

Claudia Vitolo

Curriculum Vitae

Personal Profile

I'm a scientist working in the field of natural hazard risk modelling and water resources modelling. I'm addicted to technology and passionate about open knowledge/data/source projects. My research interests are in the development of shared research environments to undertake hydrological analysis and provide open access to predictions in data rich and data poor environments.

In my spare time I am involved in initiatives to promote the use of the R language in the hydrology domain (funded the G+ community: R4Hydrology) and women in STEM (mentoring for the London's first R meetup for women: R-Ladies Coding Club).

Education

- Feb 2016 **PhD in Hydrology**, *Imperial College London*, London (United Kingdom).
Thesis title: "Exploring Data Mining for Hydrological Modelling."
- Dec 2005 **Master in Environmental Management**, *University of Naples "Federico II"*, Naples (Italy), Grade: 110/110.
Thesis title: "Analysis of the uncertainty in the hydrological balance of the Calore River catchment (Campania Region Italy)."
- Jun 2004 **Degree in Civil Engineering with major in Hydraulics**, *University of Salerno*, Fisciano (Italy), Grade: 110/110.
Thesis title: "Debris flow propagation".

Awards

- 2010 Halcrow Technical Paper Award 2010 for the paper "Extreme Rainfall in the Mediterranean".

Memberships

- 2016 Member of the International Advisory Committee - Collaborative Conference on Resource and Environmental Science 2016
- 2011 Student member of the Institution of Civil Engineers in UK.
- 2010 Member of the British Hydrological Society.
- 2004 Chartered Civil Engineer in Italy.

Experience

- 2016–Present **Scientist - Products for high-impact weather,**
FORECAST TEAM, EVALUATION SECTION,
EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECAST (ECMWF),
READING (UK).
Currently working on the ANYWHERE project to develop data product for the prediction of high impact weather (floods, flash floods, debris flow, landslides, storm surges, heatwaves, health hazards, wildfire, droughts, convective storms, severe winds and heavy snowfall) based on ECMWF's state-of-the art global weather forecasting system. The work includes developing novel ways to extract and visualise the most relevant information for selected high-impact weather events.
Key responsibilities:
- Testing, implementing and designing forecast products for high-impact weather and developing strategies to communicate them to users.
 - Developing and implementing methods for post-processing atmospheric fields, focussed on high-impact weather.
 - Contributing to the scientific evaluation of forecasts and new products for high-impact weather, and its documentation in the scientific literature
 - Supporting ANYWHERE project partners in the use of ECMWF data.
- 2015–2016 **Post-Doctoral Research Fellow in Big Data analytics for environment and health,**
DEPARTMENT OF COMPUTER SCIENCE AND THE INSTITUTE FOR ENVIRONMENT HEALTH AND SOCIETIES,
BRUNEL UNIVERSITY LONDON, UXBRIDGE (UK).
Worked on the British Council funded project "A multi dimensional environment-health risk analysis system for Kazakhstan".
Key responsibilities:
- Application of Big Data analytics techniques and technologies for the analysis of climate, pollution and health data to produce evidence-based recommendations for decision makers and improve environmental health at national and regional levels in Kazakhstan.
 - Co-I for an NCAS Air Quality and Health Studentship on low-cost air quality monitoring network for west London.
 - Configuring, managing and maintaining three servers, databases and web applications at the Brunel University's Data Centre.
 - Teaching (MSc): GIS and Data Analysis.

2010–2015 **Research Assistant/Associate in environmental modelling, uncertainty estimation and web services development,**

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING,
IMPERIAL COLLEGE LONDON, LONDON (UK).

Involved in a number of national and international projects (in Ecuador, India, Italy, Peru, The Netherlands, UK) to develop software applications for improving open data discovery and retrieval, data mining (using supervised and unsupervised machine learning techniques), environmental modelling (with a focus on hydrology and water resources) and uncertainty analysis.

