

Publications list Edzer Pebesma

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1 International journals

1. Shivam Gupta, Edzer Pebesma, Jorge Mateu and Auriol Degbelo, 2018. Air Quality Monitoring Network Design Optimisation for Robust Land Use Regression Models. Sustainability 2018, 10(5), 1442; [online](#)
2. Ngo Manh Khoi, Sven Casteleyn, M. Mehdi Moradi and Edzer Pebesma, 2018. Do Monetary Incentives Influence Users' Behavior in Participatory Sensing? Sensors 18(5), 1426; [online](#)

3. Nanki Sidhu, Edzer Pebesma Gilberto Câmara, 2018. Using Google Earth Engine to detect land cover change: Singapore as a use case. *European Journal of Remote Sensing* **51** (1), 486-500.
4. Shivam Gupta, Jorge Mateu, Auriol Degbelo, Edzer Pebesma, 2018. Quality of life, big data and the power of statistics. *Statistics & Probability Letters*; published [online](#).
5. Marius Appel, Florian Lahn, Wouter Buytaert, Edzer Pebesma, 2018. Open and scalable analytics of large Earth observation datasets: from scenes to multidimensional arrays using SciDB and GDAL. *ISPRS Journal of Photogrammetry and Remote Sensing*, **138**, 47–56 (open access)
6. Nanki Sidhu, Edzer Pebesma, Yi-Chen Wang, 2017. Usability Study to Assess the IGBP Land Cover Classification for Singapore. *Remote Sensing* **9**(10), 1075.
7. Meng Lu, Eliakim Hamunyela, Jan Verbesselt, Edzer Pebesma, 2017. Dimension reduction of multi-spectral satellite image time series to improve deforestation monitoring. *Remote Sensing* **9**(10), 1025.
8. S. Gebbert, E. Pebesma, 2017. The GRASS GIS temporal framework. *International Journal of Geographic Information Systems*, **31** (7), pp 1273-1292.
9. Daniel Nüst, Markus Konkol, Marc Schutzeichel, Edzer Pebesma, Christian Kray, Holger Przibytzin, Jörg Lorenz, 2017. Opening the Publication Process with Executable Research Compendia. *D-Lib Magazin* **23** (1/2).
10. Edzer Pebesma, Thomas Mailund, James Hiebert, 2017. Measurement units in R. *The R Journal*, **8-2**, 486-494.
11. C. Knoth, E. Pebesma, 2017. Detecting dwelling destruction in Darfur through object-based change analysis of very-high-resolution imagery. *International Journal of Remote Sensing* **38** (1) 273-295.
12. Benedikt Gräler, Edzer Pebesma and Gerard Heuvelink, 2016. Spatio-Temporal Interpolation using gstat. *The R Journal* **8**(1), 204-218
13. S. Scheider, B. Gräler, E. Pebesma, C. Stasch, 2016. Modelling spatio-temporal information generation. *Int J of Geographic Information Science*, **30** (10), 1980-2008 ([recommended pdf](#)).
14. M. Lu, E. Pebesma, A. Sanchez, J. Verbesselt, 2016. Spatio-temporal change detection from multidimensional arrays: detecting deforestation from MODIS time series. *ISPRS Journal of Photogrammetry and Remote Sensing*, **117**, 227–236 ([pdf](#)).

15. Lemke, D., S. Berkemeyer, V. Mattauch, O. Heidinger, E. Pebesma, H.-W. Hense, 2015. Small-area spatio-temporal analyses of participation rates in the mammography screening program in the city of Dortmund (NW Germany). *BMC Public Health* 15:[1190](#).
16. Helle, K.B., E. Pebesma, 2015. Optimising Sampling Designs for the Maximum Coverage Problem of Plume Detection. *Spatial Statistics* 13, [31-44](#).
17. D. Lemke, V. Mattauch, O. Heidinger, E. Pebesma, H.W. Hense, 2015. Comparing adaptive and fixed bandwidth-based kernel density estimates in spatial cancer epidemiology. *International Journal of Health Geographics* 14:[15](#).
18. Pebesma, E., R. Bivand, P.J. Ribeiro, 2015. Software for Spatial Statistics. *Journal of Statistical Software* 63(1), [1-8](#).
19. Hengl, T., P. Roudier, D. Beaudette, E. Pebesma, 2015. plotKML: Scientific Visualization of Spatio-Temporal Data. *Journal of Statistical Software*, 63(5), [1-25](#).
20. Skøien, J. O., G. Blöschl, G. Laaha, E. Pebesma, J. Parajka, and A. Viglione, 2014. rtop: an R package for interpolation of data with a variable spatial support, with an example from river networks. *Computers & Geosciences* 67, p. [180-190](#).
21. Kilibarda, M., T. Hengl, G.B.M. Heuvelink, B. Gräler, E. Pebesma, M. Percec Tadic, and B. Bajat, 2014. Spatio-temporal interpolation of daily temperatures for global land areas at 1 km resolution. *Journal of Geophysical Research Atmospheres*, 119 (5) p. [2294-2313 \(open access\)](#)
22. Fraley, G., P. Jankowski, E. Pebesma, 2014. An Exploratory Approach to Spatial Decision Support. *Computers, Environment & Urban Systems*, 45 [101-113](#)
23. Truong, P.N., G.B.M. Heuvelink, E. Pebesma, 2014. Bayesian Area-to-Point Conditional Simulation Using Expert Knowledge as Informative Priors. *International Journal of Applied Earth Observation and Geoinformation*, 30, p. [128–138](#)
24. Gebbert, S., E. Pebesma, 2014. A temporal GIS for field based environmental modeling. *Environmental Modelling & Software* 53, p [1-12 \(pdf\)](#).
25. Stasch, C., S. Scheider, E. Pebesma, W. Kuhn, 2014. Meaningful Spatial Prediction and Aggregation. *Environmental Modelling & Software*, 51, ([149–165, open access](#)).

