

**Articles in international scientific journals (refereed)**

1. Savolahti M., Karvosenoja N., Tissari J., Kupiainen K., Sippula O., Jokiniemi J. 2016. Black carbon and fine particle emissions in Finnish residential wood combustion: Emission projections, reduction measures and the impact of combustion practices. *Atmospheric Environment* 140:495–505.
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4. Pietikäinen J.-P., Kupiainen K., Klimont Z., Makkonen R., Korhonen H., Karinkanta R., Hyvärinen A.-P., Karvosenoja N., Laaksonen A., Lihavainen H. and Kerminen V.-M. 2015. Impacts of emission reductions on aerosol radiative effects. *Atmos. Chem. and Phys.*, 15:5501–5519.
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8. Taimisto P. & Tainio M., Karvosenoja N., Kupiainen K, Porvari P., Karppinen A., Kangas L., Kukkonen J. and Tuomisto J. T.. Evaluation of intake fractions for different subpopulations due to primary fine particulate matter (PM2.5) emitted from domestic wood combustion and traffic in Finland. 2011. *Air Qual Atmos Health* 4:199-209
9. Tainio M., Tuomisto J.T., Pekkanen J., Karvosenoja N., Kupiainen K., Porvari P., Sofiev M., Karppinen A., Kangas L., Kukkonen J. 2010. Uncertainty in health risks due to anthropogenic primary fine particulate matter from different source types in Finland. *Atmospheric Environment* 44:2125-2132.
10. Tainio M., Sofiev M., Hujo M., Tuomisto J. T., Loh M., Jantunen M. J., Karppinen A., Kangas L., Karvosenoja N., Kupiainen K., Porvari P., Kukkonen J. 2009. Evaluation of the European population intake fractions for European and Finnish anthropogenic primary fine particulate matter emissions. *Atm. Environ.* 43:3052-3059.
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19. Karvosenoja N. and Johansson M. 2003. Primary particulate matter emissions and the Finnish climate strategy. *Boreal Environment Research* 8:125-133.
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21. Johansson M., Alveteg M., Amann M., Bak J., Bartnicki J., Ekqvist M., Forsius M., Frohn L., Geernaert G., Gimeno B., Guardans R., Karvosenoja N., Martín F., Posch M., Suutari R. and Syri S. 2001. Integrated assessment modeling of air pollution in four European countries. *Water, Air, and Soil Pollution* 130(1-4): 175-186.
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23. Syri S. and Karvosenoja N. 2001. Low-CO<sub>2</sub> energy pathways versus emission control policies in acidification reduction. *Water, Air, and Soil Pollution* 130: 1831-1836.

#### **Articles in international scientific compilation works and international scientific conference proceedings (refereed)**

1. Belis, C., J. Baldasano, N. Blond, C. Bouland, J. Buekers, C. Carnevale, A. Cherubini, A. Clappier, E. De Saeger, J. Douros, G. Finzi, E. Frakou, C. Gama, A. Graff, G. Guariso, S. Janssen, K. Juda-Rezler, N. Karvosenoja, G. Maffeis, A. Martilli, S. Mills, A.I. Miranda, N. Moussiopoulos, Z. Nahorski, E. Pisoni, J.-L. Ponche, M. Rasoloharimahefa, E. Real, M. Reizer, H. Relvas, D. Roncolato, M. Tainio, P. Thunis, P. Viaene, C. Vlachokostas, M. Volta and L. White 2017. Current European AQ Planning at Regional and Local Scale. In: Guariso, G., Volta, M. (Eds.): Air Quality Integrated Assessment - A European Perspective. Springer 2017. ISBN 978-3-319-3348-9. pp. 37-68.
2. Paunu V.-V., Karvosenoja N., Kupiainen K., Kangas L., Savolahti M., Sassi M.-K. 2017. Validation of PM2.5 concentrations based on Finnish emission – source-receptor scenario model. ITM conference.
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4. Paunu V.-V., Savolahti M., Karvosenoja N., Kupiainen K. 2014. Cost-optimization model for reducing health and climate effects from residential wood combustion in Finland. The Sustainable City IX Vol. 2, WIT Transactions on Ecology and The Environment, Vol 191, pp. 1505-1512. doi:10.2495/SC141272.
5. Savolahti M., Karvosenoja N., Kupiainen K. 2014. Ecodesign directive for residential wood combustion appliances: Impacts and emission reduction potential in Finland. The Sustainable City IX Vol. 2, WIT Transactions on Ecology and The Environment, Vol 191, pp. 1493-1504. doi:10.2495/SC141272.

