leith, I.D., Fowler, D., Lee, H.S.J., Friend, A.D., Jarvis, P.G. 1994. Effects of elevated CO₂, nutrition and climatic warming on bud phenology in Sitka spruce (*Picea sitchensis*) and their impact on the risk of frost damage. *Tree Physiol.* **14**, 691-706.
- 67 Skiba, U., Fowler, D. & Smith, K. 1994. Emissions of NO and N₂O from soils. *Environmental Monitoring and Assessment*, **31**, 153-158. Also published in: Non-CO₂ greenhouses: why and how to control? edited by J.van Ham, L.J.H.M. Janssen & R.L. Swart. Dordrecht: Kluwer.
- 68 Smith, R.I., Anderson, C.W., Fowler, D. 1994. Critical levels of ozone over the UK – mapping aggregate exceedances over moderate to high thresholds. *Journal of Research of the National Institute of Standards and Technology* **99**, 353-359.
- 69 Smith, K.A., Clayton, H., Arah, J.R.M., Christensen, S., Ambus, P., Fowler, D., Hargreaves, K.J., Skiba, U. Harris, G.W., Wienhold, F.G., Klemetsson, L. & Galle, B. 1994. Micrometeorological and chamber methods for measurement of nitrous oxide fluxes between soils and the atmosphere: Overview and conclusions. *Journal of Geophysical Research*, **99**, 16541-16548.
- 1995**
- 70 Fowler, D., Hargreaves, K.J., Skiba, U., Milne, R., Zahniser, M.S., Moncrieff, J.B., Beverland, I.J. & Gallagher, M.W. 1995. Measurements of CH₄ and N₂O fluxes at the landscape scale using micrometeorological methods. *Philosophical Transactions of the Royal Society of London A*, **351**, 339-356.
- 71 Choularton, T.W., Gallagher, M.W., Bower, K.N., Fowler, D., Zahniser, M. & Kaye, A. 1995. Trace gas flux measurements at the landscape scale using boundary-layer budgets. *Philosophical Transactions of the Royal Society of London A*, **351**, 357-369.
- 72 Pitcairn, C.E.R., Fowler, D. & Grace, J. 1995. Deposition of fixed atmospheric nitrogen and foliar nitrogen content of bryophytes and *Calluna vulgaris* (L.) Hull. *Environmental Pollution*, **88**, 193-205
- 73 Sutton, M.A., Place, C.J., Eager, M., Fowler, D. & Smith, R.I. 1995. Assessment of the magnitude of ammonia emissions in the United Kingdom. *Atmospheric Environment*, **29**, 1393-1411.
- 74 Nisbet, T.R., Fowler, D. & Smith, R.I. 1995. An investigation of the impact of afforestation on stream-water chemistry in the Loch Dee catchment, SW Scotland. *Environmental Pollution*, **90**, 111-120.
- 75 Fowler, D., Hargreaves, K.J., MacDonald, J.A. & Gardiner, B. 1995. Methane and CO₂ exchange over peatland and the effects of afforestation. *Forestry*, **68**, 327-334.

- 76 Sutton, M.A. & Fowler, D. 1995. Atmospheric deposition of nitrogen compounds to heathlands. *Aarhus Geoscience*, **4**, 61-71.
- 77 Dollard, G., Fowler, D., Smith, R.I., Hjellbrekke, A.-G., Uhse, K. & Wallasch, M. 1995. Ozone measurements in Europe. *Water Air and Soil Pollution*, **85**, 1949-1954.
- 78 Downing, C.E.H., Vincent, K.J., Campbell, G.W., Fowler, D. & Smith, R.I. 1995. Trends in wet and dry deposition of sulphur in the United Kingdom. *Water Air and Soil Pollution*, **85**, 659-664.
- 79 Fowler, D., Smith, R.I., Coyle, M., Weston, K.J., Davies, T.D., Ashmore, M.R. & Brown, M. 1995. Quantifying the fine scale (1km x 1km) exposure, dose and effects of ozone. Part 1. Methodology and application for effects on forests. *Water Air and Soil Pollution*, **85**, 1479-1484.
