

References

INTRODUCTION

Intergovernmental Panel on Climate Change (IPCC). (2000). Penman J., Kruger D., Galbally I., Hiraishi T., Nyenzi B., Emmanuel S., Buendia L., Hoppaus R., Martinsen T., Meijer J., Miwa K., and Tanabe K. (Eds). *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. IPCC/OECD/IEA/IGES, Hayama, Japan.

IDENTIFYING AND QUANTIFYING UNCERTAINTIES

Cullen A.C., and Frey H.C. (1999). Probabilistic Techniques in Exposure and Risk Assessment: a Handbook for Dealing with Variability and Uncertainty in Models and Inputs. Plenum Press, New York.

Eggleston H. S., Charles D., Jones B.M.R., Salway A.G., and Milne R. (1998). Treatment of uncertainties for national greenhouse gas emissions. Report AEAT 2688-1 for DETR Global Atmosphere Division, AEA Technology, Culham, UK.

Fishman G.S. (1996). Monte Carlo: concepts, algorithms, and applications. Springer-Verlag, New York.

Frey H.C., and Burmaster D.E. (1999). Method for characterization of variability and uncertainty: comparison of bootstrap simulation and likelihood-based approaches. *Risk Analysis*, 19: pp. 109-129.

Frey H.C. and Rhodes D.S. (1996). Characterizing, simulating, and analyzing variability and uncertainty: an illustration of methods using an air toxics emissions example. *Human and Ecological Risk Assessment*, 2: pp. 762-797.

Intergovernmental Panel on Climate Change (IPCC). (1997). Houghton J.T., Meira Filho L.G., Lim B., Treanton K., Mamaty I., Bonduki Y., Griggs D.J. and Callander B.A. (Eds). *Revised 1996 IPCC Guidelines for National Greenhouse Inventories*. IPCC/OECD/IEA, Paris, France.

Intergovernmental Panel on Climate Change (IPCC). (2000). Penman J., Kruger D., Galbally I., Hiraishi T., Nyenzi B., Emmanuel S., Buendia L., Hoppaus R., Martinsen T., Meijer J., Miwa K., and Tanabe K. (Eds). *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. IPCC/OECD/IEA/IGES, Hayama, Japan.

Lehtonen A., Mäkipää R., Heikkilä J., Sievänen R., and Liski J. (2004). Biomass expansion factors (BEF) for Scots pine, Norway spruce and birch according to stand age for boreal forest. *Forest Ecology and Management*. 188: 211-224

Morgan M.G., and Henrion M. (1990). Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis, Cambridge University Press, New York.

Ogle S.M., Eve M.D., Breidt F.J., and Paustian K. (2003). Uncertainty in estimating land use and management impacts on soil organic carbon storage for U.S. agroecosystems between 1982 and 1997. *Global Change Biology* 9: pp.1521-1542

Oreskes N., Shrader-Frechette K. and Belitz K. (1994). Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences. *Science*, 263: pp.641-646.

Rypdal K., and Winiwarter W. (2001). Uncertainties in GHG emission inventories. *Environmental Policy and Science*, 4(2-3): pp. 107-116.

Winiwarter W., and Rypdal K. (2000). Uncertainties in the Austrian GHG emission inventory. *Atmospheric Environment* 35/32: pp. 5425-5440.

SAMPLING

Cochran W.G. (1977). Sampling techniques. John Wiley & Sons, New York.

Dees M., Koch B., and Pelz D.R. (1998). Integrating satellite based forest mapping with Landsat TM in a concept of a large scale forest information system. *PFG*, 4/1998: pp.209-220.

De Vries P.G. (1986). Sampling theory for forest inventory. Springer-Verlag, New York.

- Gertner G., and Köhl M. (1992). An assessment of some nonsampling errors in a national survey using an error budget. *Forest Science* 38(3): pp. 525-538.
- Köhl M., Scott C.T., and Zingg A. (1995). Evaluation of Permanent Sample Surveys for Growth and Yield Studies. *Forest Ecology and Management*, 71(3): pp. 187-194.
- Lund G.H. (ed.). (1998). IUFRO Guidelines for designing multipurpose resource inventories. IUFRO World Service Volume 8. International Union of Forest Research Organizations. Vienna, Austria.
- Raj D. (1968). Sampling theory. McGraw-Hill.
- Reed D.D., and Mroz G.D. (1997). Resource assessment in forested landscapes. John Wiley & Sons, New York. p.386
- Särndal C.-E., Swensson B., and Wretman J. (1992). Model assisted survey sampling. Springer, New York.
- Schreuder H.T., Gregoire T.G., Wood G.B, (1993). Sampling Methods for Multiresource Forest Inventory, John Wiley & Sons, New York.
- Scott C.T., and Köhl M. (1994). Sampling with partial replacement and stratification, *Forest Science* 40(1): pp. 30-46
- Thompson S.K. (1992). Sampling. John Wiley & Sons, New York.