26. Brink, J. and E. Pebesma, 2014. Plume tracking with a mobile sensor based on incomplete and imprecise information. *Transactions in GIS* 18 (5), p. [740–766](#).
27. Lemke, D., V. Mattauch, O. Heidinger, E. Pebesma and H.-W. Hense, 2013. Detecting cancer clusters in a regional population with local cluster tests and Bayesian smoothing methods: a simulation study. *International Journal of Health Geographics* 12:[54](#)
28. Pupin Mello, M., J. Risso, C. Atzberger, P. Aplin, E. Pebesma, C.A. Oliveira Vieira and B.F.T. Rudorff, 2013. Bayesian Networks for Raster Data (BayNeRD): Plausible Reasoning from Observations. *Remote Sensing* 5 (11), [5999–6025](#).
29. Gerharz, L.E., O. Klemm, A.V. Broich and E. Pebesma, 2013. Spatio-temporal modelling of individual exposure to air pollution. *Atmospheric Environment*, Volume 64, [56-65](#).
30. Bastin, L., D. Cornford, R. Jones, G.B.M. Heuvelink, E. Pebesma, C. Stasch, S. Nativi, P. Mazetti, M. Williams, 2013. Managing Uncertainty in Integrated Environmental Modelling Frameworks: The UncertWeb framework. *Environmental Modelling & Software* 39, [116-134](#). ([pdf](#)).
31. Gerharz, L.E., E. Pebesma, 2013. Using geostatistical simulation to disaggregate air quality model results for individual exposure estimation on GPS tracks. *Stochastic Environmental Research and Risk Assessment* 27 (1), pp [223-234](#)
32. Hosseinalizadeh, M., E. Pebesma, H. Ahmadi, S. Feiznia, F. Rivaz, B. Gräler, 2012. Spatial Modeling of the K factor for two sub-catchments with different tillage and grazing. Case study: loessial paired sub-catchments in the north-east of Iran. *Journal of Biodiversity and Ecological Sciences* 2 (2), [94-103](#).
33. Pebesma, E., 2012. spacetime: Spatio-Temporal Data in R. *Journal of Statistical Software*, volume 51, issue 7; [1-30](#).
34. Pebesma, E., D. Nüst, R. Bivand, 2012. The R software environment in reproducible geoscientific research. *Eos, Transactions American Geophysical Union* 93, vol 16, p. [163-164](#) ([pdf](#)).
35. Stasch, C., T. Foerster, C. Autermann, E. Pebesma, 2012. Spatio-Temporal aggregation of European Air Quality Observations in the Sensor Web. *Computers and Geosciences* 47, [111–118](#).

36. Espindola, G.M. de, A.P.D. de Aguiar, E. Pebesma, G. Câmara, L. Fonseca, 2012. Agricultural land use dynamics in the Brazilian Amazon based on remote sensing and census data. *Applied Geography* 32, 240–252 ([pdf](#)).
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38. Fritze, H., I.T. Stewart, E.J. Pebesma, 2011. Shifts in Western North American snowmelt runoff regimes for the recent warm decades. *Journal of hydrometeorology*, vol 12, p. [989–1006](#). [DOI](#).
39. Baume, O.P., J.O. Skøien, G.B.M. Heuvelink, E.J. Pebesma, S.J. Melles, 2011. A geostatistical approach to data harmonization – Application to radioactivity exposure data. *International Journal of Applied Earth Observation and Geoinformation*, 13, [409-419](#)
40. Pebesma, E., D. Cornford, G. Dubois, G.B.M. Heuvelink, D. Hristopoulos, J. Pilz, U. Stöhlker, G. Morin and J.O. Skøien, 2011. INTAMAP: the design and implementation of an interoperable automated interpolation web service. *Computers & Geosciences*, 37 (3), [343-352](#)
41. Hiemstra, Paul H., Edzer J. Pebesma, Gerard B.M. Heuvelink, Chris J.W. Twenhöfel, 2010. Using rainfall radar data to improve interpolated maps of dose rate in the Netherlands. *Science of the Total Environment*, 409 (1), [123-133](#)
42. Sluiter, R., E.J. Pebesma, 2010. Comparing techniques for vegetation classification using multi- and hyperspectral images and ancillary environmental data. *International Journal of Remote Sensing*, 1366-5901, Volume 31, Issue 23, Pages [6143 – 6161](#).
43. Nijs, T. de, E. Pebesma, 2010. Estimating the influence of the neighbourhood in the development of residential areas in the Netherlands. *Environment and Planning B, Planning and Design* 37, p. [21-41](#)
44. Skøien, J.O., O. Baume, E. J. Pebesma, G.B.M. Heuvelink, 2010. Identifying and removing heterogeneities between monitoring networks. *Environmetrics*, 21 (1), p. [66 - 84](#)
45. Hiemstra, P.H., E.J. Pebesma, C.J.W. Twenhöfel, G.B.M. Heuvelink, 2009. Real-time automatic interpolation of ambient gamma dose rates from the Dutch Radioactivity Monitoring Network. *Computers & Geosciences* 35 (8), [Pages 1711-1721](#)

46. Beelen, R., G. Hoek, E. Pebesma, D. Vienneau, K. de Hoogh, D.J. Briggs, 2009. Mapping of air pollution at a fine spatial scale across the European Union. *Science of the Total Environment* Vol. 407, No. 6, 1852-1867
47. Skøien, J.O., G. Blöschl, E.J. Pebesma, 2008. Geostatistics for automatic estimation of environmental variables - some simple solutions. *Georisk*, Vol. 2 No. 4, 259-272.
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49. Braak, C.J.F. ter, D.J. Brus and E.J. Pebesma, 2008. Comparing sampling patterns for kriging the spatial mean temporal trend. *Journal of Agricultural, Biological and Ecological Statistics* 13 (2), 159-176.
50. Schuurmans, J. M., M.F.P. Bierkens, E.J. Pebesma, and R. Uijlenhoet, 2007. Automatic Prediction of High-Resolution Daily Rainfall Fields for Multiple Extents: The Potential of Operational Radar. *Journal of Hydrometeorology* 8 (6), 1204-1224.
51. Dubois, G., E.J. Pebesma, P. Bossew, 2007. Automatic mapping in emergency: a geostatistical perspective. *International Journal of Emergency Management* 4 (3), pp. 455-467.
52. Addink, E.A., S.M. de Jong and E.J. Pebesma, 2007. The importance of scale in object-based mapping of vegetation parameters with hyperspectral imagery. *Photogrammetric Engineering & Remote Sensing*, 73 (8), 905-912.
53. Pebesma, E.J., P. Switzer, K. Loague, 2007. Error analysis for the evaluation of model performance: Rainfall-runoff event summary variables. *Hydrological Processes* 21, 3009-3024.
54. Pebesma, E.J., K. de Jong, D.J. Briggs, 2007. Visualising uncertain spatial and spatio-temporal data under different scenarios: an air quality example. *International Journal of GIS*, 21, 515-527 (Special Issue in Honour of the Contribution of Peter Burrough to Geographical Information Science). ([pdf](#))
55. Pebesma, Edzer J., 2006. The Role of External Variables and GIS Databases in Geostatistical Analysis. *Transactions in GIS* Vol. 10 No. 4, 615-632. ([pdf](#))