- 80 Brown, M., Cox, R., Bull, K.R., Dyke, H., Sanders, G., Fowler, D., Smith, R. & Ashmore, M.R. 1995. Quantifying the fine scale (1km x 1km) exposure, dose and effects of ozone. Part 2. Estimating yield losses for agricultural crops. *Water Air and Soil Pollution*, **85**, 1485-1490.
- 81 Inglis, D.W.F., Choularton, T.W., Wicks, A.J., Fowler, D., Leith, I.D., Werkman, B. & Binnie, J. 1995. Orographic enhancement of wet deposition in the United Kingdom: case studies and modelling. *Water Air and Soil Pollution*, **85**, 2119-2124.
- 82 Fowler, D., Mourne, R. & Branford, D. 1995. The application of ²¹⁰Pb inventories in soil to measure long-term average wet deposition of pollutants in complex terrain. *Water Air and Soil Pollution*, **85**, 2113-2118.
- 83 Fowler, D., Leith, I.D., Binnie, J., Crossley, A., Inglis, D.W.F., Choularton, T.W., Gay, M., Longhurst, J.W.S & Conland, D.E. 1995. Orographic enhancement of wet deposition in the United Kingdom: continuous monitoring. *Water Air and Soil Pollution*, **85**, 2107-2112.
- 84 Sutton, M.A., Fowler, D., Burkhardt, J.K. & Milford, C. 1995. Vegetation atmosphere exchange of ammonia: canopy cycling and the impacts of elevated nitrogen impacts. *Water Air and Soil Pollution*, **85**, 2057-2063.
- 85 Haygarth, P.M., Fowler, D., Stirup, S., Davison, B.M. & Jones, K.C. 1995. Determination of gaseous particulate selenium over grassland in the UK. *Atmospheric Environment* **28**, 3655-3664.
- 86 Hargreaves, K.J. & Fowler, D. 1995. Micrometeorological measurement of net summer carbon fluxes to northern wetlands and the potential effects of global warming. *Annales Geophysicae*, Supplement II to Vol. 13.
- 1996**
- 87 Fowler, D., Hargreaves, K.J., Choularton, T.W., Gallagher, M.W. & Kaye, A. 1996. Measurement of regional CH₄ emissions in the UK using boundary layer budget methods. *Energy Conversion and Management*, **37**, 769-775.
- 88 Hargreaves, K.J., Wienhold, F.G., Klemetsson, L., Arah, J.R.M., Beverland, I.J., Fowler, D., Galle, B., Griffith, D.W.T., Skiba, U., Smith, K.A., Welling, M. & Harris, G.W. 1996. Measurement of nitrous oxide emission from agricultural land using micrometeorological methods. *Atmospheric Environment*, **30**, 1563-1571.
- 89 MacDonald, J.A., Skiba, U., Sheppard, L.J., Hargreaves, K.J., (Smith, K.A.) & Fowler, D. 1996. Soil environmental variables affecting the flux of methane from a range of forest, moorland and agricultural soils. *Biogeochemistry*, **34**, 113-132.
- 90 Reynolds, B., Fowler, D., Thomas, S. 1996. Chemistry of cloud water at an upland site in mid-Wales. *Science of the Total Environment* **188**, 115-125.
- 91 Skiba, U., Hargreaves, K.J., Beverland, I.J., O'Neill, D.H., Fowler, D. & Moncrieff, J.B. 1996. Measurement of field scale N₂O emission fluxes from a wheat crop using micrometeorological techniques. *Plant & Soil*, **181**, 139-144.
- 92 Skiba, U., McTaggart, I.P., Smith, K.A., Hargreaves, K.J. & Fowler, D. 1996. Estimates of nitrous oxide emissions from soil in the UK. *Energy Conversion and Management*, **37**, 1303-1308.
- 1997**
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