METHODOLOGICAL CHOICE -IDENTIFICATION OF KEY CATEGORIES

- Cullen A.C., and Frey H.C. (1999). Probabilistic Techniques in Exposure Assessment,. A Handbook for Dealing with Variability and Uncertainty in Models and Inputs. ISBN 0-306-45957-4. Plenum Press. New York and London.
- Flugsrud K., Irving W., and Rypdal K. (1999). Methodological Choice in Inventory Preparation. Suggestion for Good Practice Guidance. Documents 1999/19. Statistics Norway.
- Intergovernmental Panel on Climate Change (IPCC). (1997). Houghton J.T., Meira Filho L.G., Lim B., Treanton K., Mamaty I., Bonduki Y., Griggs D.J. and Callander B.A. (Eds). *Revised 1996 IPCC Guidelines for National Greenhouse Inventories*. IPCC/OECD/IEA, Paris, France.
- Intergovernmental Panel on Climate Change (IPCC). (2000). Penman J., Kruger D., Galbally I., Hiraishi T., Nyenzi B., Emmanuel S., Buendia L., Hoppaus R., Martinsen T., Meijer J., Miwa K., and Tanabe K. (Eds). *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. IPCC/OECD/IGES, Hayama, Japan.
- Morgan M.G., and Henrion M. (1990). Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis, Cambridge University Press, New York.
- Rypdal K., and Flugsrud K. (2001). Sensitivity Analysis as a Tool for Systematic Reductions in GHG Inventory Uncertainties. *Environmental Policy and Science*. Vol 4 (2-3): pp. 117-135.

QUALITY ASSURANCE AND QUALITY CONTROL

- Intergovernmental Panel on Climate Change (IPCC). (1997). Houghton J.T., Meira Filho L.G., Lim B., Treanton K., Mamaty I., Bonduki Y., Griggs D.J. and Callander B.A. (Eds). *Revised 1996 IPCC Guidelines for National Greenhouse Inventories*. IPCC/OECD/IEA, Paris, France.
- Intergovernmental Panel on Climate Change (IPCC). (2000). Penman J., Kruger D., Galbally I., Hiraishi T., Nyenzi B., Emmanuel S., Buendia L., Hoppaus R., Martinsen T., Meijer J., Miwa K., and Tanabe K. (Eds). *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. IPCC/OECD/IGES, Hayama, Japan.

TIME SERIES CONSISTENCY AND RECALCULATIONS

- Intergovernmental Panel on Climate Change (IPCC). (2000). Penman J., Kruger D., Galbally I., Hiraishi T., Nyenzi B., Emmanuel S., Buendia L., Hoppaus R., Martinsen T., Meijer J., Miwa K., and Tanabe K. (Eds). *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. IPCC/OECD/IEA/IGES, Hayama, Japan.

