Raniero Della Peruta

Environmental scientist with 20+ years of experience in process-based agroecosystem modelling, soil biogeochemical modelling, geospatial analysis, soil monitoring, land degradation assessment, with strong analytical skills.

Employment

December 2021 - Present

Scientific collaborator

Euro-Mediterranean Centre on Climate Change CMCC

I use models to estimate the effects of climate change on crops and predict the effectiveness of possible adaptation measures.

September 2019 - Present

Teacher

Institute for Continuing Education CPIA, Savona, Italy

I develop and deliver training in environmental sciences.

September 2018 - August 2019

Research associate, Executive Team Leader

Agroscope - Swiss Soil Monitoring Network NABO, Zurich, Switzerland

- I developed a spatially-explicit modelling tool to assess the impact of agronomic management on soil element inputs and soil-plant nutrient cycling at regional scale in Switzerland. The tool combines diverse datasets and was used to assess agro-environmental measures aimed at ensuring a sustainable soil nutrient management, optimizing nutrient budgets and reducing the risk of nutrient losses, under different economic and land use change scenarios.
- I have collaborated on soil monitoring design and implementation.

September 2016 - August 2018

Teacher

Institute for Continuing Education CPIA, Rome, Italy

I have developed and delivered training in environmental sciences.

December 2009 - June 2016

Research associate

Agroscope - Swiss Soil Monitoring Network NABO, Zurich, Switzerland

- I used the process-based model EPIC to simulate biogeochemical processes in typical Swiss agricultural systems, modelling soil element cycling, including nitrogen, phosporus, carbon, and trace metals. I focused my research on the consequences of management changes on soil nutrient status. This involved the parameterization and validation of the model via statistical analyses.
- I started to develop a spatially-explicit modelling tool combining EPIC with other models to assess the effect of agronomic management on soil nutrient cycling.
- I was responsible for data analysis and modeling in the project "**Early warning system: Regional soil monitoring tool for sustainable element cycles on agricultural soils"**, funded by the Swiss National Research Program (NRP68).
- I supervised PhD, Master students and trainees.
- I have collaborated on soil monitoring design and implementation.

October 2003 - November 2009 **Scientific collaborator, Project management**

Università degli Studi di Sassari - Desertification Research Group NRD, Sassari, Italy

- I contributed to the management of the project "**Plan of Action for an Integrated Coastal Zone Management (ICZM) in the Area of Port Said, Egypt**" (funded by the EU-SMAP III programme), dealing with the assessment of land degradation in the river Nile delta, as driven by agriculture and fishery, also considering the legal and socio-economic framework. I developed terms of reference for specific actions, reviewed project's technical reports, surveyed the study sites, and edited the ICZM plan.
- I was a scientific consultant for the project "**Evaluation and integration of strategic indicators and benchmarks for assessing and monitoring desertification under the UNCCD**" (funded by European Commission - JRC-IES). I realized an inventory of global geospatial datasets, selected land degradation indicators, performed case studies, drafted technical reports to prepare the new edition of the World Atlas of Desertification.
- I studied soil erosion and its relationships with land use and landscape in an agro-pastoral area in Sardinia (Italy), in the framework of the project "**DESERTNET – Monitoring and Actions to Combat Desertification in the Mediterranean Europe**" (funded by EU - Interreg IIIB programme – MedOcc). I made field measurements of soil erosion by water and interpreted them through a geospatial analysis.
- I delivered training courses on the analysis of environmental data.

April 2006 - April 2007 **Scientific collaborator, Project management**

Istituto Sperimentale Italiano "Lazzaro Spallanzani", Rivolta d'Adda, Italy.

I coordinated the feasibility study "**Strategies to combat desertification in arid zones of Western Argentina**" (funded by the Italian Ministry of Foreign Affairs), evaluating options for land restoration, management of water resources, innovation in husbandry, involvement of local communities. I spent three months in Mendoza, Argentina, to coordinate the sectoral study groups.

March 2001 - September 2003 **Scientific collaborator**

REA - Ricerche Ecologiche Applicate s.c.r.l., Monza, Italy

I performed field surveys and soil sampling, remote sensing data interpretation, soil spatial analysis and mapping, GIS management, production of thematic maps within the projects "**Italian Geo-referenced Soil Data Base - scale 1:250,000**" (funded by the Italian Ministry of Agriculture) and "**Eco-pedologic Map of Italy**" (funded by the Italian Ministry of Environment).