Key responsibilities:

- Write scientific papers, reports and technical notes.
- Represent the research team during meetings and conferences.
- Organise internal and external seminars and events.
- Tutor undergraduate and master students.
- Instructor: Short course on “Introduction to environmental data analysis and simulation using R”
- Graduate Teaching Assistant (tutorials): Environmental Engineering, GIS and remote sensing, Mathematics 1 and 2, and Engineering Design (during the Design Week).

2008–2010 **Hydrologist/Developer,**

FLOOD RISK MODELLING TEAM,
HALCROW GROUP LTD (NOW CH2M), CRAWLEY (UK).

Involved in flood forecasting and risk mapping projects for the Environment Agency and the MetOffice.

Key responsibilities:

- Developed automated spreadsheets (using Visual Basic for Applications) to facilitate data manipulation and analysis. Implemented techniques: rate of rise extrapolation, residual analysis, catchment lag analysis, peak to peak (level to level) correlation; travel time analysis; multivariate analyses; rainfall correlation; depth duration analysis.
- Rainfall-runoff modelling and flood peak estimation using FEH methods.
- 1D Hydraulic modelling using ISIS, 2D Hydraulic modelling using TUFLOW.
- GIS analysis and mapping.
- Writing reports and technical notes.

2007–2008 **Research Engineer,**
LIDAM LABORATORY,
UNIVERSITY CONSORTIUM FOR RESEARCH ON GREAT HAZARDS (C.U.G.R.I.),
SALERNO (IT).

Worked on a research project to estimate the reliability of existing hydraulic structures within the Consortium of Sarno River in Italy.

Key responsibilities:

- Data manipulation and statistical analysis of time series (using Visual Basic, MS Excel and Matlab).
- Flood peak estimation using VAPI method.
- GIS analysis and mapping.
- Writing reports and technical notes.

2006–2007 **Research Engineer,**
CENTRE FOR ANALYSIS AND MONITORING OF ENVIRONMENTAL RISK
(A.M.R.A.), NAPLES (IT).

I coordinated a research project to develop an integrated system for forecasting and monitoring of extreme hydrological events in the Campania Region (Italy).

Key responsibilities:

- Set up a relational database of historical hydrological information,
- Design a software product to facilitate hydrological data manipulation, statistical analysis of time series, GIS analysis and mapping.

Computer skills

Advanced	R, \LaTeX , QGIS, Git, SVN, LibreOffice, Gimp, Linux
Intermediate	High Performance Computing (HPC), Amazon Web Services (E2), OGC standards, PostgreSQL, Microsoft Access, Grass GIS, ArcGIS, ArcView, MapInfo, Autocad, ISIS, TUFLOW, SMS 9.0, Hec-Ras, Visual Basic for Applications, Microsoft Windows
Basic	Spark, Python, JavaScript, Bash, HTML, Apache Web Server, GeoExt