VERIFICATION

- Achard F., Eva H.D., Stibig H.J., Mayaux P., Gallego J., Richards T., and Malingreau J.-P. (2002). Determination of deforestation rates of the world's humid tropical forests. *Science* 297: pp. 999-1002.
- Alexandrov G.A., Oikawa T., and Yamagata Y. (2002b). The scheme for globalization of a process-based model explaining gradations in terrestrial NPP and its application, *Ecological Modelling*, 148: pp.293-306.
- Aubinet M., Grelle A., Ibrom A., Rannik U., Moncrieff J., Foken T., Kowalski A.S., Martin P.H., Berbigier P., Bernhofer C., Clement R., Elbers J., Granier A., Grünwald T., Morgenstern K., Pilegaard K., Rebmann C., Snijders C.W., Valentini R., and Vesala T. (2000). Estimates of the annual net carbon and water exchange of forests: the EUROFLUX methodology. *Advances in Ecological Research* 30: pp. 113-175.
- Baldocchi D., Falge E., Gu L., Olson R., Hollinger D., Running S., Anthoni P., Bernhofer C., Davis K., Evans R., Fuentes J., Goldstein A., Katul G., Law B., Lee X., Malhi Y., Meyers T., Munger W., Oechel W., Paw T., Pilegaard K., Schmid H.P., Valentini R., Verma S., Vesala T., Wilson K., and Wofsy S. (2001). FLUXNET: A New Tool to Study the Temporal and Spatial Variability of Ecosystem-Scale Carbon Dioxide, Water Vapor, and Energy Flux Densities. *Bull. Amer. Met. Soc.* 82 (11): pp. 2415-2434.
- Bakwin P., Tans P., Ussler W. III, and Quesnell E. (1995). Measurements of carbon dioxide on a very tall tower. *Tellus* 47B: pp. 535–549.
- Birdsey R.A. (1996). Carbon storage for major forest types and regions in the conterminous United States. In: Sampson R.N., and Hair D.(eds.) *Forests and Global Change*, Vol. 2: Forest Management Opportunities for Mitigating Carbon Emission American Forests, Washington D.C., USA, pp. 1-25.
- Blair J.B., Rabine D.L., and Hofton M.A. (1999). The Laser Vegetation Imaging Sensor: a medium-altitude, digitization only, airborne laser altimeter for mapping vegetation. *ISPRS J. Photogrammetric & Remote Sensing* 54: pp.115-122.
- Butterbach-Bahl K., Breuer L., Gasche R., Willibald G., and Papen H. (2002). Exchange of trace gases between soils and the atmosphere in Scots pine forest ecosystems of the northeastern German lowlands 1. Fluxes of N₂O, NO/NO₂ and CH₄ at forest sites with different N-deposition., *Forest Ecology and Management* 167: pp. 123-134.
- Butterbach-Bahl K. and Papen H. (2002). Four years continuous record of CH₄-exchange between the atmosphere and untreated and limed soil of a N-saturated spruce and forest ecosystem in Germany., *Plant and Soil* 240: pp.77-90.
- Carlson T.N. and Ripley D.A. (1997). On the relation between NDVI, fractional vegetation cover, and leaf area index. *Remote Sensing of Environment*, 62: pp.241–252.
- Chen W., Chen J.M., Liu J., and Cihlar J. (2000a). Approaches for reducing uncertainties in regional forest carbon balance. *Global Biogeochemical Cycles* 14(3): pp. 827-838.
- Chen W., Chen J.M., and Cihlar J. (2000b). An integrated terrestrial carbon-budget model based on changes in disturbance, climate, and atmospheric chemistry. *Ecol. Modelling* 135: 55-79.
- Chen, J.M., Pavlic G., Brown L., Cihlar J., Leblanc S.G., White H.P., Hall R.J., Peddle D., King D.J., Trofymow J.A., Swift E., Van der Sanden J., and Pellikka P. (2002). Validation of Canada-wide leaf area index maps using ground measurements and high and moderate resolution satellite imagery. *Remote Sensing of Environment*, 80: pp. 165-184.
- Dubayah R.O., and Drake J.B. (2000). Lidar remote sensing for forestry. *J. Forestry* 98: pp. 44–46.
- Foody G.M., Green R.M., Lucas R.M., Curran P.J., Honzak M., and Do Amaral I. (1997). Observations on the relationship between SIR-C radar backscatter and the biomass of regenerating tropical forests. *Int. J. Remote Sens.* 18: pp. 687–694.
- Gemmell F. and McDonald A.J. (2000). View zenith angle effects on the forest information content of three spectral indices. *Remote Sensing of Environment*, 72: pp. 139–158.
- Gholz H.L. (1982). Environmental limits on aboveground net primary production, leaf area and biomass in vegetation zones of the Pacific Northwest. *Ecology* 63: pp. 469–481.
- Gobron N., Pinty B., Verstraete M.M., and Widlowski J.-L. (2000). Advanced vegetation indices optimised for up-coming sensors: design, performance, and applications. *IEEE Transactions on Geoscience and Remote Sensing*, 38: pp.2489–2505.