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7. Lihavainen H., Kerminen V.-M., Kupiainen K., Hyvärinen A., Petäjä T., Tolonen-Kivimäki O., Virkkula A., Karvosenoja N., Savolahti M., Pietikäinen J.-P., Klimont Z. 2014. Mitigation of Arctic warming by controlling European black carbon emissions. International Aerosol Conference, Aug. 28 – Sep. 2, 2014, BEXCO, Busan, Korea. 1 p.
8. Karvosenoja, Paunu, Savolahti, Judl, Häyrynen. 2013. Impact of wood pellet combustion in CHP plants on population exposure to primary PM<sub>2.5</sub> in Helsinki. 16th IUAPPA World Clean Air Congress, Cape Town, South Africa, 29 September - 4 October 2013. 4 pp.
9. Kupiainen, Aamaas, Savolahti, Karvosenoja, and Paunu. 2013. Climate impacts of Finnish air pollutants and GHGs with different emission metrics. 16th IUAPPA World Clean Air Congress, Cape Town, South Africa, 29 September - 4 October 2013. 4 pp.
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11. Savolahti, Karvosenoja, Kupiainen 2013. Impacts and reduction potentials of short-lived climate forcers from Finnish residential wood combustion. 16th IUAPPA World Clean Air Congress, Cape Town, South Africa, 29 September - 4 October 2013. 4 pp.
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13. M. Savolahti, K. Kupiainen, N. Karvosenoja 2012. Reduction potentials of black and organic carbon emissions by technical and non-technical measures in Finnish residential wood combustion. 8th International Conference on Air Quality - Science and Application Athens, 19-23 March 2012. Short papers proceedings on memory stick. 4 pp.
14. N. Karvosenoja, M. Holmberg, P. Vanhala, V.-V. Paunu, M. Tainio, and J. Kukkonen 2012. Reduction of CO<sub>2</sub> by residential wood heating and trade-off caused by population exposure to primary PM<sub>2.5</sub> in urban and non-urban areas in Finland. 8th International Conference on Air Quality - Science and Application Athens, 19-23 March 2012. Short papers proceedings on memory stick. 4 pp.
15. V.-V.Paunu, N. Karvosenoja, K. Kupiainen. 2012. RESIDENTIAL WOOD COMBUSTION IN FINLAND AND EMISSION FACTOR DATABASE. 8th International Conference on Air Quality - Science and Application Athens, 19-23 March 2012. Short papers proceedings on memory stick. 4 pp.
16. Kupiainen K.J., Savolahti M., Karvosenoja N. and Klimont Z., 2010. Sensitivity Of Carbonaceous Particle Emissions From Small Scale Wood Combustion To Different Fuel Use Scenarios And Varying Emission Factors - Consequences To Emission Modeling. Abstract Book, 15th International Union of Air Pollution Prevention and Environmental Protection Associations' (IUAPPA) World Clean Air Congress "Achieving Environmental Sustainability in a Resource Hungry World", September 12-16, 2010 Vancouver, British Columbia, Canada. p.51.
17. Karvosenoja K., Kupiainen K., Paunu V.-V., Savolahti M., Tohka A., Kangas L., Kukkonen J. and Tuomisto J.T., 2010. Cost-efficient Reduction Of Population Exposure Caused By Primary PM<sub>2.5</sub> Emissions In Finland. Abstract Book, 15th International Union of Air Pollution Prevention and Environmental Protection Associations' (IUAPPA) World Clean Air Congress "Achieving Environmental Sustainability in a Resource Hungry World", September 12-16, 2010 Vancouver, British Columbia, Canada. p.36.
18. Karvosenoja N., Kupiainen K., Kangas L., Karppinen A., Sofiev M., Tainio M., Porvari P., Kukkonen J. and Tuomisto J. T., 2009. Integrated Modeling Assessments of the Population Exposure in Finland to Primary PM<sub>2.5</sub> from Traffic and Domestic Wood Combustion on the Resolutions of 1and 10 km. In: Francis X. V. et al (Eds.). Proceedings of Short Papers, 7th