Languages

Italian	Mothertongue
English	Fluent

Peer-reviewed papers

- 1 Claudia Vitolo. hddtools: Hydrological data discovery tools. *The Journal of Open Source Software*, 2(9), jan 2017, url: <https://doi.org/10.21105/joss.00056>
- 2 Claudia Vitolo, Matthew Fry, and Wouter Buytaert. rnrf: An r package to retrieve, filter and visualize data from the uk national river flow archive. *The R Journal*, 8(2):102–116, 2016, url: <https://journal.r-project.org/archive/2016-2/vitolo-fry-buytaert.pdf>.
- 3 Claudia Vitolo, Peter Wells, Martin Dobias, and Wouter Buytaert. fuse: An r package for ensemble hydrological modelling. *The Journal of Open Source Software*, 1(8), dec 2016, url: <http://dx.doi.org/10.21105/joss.00052>
- 4 Zed Zulkafli, Katya Perez, Claudia Vitolo, Wouter Buytaert, Timothy Karpouzoglou, Art Dewulf, Bert De Bièvre, Julian Clark, David M. Hannah, and Simrita Shaheed. User-driven design of decision support systems for polycentric environmental resources management. *Environmental Modelling & Software*, 88:58 – 73, 2017, url: <http://www.sciencedirect.com/science/article/pii/S1364815216308799>
- 5 Claudia Vitolo, Andrew Russell, and Allan Tucker. rdefra: Interact with the UK AIR pollution database from DEFRA. *The Journal of Open Source Software*, 1(4), aug 2016, url: <http://dx.doi.org/10.21105/joss.00051>
- 6 M.E. Wilkinson, E. Mackay, P.F. Quinn, M. Stutter, K.J. Beven, C.J.A. MacLeod, M.G. Macklin, Y. Elkhatib, B. Percy, C. Vitolo, and P.M. Haygarth. A cloud based tool for knowledge exchange on local scale flood risk. *Journal of Environmental Management*, 161:38 – 50, 2015, url: <http://www.sciencedirect.com/science/article/pii/S0301479715301031>
- 7 Claudia Vitolo, Yehia Elkhatib, Dominik Reusser, Christopher J.A. Macleod, and Wouter Buytaert. Web technologies for environmental big data. *Environmental Modelling & Software*, 63:185 – 198, 2015, url: <http://www.sciencedirect.com/science/article/pii/S1364815214002965>

Conference Proceedings

8. Vitolo C., Wells P., WebGIS applications for the new generation of hydrological models, FOSS4G2013, Sep 2013, Nottingham (UK).
9. Vitolo C., Buytaert W., Reusser D., Hydrological Models as Web Services: An Implementation using OGC Standards, HIC-2012 10th International Conference on Hydroinformatics, July 2012, Hamburg (Germany).

10. De Luca C., Furcolo P., Rossi F., Villani P., Vitolo C., Extreme rainfall in the Mediterranean, International Workshop Advances in Statistical Hydrology, Publisher: STAHY, May 2010, Taormina (Italy).

Conference Abstracts (oral/poster presentations)

11. Claudia Vitolo, Francesca Di Giuseppe, Paul Smith, A robust scientific workflow for assessing fire danger levels using open-source software, European Geosciences Union General Assembly 2017, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2017/EGU2017-13154.pdf>
12. Claudia Vitolo, Marco Scutari, Mohamed Ghalaieny, Allan Tucker, Andrew Russell , A multi-dimensional environment-health risk analysis system for the English regions, European Geosciences Union General Assembly 2017, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2017/EGU2017-11880.pdf>
13. Cristina Prieto, Nataliya Le Vine, Claudia Vitolo, E. García, Raul Medina, Addressing model structural uncertainty in PUBs via Bayesian approach, European Geosciences Union General Assembly 2017, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2017/EGU2017-13157.pdf>
14. Vitolo C., Gazdiyeva B., Tucker A., Russell A., Ali M., Althonayan A., Kazakhstan's Environment-Health system, a Big Data challenge, European Geosciences Union General Assembly 2016, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2016/EGU2016-14186.pdf>
15. Prieto C., Le Vine N., Vitolo C., García E., Medina R., Using a probabilistic multi-model framework to predict the effects of land use changes on catchment flows, European Geosciences Union General Assembly 2016, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2016/EGU2016-8580-2.pdf>
16. Vitolo C., Fry M. and Buytaert W., RNRFA: an R package to interact with the UK National River Flow Archive, European Geosciences Union General Assembly 2015, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2015/EGU2015-8629.pdf>
17. Vitolo C., Buytaert W., 2014. HDDTOOLS: an R package serving Hydrological Data Discovery Tools. AGU Fall Meeting, December 2014, San Francisco (USA). <http://adsabs.harvard.edu/abs/2014AGUFM.H13H1209V>
18. Buytaert. W., Zulkafli Z., Vitolo C., 2014. Toward Transparent and Reproducible Science: Using Open Source "Big Data" Tools for Water Resources Assessment. AGU Fall Meeting, December 2014, San Francisco (USA). <http://adsabs.harvard.edu/abs/2014AGUFMIN21D..02B>
19. Straatsma M., Droogers P., Brandsma J., Buytaert W., Karssen D., Van Beek R., Wada Y., Sutanudjaja E., Vitolo C., Schmitz O., Meijer K., Van Aalst M., Bierkens M., 2014. Bridging the climate-induced water gap in the twenty-first century: adaptation support based on water supply, demand, adaptation and financing. European Geosciences Union General Assembly 2014, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-10641.pdf>
20. Buytaert W., Vitolo C., Reaney S.M., Beven K. Environmental virtual observatories: managing catchments with wellies, sensors and smartphones. IAHS IAPSO IASPEI Joint Assembly, July 2013, Gothenburg (Sweden).