- Gurney K.R., Law R.M., Scott Denning A., Rayner P.J., Baker D., Bousquet P., Bruhwiler L., Chen Yu-Han, Ciais P., Fan S., Fung I.Y., Gloor M., Heimann M., Higuchi K., John J., Maki T., Maksyutov S., Masarie K., Peylin P., Prather M., Pakk B.C., Randerson J., Sarmiento J., Taguchi S., Takahashi T., Yuen C.-W. (2002). Towards robust regional estimates of CO₂ sources and sinks using atmospheric transport models. *Nature*, 415: pp. 626-630.
- Huete A.R., Liu H.Q., Batchily K., and van Leeuwen W. (1997). A comparison of vegetation indices over a global set of TM images for EOS-MODIS. *Remote Sensing of Environment*, 59: pp. 440–451.
- Intergovernmental Panel on Climate Change (IPCC). (2000). Penman J., Kruger D., Galbally I., Hiraishi T., Nyenzi B., Emmanuel S., Buendia L., Hoppaus R., Martinsen T., Meijer J., Miwa K., and Tanabe K. (Eds). *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. IPCC/OECD/IEA/IGES, Hayama, Japan.
- Janssens I.A., Lankreijer H., Matteucci G., Kowalski A.S., Buchmann N., Epron D., Pilegaard K., Kutsch W., Longdoz B., Grünwald T., Montagnani L., Dore S., Rebmann C., Moors E.J., Grelle A., Rannik Ü., Morgenstern K., Oltchev S., Clement R., Guðmundsson J., Minerbi S., Berbigier P., Ibrom A., Moncrieff J., Aubinet M., Bernhofer C., Jensen N.O., Vesala T., Granier A., Schulze E.-D., Lindroth A., Dolman A.J., Jarvis P.G., Ceulemans R., Valentini R. (2001). Productivity overshadows temperature in determining soil and ecosystem respiration across European forests, *Global Change Biology*, 7: pp. 269-278.
- Kaufman Y.J. and Tanré D. (1992). Atmospherically-resistant vegetation index (ARVI) for EOS-MODIS. *IEEE Transactions on Geoscience and Remote Sensing*, 30: pp. 261–270.
- Kauppi P.E., Mielikäinen K., Kuusela K. (1992). Biomass and carbon budget of European forests, 1971 to 1990. *Science*, 256: pp. 70-74.
- Körner C. (2003). Slow in, rapid out – Carbon flux studies and Kyoto targets. *Science*, 300: pp. 1242-1243.
- Kramer K., Leinonen I., Bartelink H.H., Berbigier P., Borghetti M., Bernhofer C., Cienciala E., Dolman A.J., Froer O., Gracia C.A., Granier A., Grünwald T., Hari P., Jans W., Kellomäki S., Loustau D., Magnani F., Markkanen T., Matteucci G., Mohren G.M.J., Moors E., Nissinen A., Peltola H., Sabaté S., Sanchez A., Sontag M., Valentini R., Vesala T. (2002). Evaluation of 6 process-based forest growth models based on eddy-covariance measurements of CO₂ and H₂O fluxes at 6 forest sites in Europe. *Global Change Biology*, 8: pp. 213-230.
- Kurz W., Apps M. (1999). A 70-year retrospective analysis of carbon fluxes in the Canadian forest sector. *Ecological Applications* 9(2): pp.526-547.
- Landsberg J.J. and Waring R.H. (1997). A generalised model of forest productivity using simplified concepts of radiation-use efficiency, carbon balance, and partitioning. *Forest Ecology and Management*, 95: pp. 209–228.
- Luckman A., Baker J., Honzák M., and Lucas R. (1998). Tropical forest biomass density estimation using JERS-1 SAR: Seasonal variation, confidence limits, and application to image mosaics. *Remote Sens. Environ.*, 63: pp. 126–139.
- McGuire A.D., Sitch S., Clein J.S., Dargaville R., Esser G., Foley J., Heimann M., Joos F., Kaplan J., Kicklighter D.W., Meier R.A., Melillo J.M., Moore B. III, Prentice I.C., Ramankutty N., Reichenau T., Schloss A., Tian H., Williams L.J., and Wittenberg U. (2001). Carbon balance of the terrestrial biosphere in the twentieth century: Analyses of CO₂, climate and land-use effects with four process-based ecosystem models. *Global Biogeochemical Cycles*, 15: pp.183-206.
- Means J.E., Acker S.A., Harding D.J., Blair J.B., Lefsky M.A., Cohen W.B., Harmon M.E., and McKee W.A. (1999). Use of large-footprint scanning airborne lidar to estimate forest stand characteristics in the Western Cascades of Oregon. *Remote Sens. Environ.*, 67: pp. 298–308.
- Mollicone D., Matteucci G., Koble R., Masci A., Chiesi M., Smits P.C. (2003). A model based approach for the estimation of carbon sink in European forest. In: Valentini R. (ed.) *Fluxes of carbon, water and energy of European forests. Ecological Studies*, Vol. 163, Springer-Verlag, Berlin, pp.179-206.
- Monteith J.L. (1977). Climate and the efficiency of crop production in Britain. *Philosophical Transactions of the Royal Society of London*, Series B, 281: pp.277–294.
- Moreau L. and Li Z. (1996). A new approach for remote sensing of canopy absorbed photosynthetically active radiation. II.: proportion of canopy absorption. *Remote Sensing of Environment*, 55: pp.192–204.
- Nabuurs G.J., Pavin R., Sikkema R., Mohren G.M.J. (1997). The role of European forests in the global carbon cycle – a review. *Biomass and Bioenergy*, 13: pp. 345-358.