- International Conference on Air Quality – Science and Application, Istanbul, 24-27 March 2009. Published by the University of Hertfordshire. pp. 109-112
19. Kupiainen K., Karvosenoja N., Tenhunen J., Seppälä J. 2009. EFFECT OF CO<sub>2</sub> BASED CAR REGISTRATION TAX ON PM<sub>2.5</sub> EMISSIONS IN FINLAND. Proceedings of 7<sup>th</sup> Air Quality Conference, 23-27 March 2009, Istanbul. CD-ROM. 4 pp.
  20. Savolahti M., Karvosenoja N., Tohka A., Kupiainen K. 2009. Fine particle emissions from small biomass fired combustion plants in Finland. Proceedings of 7<sup>th</sup> Air Quality Conference, 23-27 March 2009, Istanbul. CD-ROM. 4 pp.
  21. Niko Karvosenoja and Matti Johansson 2007. FINNISH REGIONAL EMISSION MODEL IN POLICY-SUPPORT. In: Doley D. (ed.) Proceedings of the 14th World Congress of IUAPPA, Brisbane, Australia 9-14 Sept 2007. CD-ROM. 6 pp.
  22. Kaarle J. Kupiainen, Niko Karvosenoja and Petri Porvari 2007. NON-EXHAUST PARTICLE EMISSIONS FROM TRAFFIC SOURCES IN FINLAND. In: Doley D. (ed.) Proceedings of the 14th World Congress of IUAPPA, Brisbane, Australia 9-14 Sept 2007. CD-ROM. 6 pp.
  23. Sofiev, M., Jourden, E., Kangas, L., Karvosenoja, N., Karppinen, A., Kukkonen, J., 2007. The Spatial Distribution and Temporal variations of fine Particulate Matter in Europe. In: Ranjeet S.Sokhi and Marina Neophytou (eds): Proceedings of the 6th International Conference on Urban Air Quality, Limassol, Cyprus, 27-29 March 2007, University of Hertfordshire p.67.
  24. Kaarle J. KUPIAINEN, Niko KARVOSENOJA, Petri PORVARI, Matti JOHANSSON, Marko TAINIO and Jouni T. TUOMISTO 2006. EMISSIONS OF PRIMARY CARBONACEOUS PARTICLES, THEIR UNCERTAINTIES AND SPATIAL ALLOCATION IN FINLAND. Proceedings of IUAPPA regional conference / 17th EFCA speciality conference, Lille, FRANCE, September 6 - 8, 2006. CD-ROM, 8pp.
  25. Antti TOHKA , Tuuli MYLLYMAA, Helena DAHLBO, Niko KARVOSENOJA 2006. OPTIMIZING PM AND GHG EMISSIONS AND ENERGY BALANCE BETWEEN NEW WASTE INCINERATION PLANTS AND EXISTING POWER PLANTS. Proceedings of IUAPPA regional conference / 17th EFCA speciality conference, Lille, FRANCE, September 6 - 8, 2006. CD-ROM, 8pp.
  26. Antti TOHKA, Niko KARVOSENOJA 2006. PARTICLE EMISSIONS AND CONTROL POTENTIAL FROM NON-FUEL PROCESS INDUSTRY SOURCES IN FINLAND. Proceedings of IUAPPA regional conference / 17th EFCA speciality conference, Lille, FRANCE, September 6 - 8, 2006. CD-ROM, 8pp.
  27. Petri K. Porvari, N. Karvosenoja, Kaarle J. Kupiainen and Matti Johansson 2006. SPATIAL ALLOCATION OF PM<sub>2.5</sub> EMISSIONS FROM ROAD TRAFFIC IN FINNISH REGIONAL EMISSION MODEL. Proceedings of IUAPPA regional conference / 17th EFCA speciality conference, Lille, FRANCE, September 6 - 8, 2006. CD-ROM, 8pp.
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  29. Niko Karvosenoja, Kaarle Kupiainen, Antti Tohka, Petri Porvari, Jouni T. Tuomisto and Jaakko Kukkonen 2006. EMISSION REDUCTION POTENTIAL AND COSTS FOR PRIMARY AND SECONDARY PM<sub>2.5</sub> IN FINLAND. Proceedings of IUAPPA regional conference / 17th EFCA speciality conference, Lille, FRANCE, September 6 - 8, 2006. CD-ROM, 8pp.
  30. N. KARVOSENOJA 2005. REDUCTION POTENTIAL FOR PM<sub>2.5</sub> EMISSIONS FROM WOOD COMBUSTION IN THE NORDIC COUNTRIES AND POPULATION EXPOSURE IN FINLAND, Proceedings of *Abatement strategies for air pollution and health effects from locally emitted and transnationally transported biomass combustion aerosols*, 27-28 Oct 2005, Helsinki, pp 12-13.