56. Pebesma, E.J., R.S. Bivand, 2005. Classes and methods for spatial data in R. *R News* 5 (2), 9–13.
57. Pebesma, E.J., 2005. Mapping Radioactivity from monitoring data, automating the classical geostatistical approach. *Applied GIS*, Vol. 1, No. 2.
58. Pebesma, E.J., R.N.M. Duin, P.A. Burrough, 2005. Mapping Sea Bird Densities over the North Sea: Spatially Aggregated Estimates and Temporal Changes. *Environmetrics* 16, (6), p 573-587. ([pdf](#)) ([R script](#))
59. Pebesma, E.J., P. Switzer, K. Loague, 2005. Error analysis for the evaluation of model performance: Rainfall-runoff event time series data. *Hydrological Processes*, 19, p 1529-1548.
60. Pebesma, E.J., 2004. Multivariable geostatistics in S: the gstat package. *Computers & Geosciences* 30 (7), 683-691 (C&G best paper award for 2004).
61. Pfeffer, K., E.J. Pebesma, P.A. Burrough, 2003. Mapping alpine vegetation using vegetation observations and topographic attributes. *Landscape Ecology* 18: 759-776.
62. Jong, S.M. de, E.J. Pebesma, B. Lacaze, 2003. Aboveground biomass assessment of mediterranean Forests using Airborne Imaging Spectrometry: the DAIS Payne Experiment Int. *J. of Remote Sensing* 24 (7), 1505-1520.
63. Kros, J., J.P. Mol Dijkstra, E.J. Pebesma, 2002. Assessment of the prediction error in a large-scale application of a dynamic soil acidification model. *Stochastic Environmental Research and Risk Assessment* 16, 279–306.
64. Horssen, P.W. van, E.J. Pebesma, P.P. Schot, 2002. Uncertainties in spatially aggregated predictions from a logistic regression model. *Ecological Modelling* 154 (1-2), 93-101.
65. Wit, M.J.M. de, E.J. Pebesma, 2001. Nutrient fluxes at the river basin scale. Part II: the balance between data availability and model complexity. *Hydrological Processes* 15, 761-775.
66. Thorsen, M., J.C. Refsgaard, S. Hansen, E.J. Pebesma, J.B. Jensen, and S. Kleeschulte, 2001. Assessment of uncertainty in simulation of nitrate leaching to aquifers at catchment scale. *Journal of Hydrology* 242, 210-227.

67. Hansen, S., M. Thorsen, E.J. Pebesma, S. Kleeschulte, H. Svendsen, 1999. Uncertainty in simulated nitrate leaching due to uncertainty in input data. A case study. *Soil Use and Management* **15** (3), pp. 167-175.
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69. Kros, J., E.J. Pebesma, G.J. Reinds and P.A. Finke, 1999. Uncertainty assessment in modelling soil acidification at the European scale: a case study. *Journal of Environmental Quality* **28** (2), pp. 366-377.
70. Heuvelink, G.B.M., and E.J. Pebesma, 1999. Spatial aggregation and soil process modelling. *Geoderma* **89**, 47-65.
71. Pebesma, E.J. and G.B.M. Heuvelink, 1999. Latin hypercube sampling of Gaussian random fields. *Technometrics* **41** (4), pp. 303-312.
72. Pebesma, E.J. and C.G. Wesseling, 1998. Gstat, a program for geo-statistical modelling, prediction and simulation. *Computers & Geosciences* **24** (1), 17-31.
73. Pebesma, E.J. and J.W. de Kwaadsteniet, 1997, Mapping Groundwater Quality in the Netherlands. *Journal of Hydrology* **200**, pp. 364-386.

2 Conference papers

1. Edzer Pebesma, Marius Appel, and Florian Lahn, 2018. R vector and raster data cubes for openEO. EGU2018-8198; IE4.4/GM2.8/AS5.8/BG1.17/CL5.28/GD10.10/ - R and the benefit of low-cost solutions - democratic participation to face challenges in Earth science (co-organized).
2. Avipsa Roy, Edzer Pebesma, 2017. A Machine Learning Approach to Demographic Prediction using Geohashes. *SocialSens'17 Proceedings of the 2nd International Workshop on Social Sensing*, Pittsburgh, PA, USA — April 18 - 21, 2017, Pages 15-20 <https://dl.acm.org/citation.cfm?id=3055603>
3. Luiz Gustavo Diniz, Merretuurman, Pedro R. Andrade, Gilberto Câmara, Edzer Pebesma, 2013. Measuring Allocation Errors in Land Change Models in Amazonia. *Proceedings GeoINFO 2013*, Nov 24-27, Campos do Jordão, Br.

4. Marcio Pupin Mello, Daniel Alves Aguiar, Bernardo Friedrich Theodor Rudorff, Edzer Pebesma, Jim Jones, Naiara Carolina Pontes Santos. Spatial statistic to assess remote sensing acreage estimates: an analysis of sugarcane in São Paulo state, Brazil. [IGARSS 2013](#), Jul 21-16, Melbourne, Australia.
5. Matthias Hinz, Daniel Nüst, Benjamin Proß, Edzer Pebesma, 2013. Spatial Statistics on the Geospatial Web. Short paper, [AGILE 2013](#).
6. Schulz, M., J. Skøien, L. Gerharz, E. Pebesma, G. Dubois. Uncertainty propagation between web services – a case study using the eHabitat WPS to identify unique ecosystems. In: R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.) [Proceedings of the 2012 International Congress on Environmental Modelling & Software: Managing Resources of a Limited Planet](#), Sixth Biennial Meeting, Leipzig, Germany; pp. 1489-1496.
7. Pross, B., C. Stasch, L. Gerharz, E. Pebesma, 2012. Tools for uncertainty propagation in the Model Web using Monte Carlo Simulation. In: R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.) [Proceedings of the 2012 International Congress on Environmental Modelling & Software: Managing Resources of a Limited Planet](#), Sixth Biennial Meeting, Leipzig, Germany; pp. 933-941.
8. Gräler, B., E. Pebesma, 2012. Modelling Dependence in Space and Time with Vine Copulas. [GEOSTATS 2012: Ninth International Geostatistics Congress](#), Oslo, Norway, June 11-15, 2012
9. Truong, P., G.B.M. Heuvelink and E. Pebesma, 2012. Influence of point-support variogram on disaggregation uncertainty using ATP Kriging. [GIZeitgeist](#), 16th and 17th of March 2012, Muenster. <http://gi-zeitgeist.uni-muenster.de/>
10. Senaratne, H. L. Gerharz, E. Pebesma, A. Schwering, 2012. Usability of Spatio-Temporal Uncertainty Visualisation Methods. In: [Bridging the Geographic Information Sciences, Lecture Notes in Geoinformation and Cartography](#), J. Gensel, D. Josselin and D. Vandenbroucke. Springer Berlin Heidelberg, doi, [draft pdf](#). (Agile 2012 proceedings)
11. Fairgrieve, S., C. Stasch, S. Falke, L. Gerharz, E. Pebesma, 2011. Error Aware Near Real-Time Interpolation of Air Quality Observations in GEOSS. [ISW-2011: Integrating Sensor Web and Web-based Geoprocessing](#), An AGILE 2011 Conference Workshop; Utrecht, The Netherlands, April 18, 2011 ([pdf](#)).