- Nilsson S., Jonas M., Obersteiner M., Victor D.G. (2001). Verification: the gorilla in the struggle to slow global warming. *The Forestry Chronicle* 77(3): pp.475-478.
- Okuda T. and Nakane K. (1988). Application of Landsat MSS data to the vegetation classification—a case study of the northwestern part of Fukuoka prefecture, Japan. *Jpn. J. Ecol.* 38: pp. 85–97.
- Okuda T., Suzuki M., Adachi N., Yoshida K., Niyyama K., Nur Supardi M.N., Manokaran N., Mazlan H. (2003). Logging history and its impact on forest structure and species composition in the Pasoh Forest Reserve - Implication for the sustainable management of natural resources and landscapes. In Okuda T., Niyyama K., Thomas S.C., and Ashton P.S. (eds.). *Pasoh: Ecology of a Rainforest in South East Asia*, Springer, Tokyo, pp. 15-34.
- Oreskes N., Shrader-Frechette K. and Belitz K.(1994). Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences.. *Science*, 263: pp. 641-646.
- Page S.E., Siegert F., Rieley J.O., Boehm H.-D.V., Jaya A. and Limin S. (2002). The amount of carbon released from peat and forest fires in Indonesia during 1997. *Nature*, 420: pp.61-65.
- Rauste Y., Häme T., Pulliainen J., Heiska K., Hallikainen M. (1994). Radar-based forest biomass estimation. *Int. Jour. Remote Sensing* 15(14): pp. 2797-2808.
- Running S.W. (1994). Testing FOREST-BGC ecosystem process simulations across a climatic gradient in Oregon, *Ecol. Appl.* 4(2): pp. 238–247.
- Running S.W. and Coughlan J.C. (1988). A general model of forest ecosystem processes for regional applications I. Hydrological balance, canopy gas exchange and primary production processes *Ecol. Model.* 42: pp.125–154.
- Running S.W. and Hunt E.R. Jr. (1993). Generalization of a forest ecosystem process model for other biomes, BIOME-BGC, and an application for global-scale models. In: Ehleringer J.R. and Field C. (eds.), *Scaling physiological processes: Leaf to globe*, Academic Press, San Diego, CA, pp. 141–158.
- Saatchi S.S., Nelson B., Podest E., and Holt J. (2000). Mapping land cover types in the Amazon Basin using 1 km JERS-1 mosaic. *Int. J. Remote Sens.* 21: pp. 1201–1234.
- Schulze E.-D., Valentini R., Sanz M.-J.(2002). The long way from Kyoto to Marrakesh: implication of the Kyoto Protocol negotiations for global ecology. *Global Change Biology* 8: pp. 505-518.
- Smith P. (2001). Verifying sinks under the Kyoto Protocol. *VERTIC Briefing Paper* 01/03, 1-9 (<http://www.vertic.org/briefing/briefing.html>)
- Steinkamp R., Butterbach-Bahl K., Papen H. (2001). Methane oxidation by soils of an N limited and N fertilized spruce forest in the Black Forest, Germany. *Soil Biology & Biochemistry* 33: pp. 145-153.
- Terhikki Manninen A., Ulander L.M.H. (2001). Forestry parameter retrieval from texture in CARABAS VHF-Band SAR images. *IEEE Transactions on Geoscience and Remote Sensing* 39(12): pp. 2622-2633.
- Trotter C.M., Dymond J.R., and Goulding C.J. (1997). Estimation of timber volume in a coniferous plantation forest using Landsat TM.. *International Journal of Remote Sensing*, 18: pp. 2209–2223.
- Uchijima Z. and Seino H. (1985). Agroclimatic evaluation of net primary productivity of natural vegetation. (1) Chikugo model for evaluating net primary productivity, *J. Agr. Met.* 40: pp. 343–352.
- Waring R.H. (1983). Estimating forest growth and efficiency in relation to canopy leaf area *Adv. Ecol. Res.* 13: pp. 327-354.
- Waring R.H. and Running S.W. (1998). *Forest Ecosystems. Analysis at multiple scales*. Academic Press, San Diego, CA, USA.