21. Vitolo C., Buytaert W., Data Mining of Hydrological Model Performances, European Geosciences Union General Assembly 2013, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2013/EGU2013-10476.pdf>
22. Buytaert W., Vitolo C., Hydrological modelling in a “big data” era: a proof of concept of hydrological models as web services, European Geosciences Union General Assembly 2013, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2013/EGU2013-10383-1.pdf>
23. Wilkinson M., Beven K., Brewer P., Elkhatab Y., Gemmell A., Haygarth P., Mackay E., Macklin M., Marshall K., Quinn P., Thomas N., Vitolo C., EVOp Team, The Environmental Virtual Observatory (EVO) local exemplar: A cloud based local landscape learning visualisation tool for communicating flood risk to catchment stakeholders, European Geosciences Union General Assembly 2013, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2013/EGU2013-11592-1.pdf>
24. Buytaert W., Vitolo C., Reayney S.M., Beven K. Hydrological models as web services: Experiences from the Environmental Virtual Observatory project. AGU Fall Meeting, December 2012, San Francisco (USA). <http://adsabs.harvard.edu/abs/2012AGUFMIN11E1491B>
25. Vitolo C., Buytaert W., Elkhatab Y., Gemmell A., Reany S., Beven K., Cloud-enabled Web Applications for Environmental Modelling, AGU Fall Meeting, December 2012, San Francisco (USA). <http://adsabs.harvard.edu/abs/2012AGUFMIN33B1536V>
26. Reusser D., Buytaert W., Vitolo C., RHydro - Hydrological models and tools to represent and analyze hydrological data in R, European Geosciences Union General Assembly 2012, Vienna (Austria). <http://meetingorganizer.copernicus.org/EGU2012/EGU2012-4166.pdf>
27. Buytaert W., Vitolo C., Baez S., Veliz Rosas C., 2012. Web services for ecosystem services management and poverty alleviation. Planet Under Pressure Conference, March 2012, London (UK).
28. Pasetto D., Vitolo C., Data Assimilation for the Lorenz (1963) Model using Ensemble and Extended Kalman Filter, Biogeodynamics and Earth System Sciences Summer School (BESS), June 2011, Venice (Italy). http://www.istitutoveneto.org/bess/conclusions_2011/DamianoClaudia.pdf
29. Mastrandrea G., Vitolo C., Benevento G., Furcolo P., Rossi F., Regional characteristics and spatial patterns of extreme precipitation in Southern Italy, European Geosciences Union General Assembly 2007, Vienna (Austria). <http://meetings.copernicus.org/www.cosis.net/abstracts/EGU2007/11301/EGU2007-J-11301.pdf>

Guest blog posts

30. Discover hydrological data using the hddtools R package on the rOpenSci blog (<https://ropensci.org/blog/blog/2017/03/07/hddtools>)
31. Get air quality data for the United Kingdom using the rdefra package on the rOpenSci Tech-notes (<http://ropensci.org/blog/technotes/2016/09/14/rdefra-release-033>)
32. Using the Web for Environmental Big Data on HEPEX (<http://hepex.irstea.fr/using-the-web-for-environmental-big-bata/>)