12. Helle, Kristina B., Poul Astrup, Wolfgang Raskob and Edzer Pebesma, 2011. Methods and Sampling Designs to Map Plumes Using Prior Knowledge from Simulations. Short paper presented at ISSDQ 2011.
13. Giovana M. de Espindola, Edzer Pebesma, Gilberto Câmara, 2011. Spatio-temporal regression models for deforestation in the Brazilian Amazon. [STDM 2011](#), The International Symposium on Spatial-Temporal Analysis and Data Mining, University College London - 18th-20th July 2011 [pdf](#)
14. Helle, K.B., L. Urso, P. Astrup, T. Mikkelsen, J.C. Kaiser, E. Pebesma, C. Rojas-Palma, E. Holo, J.E. Dyve, W. Raskob, 2011. Planning sensor locations for the detection of radioactive plumes for Norway and the Balkans. Planning and assessment of monitoring strategies for the detection of radioactive plumes for Norway and the Balkans' region. ICRER conference (19th - 24th June 2011), Hamilton, Canada.
15. Katharina Henneböhl, Marius Appel, Edzer Pebesma, 2011. Spatial interpolation in massively data parallel computing environments. In: Stan Geertman, Wolfgang Reinhardt, and Fred Toppen, editors. Proceedings of the 14th AGILE International Conference on Geographic Information Science - Advancing Geoinformation Science for a Changing World, Utrecht, 2011. AGILE. ISBN 978-90-816960-1-2.
16. Daniel Nüst, Christoph Stasch and Edzer J. Pebesma, 2011. Connecting R to the Sensor Web. In: S.C.M. Geertman, W.P. Reinhardt, and F.J. Toppen, editors. [Advancing Geoinformation Science for a Changing World](#). Lecture Notes in Geoinformation and Cartography. Springer Verlag, Berlin, etc., 2011. ISBN 978-3-642-19788-8.
17. Gerharz, L.E., B. Gräler, E Pebesma, 2011. Disaggregating gridded air quality data for individual exposure modelling. *Procedia Environmental Sciences* [Volume 7](#), p. 146-151 [Spatial Statistics 2011: Mapping Global Change](#).
18. Gräler, B., E. Pebesma, 2011. The pair-copula construction for spatial data: a new approach to model spatial dependency. *Procedia Environmental Sciences* [Volume 7](#), p. 206-211 [Spatial Statistics 2011: Mapping Global Change](#).
19. Pebesma, E., D. Cornford, S. Nativi, and C. Stasch, 2010. [The uncertainty enabled model web \(UncertWeb\)](#). *Environmental Information Systems and Services Infrastructures and Platforms*, Workshop at [EnviroInfo2010](#), Bonn/Cologne, October 6-8, 2010. ([proceedings](#); [video](#))
20. Raskob, W., C. Rojas-Palma, C. Kaiser, T. Mikkelsen, E. Pebesma, 2009. Design of optimised systems for monitoring of radiation and

radioactivity in case of a nuclear or radiological emergency in europe (DETECT). Proceedings of the 14. Fachgespräch zur Überwachung der Umweltradioaktivität, Freiburg, DE, March 23-26, 2009

21. Stoehlker, U., G. Dubois, J. De Jesus, S. Burbeck, M. Bleher, E. Pebesma, 2009. Real-time mapping for environmental surveillance: A decision-maker's perspective. StatGIS 2009: Geoinformatics for environmental surveillance. Milos, June 17-18 2009.
22. Skøien, J.O., E.J. Pebesma, G. Blöschl, 2009. rtop – an R package for interpolation along the stream network. StatGIS 2009: Geoinformatics for environmental surveillance. Milos, June 17-18 2009.
23. Pebesma, E., D. Cornford, G. Dubois, G. Heuvelink, D. Hristopoulos, J. Pilz, U. Stoehlker, J. Skøien, 2009. INTAMAP: an interoperable automated interpolation web service. StatGIS 2009: Geoinformatics for environmental surveillance. Milos, June 17-18 2009.
24. Henneböhl, K. L.E. Gerharz, E.J. Pebesma, 2009. An OGC web service architecture for near real-time interpolation of air quality over Europe. StatGIS 2009: Geoinformatics for environmental surveillance. Milos, June 17-18 2009.
25. Pebesma, E., G. Dubois, D. Cornford, 2009. Automated mapping of environmental variables from a SEIS or SISE perspective. Presented at: European conference of the Czech Presidency of the Council of the EU: TOWARDS eENVIRONMENT (Challenges of SEIS and SISE: Integrating Environmental Knowledge in Europe). Jiri Hrebicek (chief editor), Jiri Hradec, Emil Pelikan, Ondrej Mirovsky, Werner Pillmann, Ivan Holoubek, Thomas Bandholtz (Eds.) [Masaryk University, Mar 25-27, 2009](#).
26. Dubois, G., J. de Jesus, B. Doherty, D. Cornford, E.J. Pebesma. Lessons learnt from INTAMAP, an interoperable web service for the real-time interpolation of environmental variables. 33rd Int. Symposium on Remote Sensing of the Environment (<http://isrse-33.jrc.ec.europa.eu/>), May 4-8, 2009.
27. Skøien, J.O., G.B.M. Heuvelink, E.J. Pebesma. Unbiased block predictions and exceedance Probabilities for environmental thresholds. In: Julián M. Ortiz and Xavier Emery (Eds.), GEOSTATS 2008 - VIII International Geostatistics Congress 1-5 December, Santiago, Chile.
28. Baume, O., J.O. Skøien, G.B.M. Heuvelink, E.J. Pebesma. Data harmonization with geostatistical tools: a Bayesian extension. In: Julián M. Ortiz and Xavier Emery (Eds.), GEOSTATS 2008 - VIII International Geostatistics Congress 1-5 December, Santiago, Chile.