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34. Karvosenoja N., Johansson M., Kindbom K., Lükewille A., Jensen D., Sternhufvud C. and Illerup J.B. 2004. Fine particulate matter emissions from residential wood combustion and reduction potential in the Nordic countries. *Proceedings of the 13th World Clean Air and Environmental Protection Congress and Exhibition, London 22-27 August 2004.* 6 pp.
35. Karvosenoja N. and Johansson M. 2003. The Finnish Regional Emission Scenario model – a base year calculation. *Proceedings of Air Pollution XI Conference, Catania, Italy,* pp. 315-324.
36. Karvosenoja N., Johansson M. and Kupiainen K. 2003. Size-fractioned particulate matter emissions in Finland in 1990-2020. *Proceedings of the 14th International IUAPPA Conference "Air Quality – Assessment and Policy at Local, Regional and Global Scales"* 6.-10.10.2003, Dubrovnik, Croatia, pp. 97-104.
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#### **Articles and abstracts in international scientific conference proceedings (non-refereed)**

1. Karvosenoja N., Paunu V.-V., Kupiainen K., Savolahti M., Importance of spatially representative emission inventories in air quality modeling. Abstract 17th IUAPPA World Clean Air Congress 29.8.-2.9.2016 Busan, S. Korea.
2. Kupiainen K., Stojiljkovic A., Paunu V.-V., Karvosenoja N., Karppinen A., Kukkonen J., Kangas L., Kauhaniemi M., Denby B. 2016. Particle emissions from road traffic – novel tools to estimate emission of non-exhaust emissions. Abstract 17th IUAPPA World Clean Air Congress 29.8.-2.9.2016 Busan, S. Korea.
3. Kupiainen K., Kulovesi K., Lehtinen K., K, Kühn T., Klimont Z., Karvosenoja N., Paunu V.-V., Yamineva Y., Khan S.A. 2016. Black Carbon and Other Short-Lived Climate Pollutants in the Arctic – Consequences of Current Regulatory Frameworks to Emissions and Impacts. Abstract 17th IUAPPA World Clean Air Congress 29.8.-2.9.2016 Busan, S. Korea.N.
4. Karvosenoja, M. Savolahti, V.-V. Paunu, K. Kupiainen. 2015. Cost-efficient reduction of population exposure to primary PM2.5 from residential wood combustion in Finland. Abstract on the 1st International Biomass Emissions Conference, 14 - 15 September 2015, Leeds, UK.