Invited talks and guest lectures

33. Workshop on: "Make your own blog using R and GitHub". 2017-04-26, R-Ladies London meetup, London (United Kingdom).
34. Guest lecture & workshop: "Geospatial analysis using R". 2017-03-22, MSc GIS and Data Analysis, Brunel University London.
35. "Data Science @ECMWF". 2017-02-03, Women in Data Science conference.
36. Keynote: "Web-based modelling and sharing of Big Environmental Data". International Conference on Ecological Informatics 'Facing Global Change by Sharing Data and Models', 24-28 October 2016, Dubrovnik (Croatia).
37. "Why and how open data and an open API standards can improve research, with examples using the National River Flow Archive and the R language". Environmental Dynamics research group seminar series, Department of Geography, King's College London, 12th February 2016, London (UK).
38. "Improving access to geospatial Big Data in the hydrology domain" for the Big Data and Spatial Analytics event at the Royal Statistical Society, 18th November 2015, London (UK).
39. "Hydrological models as web services: results from EVOp and ESPA projects". British Hydrological Society meeting on "Environmental Virtual Observatories: managing catchments with wellies, sensors and smartphones", February 2013, Institute of Civil Engineers, Westminster, London (UK).

Open source projects

40. Claudia Vitolo. *rdefra: Interact with the UK AIR Pollution Database from DEFRA*, 2016. R package version 0.2.0, available from CRAN: <https://CRAN.R-project.org/package=rdefra>. This package is part of the ROpenSci project: <https://github.com/ropenscilabs/rdefra>.
41. Claudia Vitolo. *hddtools: Hydrological Data Discovery Tools*, 2016. R package version 0.3.0, available from CRAN: <https://CRAN.R-project.org/package=hddtools>. This package is part of the ROpenSci project: <https://github.com/ropenscilabs/hddtools>.
42. Claudia Vitolo. *rnrf: UK National River Flow Archive Data from R*, 2016. R package version 1.3.0, available from CRAN: <https://CRAN.R-project.org/package=nrfa>
43. Claudia Vitolo. *kehra: an R package to collect, assemble and model air pollution, weather and health data*, 2016. R package version 0.3.0, available from CRAN: <https://CRAN.R-project.org/package=kehra>
44. Claudia Vitolo and Nataliya Le Vine. *curvenumber: an R package implementing the Soil Conservation Service Curve Number method*, 2015. R package version 0.3.0, available from GitHub: <https://github.com/cvitolo/curvenumber>
45. Claudia Vitolo. *amca: an R package implementing an Automatic Model Configuration Algorithm*, 2015. R package version 0.4.0, available from GitHub: https://github.com/cvitolo/r_amca

46. Claudia Vitolo and Nathan Huntley. *pure: an R package implementing a workflow for flood frequency analysis under uncertainty*, 2015. R package version 0.1.6, available from GitHub: https://github.com/cvitolo/r_pure
47. Claudia Vitolo. *treemap: an R package to generate D3 tree maps from excel table*, 2015. R package version 0.2.0, available from GitHub: https://github.com/cvitolo/r_treemap
48. Claudia Vitolo. *xml4wps: an R package to encapsulate wps response in ad-hoc xml*, 2012. R package version 0.2.0, available from GitHub: <https://github.com/cvitolo/xml4wps>
49. Claudia Vitolo. *BigDataAnalytics: an R package that provides functions for scraping GitHub and other sources. (in preparation)*, 2012. R package version 0.1.0, available from GitHub: https://github.com/cvitolo/r_BigDataAnalytics

Grants

50. 2016 - R-Ladies Alignment and Global Expansion for the R-Consortium and Linux Foundation (USD 10000).
51. 2016 - Participated to the writing of the proposal for the Brunel University London Flood & Coastal Engineering Higher Education Programme.
52. 2016 - Co-I for an NCAS Air Quality and Health Studentship on low-cost air quality monitoring network for west London (£87,000).
53. 2016 - Travel grant from the British Hydrological Society (£700).