29. Pebesma, E.J., G. Dubois, D. Cornford, 2008. The challenge of real-time automatic mapping for environmental monitoring network management. In: A. Soares, M.J. Pereira, R. Dimitrakopoulos (Eds.): geoENV VI, Geostatistics for Environmental Applications. Quantitative Geology and Geostatistics, Vol. 15, pp 467-476. Springer.
30. Hiemstra, P.H., E.J. Pebesma, C.J.W. Twenhöfel, G.B.M. Heuvelink, 2007. Toward an Automatic Real-Time Mapping System for Radiation Hazards. GI-Days 2007 – Young researchers Forum. In: F. Probst, C. Kessler (Eds.), Proceedings of the 5th Geographic Information Days 10.-12. September 2007, Münster, Germany. IfGI prints 30.
31. Williams, M., Cornford, D., Ingram, B. R., Bastin, L., Beaumont, A. J., Pebesma, E. and Dubois, G. 2007. Supporting interoperable interpolation: the INTAMAP approach. International Symposium on Environmental Software Systems 2007, 22-25 May, Prague, Czech Republic.
32. Addink, E.A., S.M. de Jong, E.J. Pebesma, 2007. Object definition for aboveground biomass and leaf area index estimation. Proceedings 5th EARSeL Workshop on Imaging Spectroscopy. Bruges, Belgium, April 23-25, 2007.
33. Addink, E.A., Jong, S.M. de, Pebesma, E.J. & Nijland, W. (2007). Estimating biomass and LAI in Mediterranean forests from HyMap data using object-oriented image analysis. How to define optimal objects? In Proceedings ForestSat 2007 SCIENTIFIC WORKSHOP - Forests and Remote sensing : Methods and Operational Tools (pp. 5). Montpellier, France: ForestSat.
34. Pebesma, E.J., D. Karssenbergh, K. de Jong, 2006. Dynamic visualisation of spatial and spatio-temporal probability distribution functions. Proceedings of 7th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences, July 5-7 2006. Edited by M. Caetano and M. Painho.
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3 Conference/meeting (extended) abstracts or posters

1. Edzer Pebesma, Wolfgang Wagner, Pierre Soille, Miha Kadunc, Noel Gorelick, Matthias Schramm, Jan Verbesselt, Johannes Reiche, Marius Appel, Jeroen Dries, Alexander Jacob, Markus Neteler, Soeren Gebbert, Christian Briese, and Pieter Kempeneers, 2018. openEO: an open API for cloud-based big Earth Observation processing platforms. [EGU2018-4957](#) ESSI2.2 - Data cubes of Big Earth Data - a new paradigm for accessing and processing Earth Science Data ([poster](#))
2. Matthias Schramm, Wolfgang Wagner and Edzer Pebesma, 2017. openEO - An open source Interface between EO Data Infrastructures and Front-End Applications. 2017 Conference on Big Data from Space (BiDS'17) 28-30 November 2017 Centre de Congrès Pierre Baudis, Toulouse, France
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4. Joshi, Jigeeshu; Edzer Pebesma, Marius Appel, 2017. Evaluation of Array Database to Manage and Query Massive Sensor Data. Earth Observation Open Science 2017 Conference (ESRIN, Frascati, 25-28 September 2017)
5. Edzer Pebesma, Etienne Racine, Michael Sumner, 2017. Scalable, Spatiotemporal Tidy Arrays for R (stars). UseR! 2017, Jul 4-7 2017, Brussels, Belgium.
6. Spatio-temporal point patterns analysis of geolocated tweets to characterise urban dynamics. Fernando Santa, Roberto Henriques, Joaquin Torres, Edzer Pebesma, 2017. Spatial Statistics, Jul 4-7 2017, Lancaster, UK.
7. Benedikt Gräler, Christoph Stasch, Benedikt Gräler, Edzer Pebesma, 2017. EnviroCar - community driven open data car trajectories. Poster, Spatial Statistics, Jul 4-7 2017, Lancaster, UK.
8. Shivam Gupta, Edzer Pebesma, Jorge Mateu, 2017. Air quality monitoring network location optimization for robust Land Use Regression Model. Poster, Spatial Statistics, Jul 4-7 2017, Lancaster, UK.
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10. Marius Appel, Daniel Nüst, and Edzer Pebesma, 2017. Reproducible Earth observation analytics: challenges, ideas, and a study case on containerized land use change detection. [EGU2017-17610 abstract](#)
11. Meng Lu, Marius Appel, Edzer Pebesma, 2017. Modelling spatiotemporal change using multidimensional arrays. EGU IE3.1/BG9.58; [EGU2017-17610](#)
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32. Jairo A. Torres, Edzer Pebesma, 2013. State of R in Hydrological Modelling. 2nd OpenWater symposium, Brussels, September 16-17, 2013. ([abstract](#), [slides](#))
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4 Invited papers/presentations

1. Edzer Pebesma, 2018. Tidy spatial data analysis. [Rstudio::conf 2018](#); Feb 2, 2018 ([slides](#), [video](#)).
2. Edzer Pebesma, 2017. New developments in r-spatial. Keynote at *Hands-on Global Soil Information Facilities (GSIF)*, 15-19 May 2017, Wageningen, Netherlands ([video](#)).
3. Edzer Pebesma, 2017. Incentives and rewards in scientific software communities. Keynote, "Software and Services for Science (S3)", [2nd Conference on Non-Textual Information](#), May 10-11, 2017, TIB Hannover ([slides](#) [video](#)).
4. Edzer Pebesma, 2016. Simple Features Now on CRAN. [R Consortium blog](#).
5. Edzer Pebesma, 2016. Scalable Spatiotemporal Geostatistics. Dept of Statistics, University of Innsbruck, Dec 15, 2016 ([pdf](#)).
6. Edzer Pebesma, 2016. Reproducible Research in Practice. [Reproducible Research Workshop](#), UZH, Zürich, Sept 13-14, 2016.
7. Edzer Pebesma, 2016. [Breaking down barriers in the scientific use of EO data](#). EODC Forum 2016, 31st May – 1st June 2016.
8. Edzer Pebesma, 2016. Support of observations and predictions in spatial and temporal statistics: practical aspects and software challenges. [DAGStat 2016](#), Mar 14-18 2016, Computational Statistics and Statistical Software section ([pdf](#)).