5. Tainio M., Sofiev M., Hujo M., Tuomisto J.T., Loh M., Jantunen M.A., Karppinen A., Kangas L., Karvosenoja N., Kupiainen K., Porvari P., Kukkonen J. 2009. Evaluation of the intake fractions for the European anthropogenic PM2.5 emission and populations. Proceedings of 7<sup>th</sup> Air Quality Conference, 23-27 March 2009, Istanbul. 1 p.
6. Tainio M., Karvosenoja N., Sofiev M., Karppinen A., Kupiainen, K., Kangas L., Tuomisto, J.T. Pekkanen, J. and Kukkonen J. (2007). Integrated risk analysis model to estimate health effects due to primary fine particle (PM2.5) emissions from different sectors. Society for Risk Analysis Annual Meeting, 2007, San Antonio, TX, USA.
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8. Sofiev M., Jourden E., Pirjola L., Kangas L., Karvosenoja N., Karppinen A. and Kukkonen J., 2006. Dispersion modelling of the concentrations of fine particulate matter in Europe. Presented at 28<sup>th</sup> NATO/CCMS International Technical Meeting on Air Pollution Modelling and its Application. May 15-19, 2006, Leipzig, Germany.
9. Jänis M, Pasanen K, Kolehmainen M, Karvosenoja N, Verkasalo PK 2006. Associations between socio-economic status and environmental exposures in Finland. Abstract submitted to *Proceedings of Spatial Epidemiology Conference, London, UK, 23-25 May 2006???*
10. Jänis M, Pasanen K, Kolehmainen M, Karvosenoja N, Verkasalo PK. 2006. Associations between socio-economic status and environmental exposures in Finland. [Abstract] International Society for Environmental Epidemiology, Paris, France, 2.-6.9.2006.
11. N. KARVOSENOJA 2005. REDUCTION POTENTIAL FOR PM2.5 EMISSIONS FROM WOOD COMBUSTION IN THE NORDIC COUNTRIES AND POPULATION EXPOSURE IN FINLAND, Proceedings of *Abatement strategies for air pollution and health effects from locally emitted and transnationally transported biomass combustion aerosols*, 27-28 Oct 2005, Helsinki, pp 12-13.
12. Karvosenoja N., Tohka A. and Hilden M. 2005. The impacts of CO2 emission trading on air pollution in Finland. Proceedings of Acid Rain 2005, Prague, June 12-17 2005. p. 29.
13. Seppälä J., Koskela S., Talve S., Pöld E., Sokka L., Hiltunen M-R, Karvosenoja N., Tohka A., Kulczycka J. and Lehtla R. 2005. Comparison of the environmental performances of oil shale and coal electricity. Proceedings of Innovation by Life Cycle Management LCM 2005 International Conference 5 – 7 September 2005, Barcelona, Spain. pp. 558-564.
14. Illerup J., Sternhufvud C., Karvosenoja N., Kindbom K., Lükewille A., Johansson M. & Jensen D. 2004. PARTICULATE MATTER EMISSIONS AND ABATEMENT OPTIONS IN RESIDENTIAL WOOD BURNING IN THE NORDIC COUNTRIES. *Proceedings of the UNECE TFEIP meeting, 19-20 October, 2004, Palanza, Italy.* 7 pp.
15. Karvosenoja N., Johansson M. and Porvari P. 2003. Emissions of fine particles, sulphur dioxide and nitrogen oxides from biomass combustion in Finland. *Proceedings of International Nordic Bioenergy Congress and Exhibition 2.-5.9.2003, Jyväskylä, Finland*, pp. 310-312.
16. Johansson M., Karvosenoja N., Porvari P. and Kupiainen K. 2003. Emission scenarios for particulate matter research and policy assessment in Finland. *Proceedings of the 12<sup>th</sup> International USEPA Emission Inventory Conference "Emission Inventories – Applying New Technologies"*, San Diego, USA 29.4.-1.5.2003, 14 pp.
17. Syri S., Fronzek S., Karvosenoja N. and Forsius M. 2002. Sulfur and nitrogen oxides emissions in Europe and deposition in Finland during the 21st Century. *Proceedings of the FINSKEN final seminar*, 27-28.11.2002., Helsinki, Finland, pp. 71-83.
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## **Scientific monographs (refereed)**

1. Karvosenoja N. 2008. Emission scenario model for regional air pollution. *Monographs Boreal Environ. Res.* 32.

## **Other scientific publications, such as publications in university and institute series**

1. Koljonen Tiina, Sampo Soimakallio, Antti Asikainen, Timo Lanki, Perttu Anttila, Mikael Hildén, Juha Honkatukia, Niko Karvosenoja, Antti Lehtilä, Heikki Lehtonen, Tomi J. Lindroos, Kristiina Regina, Olli Salminen, Mikko Savolahti, Riikka Siljander, Pekka Tiittanen 2017. Energia- ja ilmastostrategian vaikutusarviot: Yhteenvetoraportti. Valtioneuvoston selvitys ja tutkimustoiminnan julkaisusarja 21/2017. 106 pp. (In Finnish with English abstract.)
2. Fauser, P., Ketzel, M., Becker, T., Plejdrup, M., Brandt, J., Hertel, O., Gidhagen, L., Omstedt, G., Skårman, T., Bartonova, A., Schwarze, P., Karvosenoja, N., Paunu, V-V., Kukkonen, J., Karppinen, A. 2016. Risk of Air Pollution in Relation to Cancer in the Nordic Countries. <https://norden.diva-portal.org/smash/get/diva2:955762/FULLTEXT01.pdf>
3. Suoheimo P., Grönroos J., Karvosenoja N., Petäjä J., Saarinen K., Savolahti M., Silvo K. 2015. Päästökattodirektiiviehdotuksen ja keskisuurten polttolaitosten direktiiviehdotuksen toimeenpanon vaikutukset Suomessa. Suomen ympäristökeskuksen raportteja 6/2015. 74 pp. (In Finnish with English abstract.)
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