9. Edzer Pebesma, 2015. [Meaningful spatial statistics](#). [Geomatik Seminar](#), ETH Zürich, Nov 19, 2015.
10. Edzer Pebesma, 2015. On generating spatio-temporal data. Hunter College, CUNY, [Geography Seminar Series](#) Oct 5, 2015.
11. Edzer Pebesma, 2015. [On generating spatio-temporal data](#). Wageningen University/Research Center; Sept 30, 2015.
12. Edzer Pebesma, 2014. Analyzing Spatial and Spatio-Temporal Data with R. Bay Area useR Group meeting, Wednesday, December 17, 2014.
13. Edzer Pebesma, Christoph Stasch, Benedikt Gräler, Simon Scheider, 2014. Meaningfully Integrating Big Earth Science Data. AGU fall meeting; invited contribution IN33A-3757 ([abstract](#), [e-poster](#)).
14. E. Pebesma, 2014. Visualizing uncertainty in spatial and spatiotemporal field data. Keynote at workshop on *Visually-Supported Reasoning with Uncertainty* held during GIScience 2014, Sept 23, 2014 ([slides](#)).
15. E. Pebesma, 2014. Spatial and temporal support of meteorological observations and predictions. Keynote lecture at <http://www.dailymeteo.org>; [abstract](#).
16. E. Pebesma, 2014. Are current spatial databases useful for meaningful analysis? [Presentation](#) held for an ad-hoc symposium in Utrecht, May 8, 2014 and as GI Forum/ERCIS lunch seminar in Münster, Apr 22, 2014.
17. E. Pebesma, 2014. Visualizing and communicating uncertainty in the earth and environmental sciences: a review. EGU General Assembly 2014, invited contribution to session SSS11.1/ESSI3.6, *Communication of uncertainty about information in earth sciences*.
18. Edzer Pebesma, 29 Jan 2013. *Where do spatial statistics and geoinformatics meet?* Geodätischen Kolloquium der Leibniz Universität Hannover. ([slides](#))
19. Edzer Pebesma, 2012. *The uncertainty-enabled model web: concepts and tools*. Workshop on Uncertainty Quantification for Climate and Environmental Models, UCL, 29 June 2012
20. Edzer Pebesma, 2011. *Spatial data quality and error propagation in spatio-temporal modelling in practice*. [Keynote](#) at 7th International Symposium on Spatial Data Quality (ISSDQ 2011): Raising awareness of Spatial Data Quality (Coimbra, PT, 12-14 October 2011).

21. Edzer Pebesma, 2010. *Modelling spatio-temporal data with R*. Invited [lecture](#) at [GeoInfo 2010](#), November 28 to December 1, 2010, Campos do Jordão and on December 2, 2010 at [INPE](#), São José dos Campos, São Paulo, Brazil.
22. Edzer Pebesma, 2010. *Modelling uncertain and fuzzy spatial information*. Abstract for the workshop on Multidimensional Geoinformation - advances in spatial information sciences towards modeling geo-processes ([multiGI](#)), Karlsruhe Institute for Technology, Oct 14-15 2010.
23. Edzer Pebesma, 2010. Open geostatistics for global change. [Inaugural lecture](#), faculty of geosciences, University of Muenster, June 25, 2010.
24. Invited talk: *Interoperability and automated mapping: the past, the INTAMAP project, and the future*. [Agaduc](#) workshop, Dec 4, 2008.

5 Books, reports, book chapters, etc.

1. Pebesma, Edzer; Wagner, Wolfgang; Schramm, Matthias; Von Beringe, Alexandra; Paulik, Christoph; Neteler, Markus; Reiche, Johannes; Verbesselt, Jan; Dries, Jeroen; Goor, Erwin; Mistelbauer, Thomas; Briese, Christian; Notarnicola, Claudia; Monsorno, Roberto; Marin, Carlo; Jacob, Alexander; Kempeneers, Pieter; Soille, Pierre. (2017, November 23). OpenEO - a Common, Open Source Interface Between Earth Observation Data Infrastructures and Front-End Applications (Version 1.0). Zenodo. <http://doi.org/10.5281/zenodo.1065474>
2. G.B.M. Heuvelink, E. Pebesma, B. Gräler, 2015. Space-Time Geostatistics. In: S. Shekhar, H. Xiong and X. Zhou: Encyclopedia of GIS. Springer International Publishing. pages 1–7. [10.1007/978-3-319-23519-6_1647-1](#)
3. Matt Duckham, Edzer Pebesma, Kathleen Stewart, Andrew U. Frank, 2014. Geographic Information Science. 8th International Conference, GIScience 2014, Vienna, Austria, September 24-26, 2014, Proceedings. Lecture Notes in Computer Science Volume [8728](#).
4. Kathleen Stewart, Edzer Pebesma, Gerhard Navratil, Paolo Fogliarini, Matt Duckham (eds.) Extended Abstract Proceedings of the GIScience 2014. [GEO.INFO 40](#), Department of Geodesy and Geoinformation, Vienna University of Technology.
5. Rehr, M., E. Pebesma, B. Gräler, 2013. Detecting outlying observations and structural changes in European air quality data. [ETC/ACM Technical Paper 2012/16](#); Released: May 2013.

6. Christoph Stasch, Edzer Pebesma, Lydia Gerharz, Benedikt Gräler, 2013. [Error-Aware Spatio-temporal Aggregation in the Model Web](#). In: Vandenbroucke, Danny; Bucher, Bénédicte; Crompvoets, Joep (Eds.) [Geographic Information Science at the Heart of Europe](#). Lecture Notes in Geoinformation and Cartography. ([pdf](#))
7. Bivand, R.S., E. Pebesma, V. Gómez-Rubio, 2013. Applied Spatial Data Analysis with R, [Second edition](#). Springer, NY.
8. Edzer Pebesma, 2012. Profile: geoinformatics. [Public service review: European science and technology - issue 16](#)
9. Kristina B. Helle, Edzer Pebesma, 2012. Stationary Sampling Designs Based on Plume Simulations. Chapter 14, in: Jorge Mateu and Werner G. Müller (eds.), [Spatio-temporal Design: Advances in Efficient Data Acquisition](#), Wiley, 348 pp.
10. Gräler, B., L. Gerharz, E. Pebesma, 2012. Spatio-temporal analysis and interpolation of PM10 measurements in Europe. [ETC/ACM Technical Paper 2011/10](#); Released: 2012/01/30.
11. Gerharz, L., B. Gräler, E. Pebesma, 2011. Measurement artefacts and inhomogeneity detection. [ETC/ACM Technical Paper 2011/8](#); Released 2011/12/06.
12. Schwering, A., E. Pebesma, Kai Behncke, 2011. Geoinformatik 2011 “Geochange”. 15-17 Juni 2011, Münster, Germany. Konferenzband. [IfgiPrints, band 41](#). 272 pp.
13. Dürrfeld, J., J. Bisier and E. Pebesma, 2011. An OGC Web Processing Service for automated interpolation. Book chapter, in: [Advances in Web-based GIS, Mapping Services and Applications](#). Editor(s): Songnian Li; Suzana Dragicevic; Bert Veenendaal. CRC Press, 400 pp.
14. Henneböhl, K., L. Vinhas, E. pebesma and G. Câmara (Eds.), 2010. GIScience for environmental change. Symposium proceedings, Nov 27, 2010, Campos de Jordão (São Paulo), Brazil. [ifgiPrints, Band 40](#); 66 pages.
15. Pebesma, E.J., 2009. How we build geostatistical models and deal with their output. In: J. Pilz (Ed.), [Interfacing Geostatistics and GIS](#), Springer, Berlin, <http://dx.doi.org/10.1007/978-3-540-33236-7>.
16. Bivand, R.S., E.J. Pebesma, V. Gómez-Rubio, 2008. [Applied spatial data analysis with R](#). Springer, New York.
17. Pebesma, E., M. Bishr, Th. Bartoschek (Eds.), 2008. GI-Days 2008. Proceedings of the 6th Geographic Information Days. June 16-18, 2008, Münster, Germany. [IfGI prints 32](#). 337 pp.

18. Pebesma, E.J., R.N.M. Duin (2006). Spatial patterns of temporal change in North Sea sediment quality on different spatial scales. Unpublished report, available from <http://www.geog.uu.nl/~pebesma/rikz/>
19. Pebesma, E.J. (2005) Mapping radioactivity from monitoring data: automating the classical geostatistical approach. In: G. Dubois (Editor), Automatic mapping algorithms for routine and emergency monitoring data. Report on the Spatial Interpolation Comparison (SIC2004) exercise. Office for Official Publications of the European Communities, Luxembourg; EUR 21595 EN; ISBN: 92-894-9400-X (150 pp.)
20. De Jong, S.M., E. Pebesma, F.D. van der Meer, 2004. Spatial variability, mapping methods, image analysis and pixels. In: S.M. de Jong, F.D. van der Meer (eds), Remote sensing image analysis: including the spatial domain. **Kluwer**, Dordrecht, (359 pp), pp 17–35
21. Pebesma E.J. and A.M.F. Bio, 2002. Landsdekkende interpolatie van aanwezigheid van plantensoorten. ICG report 02/4, 59 + v pp, Utrecht University.
22. Pebesma, E.J., 2002. Interpolating sea bird densities: cokriging temporal changes and block aggregate estimates. ICG report 02/5, 21 + v pp., Utrecht University.
23. Pebesma, E.J., R.N.M. Duin, A.M.F. Bio, 2000. Spatial Interpolation of sea bird densities on the Dutch part of the North Sea. ICG report 00/10, 130 + v pages, Utrecht University.
24. Pebesma, E.J., 2001. Gstat user's manual. Technical report, Dept. of Physical Geography, Utrecht University, Utrecht, The Netherlands. (103 pp; PDF available from <http://www.gstat.org/> or [here](#))
25. Stein, A., E. Pebesma (ed.), 1999. GIS en waarachtig! Symposium statistische software. Amsterdam, ISBN 90-9013205-8. 152 pages (in Dutch).
26. Pebesma, E.J., 1996, Mapping Groundwater Quality in the Netherlands. Utrecht University, Utrecht. [Netherlands Geographical Studies 199](#) . (PhD thesis; [pdf](#)).
27. Pebesma, E.J. and J.W. de Kwaadsteniet, 1995, Een landsdekkend beeld van veranderingen in de Nederlandse grondwaterkwaliteit op 5 tot 17 meter diepte (*Maps of temporal changes in groundwater quality in the Netherlands at 5 – 17 metre depth*). National Institute of Public Health and the Environment, Bilthoven. Report No. 714810015 (in Dutch).

28. Pebesma, E.J., and J.W. de Kwaadsteniet, 1994. Een landsdekkend beeld van de Nederlandse grondwaterkwaliteit op 5 tot 17 meter diepte in 1991 (*Maps of groundwater quality in the Netherlands at 5 – 17 metre depth in 1991*). National Institute of Public Health and the Environment, Bilthoven. Report No. 714810014 (in Dutch).

6 Standard documents

1. Uncertainty Markup Language (UncertML). M. Williams, D. Cornford, L. Bastin and E. Pebesma (eds.) OGC Discussion paper [08-122r2 \(pdf\)](#). See also <http://www.uncertml.org/>.

7 Published reviews

1. Pebesma, E. [Package Review of osmdata](#). Software review for [ROpen-Sci](#).
2. Pebesma, E. “Extending R”, by John M. Chambers. Book review, [Journal of Agricultural, Biological, and Environmental Statistics](#).
3. Pebesma, E. Interactive discussion: Review of: Ordinary kriging as a tool to estimate historical daily streamflow records; [HESSD](#).
4. Pebesma, E. Interactive [comment](#) on “An open and extensible framework for spatially explicit land use change modelling in R: the lulccR package (0.1.0)” by S. Moulds et al.
5. Pebesma, E. Interactive [comment](#) on “Topological and canonical kriging for design-flood prediction in ungauged catchments: an improvement over a traditional regional regression approach?” by S. A. Archfield et al.
6. Gräler, B., E. Pebesma, [Review](#) of “Interpolation of groundwater quality parameters with some values below the detection limit”, by A. Bárdossy.
7. Pebesma, E., 2010. Is PSBI still a geostatistical interpolation method? Interactive [comment](#) on “Geostatistical regionalization of low-flow indices: PSBI and Top-Kriging” by S. Castiglioni et al.
8. Pebesma, E.J., 2004. Review of: *Image analysis, Random Fields and Markov Chain Monte Carlo Methods, a mathematical introduction*, by G. Winkler. *Kwantitatieve methoden* 72.,

9. Pebesma, E.J., 2003. Review of: *The elements of statistical learning*, by T. Hastie, R. Tibshirani, and J. Friedman. The International Environmetrics Society Newsletter, Volume 9, No 1, p. 13.
10. Pebesma, E.J., 1999. Review of: *Multivariate Geostatistics; An Introduction with Applications*, by H. Wackernagel. Earth-Science Reviews 48, pp. 132-133.

8 Under review/accepted for publication

1. Edzer Pebesma, 2018 (conditionally accepted). Simple Features for R: Standardized Support for Spatial Vector Data. The R Journal. ([online](#))
2. Schramm, Matthias; Pebesma, Edzer; Wagner, Wolfgang; Soille, Pierre; Kadunc, Miha; Gorelick, Noel; Verbesselt, Jan; Reiche, Johannes; Appel, Marius; Dries, Jeroen; Jacob, Alexander; Gößwein, Bernhard; Neteler, Markus; Gebbert, Soeren; Briese, Christian; Kempeneers, Pieter. 2018. openEO: An Open Interface To Allow Standardized Communication With EO Service Providers. Abstract, submitted to Φ -week EO Open Science and Future EO.
3. Victor Maus, Gilberto Câmara, Marius Appel, Edzer Pebesma, accepted. [dtwSat: Time-Weighted Dynamic Time Warping for Satellite Image Time Series Analysis in R](#). Journal of Statistical Software.
4. Christian Knoth, Sofian Slimani, Marius Appel, Edzer Pebesma, submitted. Combining automatic and manual image analysis in a web-mapping application for collaborative conflict damage assessment
5. Sergio Ibarra-Espinosa, Rita Ynoue, Shane O’Sullivan, Edzer Pebesma, María de Fátima Andrade, and Mauricio Osses (2018, accepted). VEIN v0.2.2: an R package for bottom-up Vehicular Emissions Inventories. Geoscientific Model Development, <https://doi.org/10.5194/gmd-2017-193>.

9 Editorial boards/guest editorials

1. Co-Editor-in-Chief, [Journal of Statistical Software](#), Feb 2015 – present.
2. Associate editor, [Spatial Statistics](#), 2011 – present.
3. Co-Editor-in-Chief, [Computers and Geosciences](#), May 2014 – Dec 2017.
4. Associate editor, [Journal of Statistical Software](#), Jun 2013 – Feb 2015.

5. Associate editor, [Computers and Geosciences](#), Apr 2013 – May 2014.
6. Editorial board member, [Environments](#), 2013 – 2014.
7. Editorial board, *Catena*, 2006 – 2009
8. Special Section editor, with Thomas Romary on a Spatial Statistics special issue on *GeoENV* 2014.
9. T. Hengl, E. Pebesma R. J. Hijmans, 2015. Spatial and spatio-temporal modeling of meteorological and climatic variables using Open Source software. *Spatial Statistics*, [in press](#).
10. Special Issue editor, with Roger Bivand and Paulo Justiano Ribeiro Jr, for a *Journal of Statistical Software* special issue on [Spatial Statistics](#)
11. Gerard Heuvelink, Edzer Pebesma, Alfred Stein, 2013. Spatial statistics for mapping the environment. *International Journal of Applied Earth Observation and Geoinformation* [Volume 22, Pages 1–2](#).
12. A. Stein, E. Pebesma and G. Heuvelink, 2012. Editorial. *Spatial Statistics* Vol. 1, pages [1-2](#).
13. Alfred Stein, Edzer Pebesma and Gerard Heuvelink, 2011. Editorial. *Procedia Environmental Sciences*, [Volume 7, Pages 1-400](#). *Spatial Statistics 2011: Mapping Global Change*
14. Dubois, G. D. Cornford, D. Hristopulos, E. Pebesma, and J. Pilz, 2010. Introduction to this special issue on Geoinformatics for Environmental Surveillance. *Computers & Geosciences* [37, 277-279](#).

10 Tutorials/workshops etc.

1. Edzer Pebesma, 2017. R / Python and Big Data; openEO. [EDC Workshop "Big Data Analytics & GIS"](#) September 21-22, 2017. Münster. [slides](#).
2. Edzer Pebesma, 2017. Spatial data in R: new directions. Workshop, UseR! 2017, Jul 4-7, Brussels, Belgium.
3. Daniel Nüst, Edzer Pebesma, Vicky Steeves, 2017. Reproducible computational research in the publication cycle . Short course, EGU 2017, [SC81](#).
4. [Handling and analyzing spatial, spatiotemporal and movement data](#). UseR!, The R User Conference 2016, Stanford, Jun 27-30, 2016.

5. Chue Hong, Neil; Hammitzsch, Martin; Hufton, Andrew; Neteler, Markus; Pebesma, Edzer; van Edig, Xenia; Wenig, Philip, 2015. Open Science goes Geo – Part II: Scientific Software. Short course, held at the European Geosciences Union General Assembly 2015. The talks are available at [YouTube](#), slides at [Zenodo](#).
6. Various [geostat-course.org](#) video's: [2012](#) [2014](#)
7. Analysing spatio-temporal data with R. Agile, Leuven, May 14, 2013.
8. Software for spatio-temporal analysis. Session on Spatial Statistics 2013.
9. Analysing spatio-temporal data with R. Workshop at Spatial Statistics, Jun 4, 2013.
10. [Handling and Analyzing Spatio-temporal Data in R](#). Tutorial at UseR! 2011, The R User Conference 2011, August 16-18 2011 University of Warwick, Coventry, UK
11. Spatiotemporal Data Handling in R. Tutorial at: GeoINFO 2010, XI Brazilian Symposium on GeoInformatics. November 29-Dec 1, 2010 at Campos do Jordao, Brazil.
12. [Handling and analyzing spatio-temporal data in R, Workshop, 21-22 Mar 2011](#) Workshop at institute for geoinformatics, University of Muenster, Germany.
13. GI science for improving risk and resource management in the Brazilian Amazon. Gilberto Câmara, Edzer Pebesma and Giovana Mira de Espindola. Tuturial at [Geoinformatik 2011](#), 15-17 June 2011, Münster, Germany.
14. GI science for environmental change: use cases the Brazilian Amazon. Giovana Mira de Espindola, Gilberto Câmara and Edzer Pebesma. Workshop at [Geoinformatik 2011](#), 15-17 June 2011, Münster, Germany.

11 Published software tutorials (R package vignettes or task views)

1. Pebesma, E., R. Bivand, 2005. S Classes and Methods for Spatial Data: the sp Package. [Vignette](#) in R package [sp](#)
2. Pebesma, E., 2011. sp: overlay and aggregation. [Vignette](#) in R package [sp](#)

3. Pebesma, E., 2013. [Customising spatial data classes and methods](#), in R package [sp](#)
4. Pebesma, E., 2011. [spacetime: Spatio-Temporal Data in R](#). [Vignette](#) in R package [spacetime](#)
5. Pebesma, E., 2011. Spatio-temporal overlay and aggregation. [Vignette](#) in R package [spacetime](#)
6. Pebesma, E., 2011. Spatio-temporal objects to proxy a PostgreSQL table. [Vignette](#) in R package [spacetime](#)
7. Pebesma, E., 2011. The meuse data set: a brief tutorial for the gstat R package. [Vignette](#) in R package [gstat](#)
8. Pebesma, E., 2011. The pairwise relative semivariogram. [Vignette](#) in R package [gstat](#)
9. Pebesma, E., 2011. Spatio-temporal geostatistics using gstat. [Vignette](#) in R package [gstat](#)
10. Pebesma, E., 2013. [CRAN Task View: Handling and Analyzing Spatio-Temporal Data](#)
11. Pebesma, E., 2016. [Units of Measurement for R Vectors: an Introduction](#)