Education

December 2009 - September 2013	**Doctoral Degree in Environmental Sciences (Dr. Sc. ETH Zurich)** *ETH Zurich – Institute of Terrestrial Ecosystems, Zurich, Switzerland* Dissertation: Modelling long-term phosphorus dynamics in Swiss agricultural soils using EPIC (Diss. ETH No. 21490). Supervisor: Prof. R. Schulin.
September 1993 - November 2000	**University Degree in Environmental Sciences** *Università degli Studi di Milano Bicocca, Milan, Italy* Graduation thesis: Soil erosion and land use in the Atécuaro watershed (Michoacán, Mexico). Proposals of land management. Supervisor: Prof. F. Previtali
September 1988 - July 1993	**Secondary School Diploma in Informatics** *Istituto Tecnico Industriale Statale "Leonardo da Vinci", Borgomanero, Italy*

Main publications

Della Peruta R., Gross T., Keller A. (2023). Fluxes of nutrients and trace elements in agricultural soils: A regional-scale model. Agroscope Science 175. https://doi.org/10.34776/as175e

Gómez Giménez M., R. de Jong, **R. Della Peruta**, A. Keller, M. E. Schaepman (2017). Determination of grassland use intensity based on multi-temporal remote sensing data and ecological indicators. Remote Sensing of Environment 198: 126-139. https://doi.org/10.1016/j.rse.2017.06.003

Gómez Giménez M., R. **Della Peruta, R.** de Jong, A. Keller, M. E. Schaepman (2016). Spatial Differentiation of Arable Land and Permanent Grassland to Improve a Land Management Model for Nutrient Balancing. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 9: 5655-5665. https://doi.org/10.1109/JSTARS.2016.2551729

Della Peruta R. and A. Keller (2016), A regional modelling tool to assess the risk of accumulation of nutrients, trace metals and pesticides in agricultural soils (iMSoil), in Bulletin der Bodenkundlichen Gesellschaft der Schweiz, 37.

Müller M., **Della Peruta R.** (2015), Impact of farm management on soil phosphorus dynamics: a monitoring-modelling approach, in Bulletin der Bodenkundlichen Gesellschaft der Schweiz, 35, 37-47.

Della Peruta R., A. Keller, R. Schulin (2014). Sensitivity analysis, calibration and validation of EPIC for modelling soil phosphorus dynamics in Swiss agro-ecosystems. Environmental Modelling & Software 62: 97-111. https://doi.org/10.1016/j.envsoft.2014.08.018

Zucca C., **Della Peruta R.**, Salvia R., Sommer S. and Cherlet M. (2012). Towards a World Desertification Atlas. Relating and selecting indicators and data sets to represent complex issues. Ecological Indicators 15: 157-170. https://doi.org/10.1016/j.ecolind.2011.09.012

Sommer S., Zucca C., Grainger A., Cherlet M., Zougmore R., Sokona Y., Hill J., **Della Peruta R.**, Roehrig J. and Wang G. (2011). Application of indicator systems for monitoring and assessment of desertification from national to global scales. Land Degradation & Development 22: 184-197. https://doi.org/10.1002/ldr.1084

Zucca C., **Della Peruta R.**, Salvia R., Cherlet M. and Sommer S. (2010). Evaluation and Integration of Baseline Indicators for Assessing and Monitoring Desertification. European Communities, EUR Report, ISSN 1018-5593, Luxembourg, Office for Official Publications of the European Communities.

Zucca C., Canu A., **Della Peruta R.** (2006). Effects of land use and landscape on spatial distribution and morphological features of gullies in an agropastoral area in Sardinia (Italy). Catena, Vol. 68, pp. 87-95. https://doi.org/10.1016/j.catena.2006.03.015

Lecturing

May 2009 *CIHEAM - MAIB – Mediterranean Agronomic Institute of Bari, Italy*	"**Land degradation and desertification: monitoring, assessment and mitigation technologies and policies**" within the course "Technological innovations and advanced models of land and water resources management in the Mediterranean and Balkan areas".
April 2007 *Università degli Studi di Sassari, Italy*	"**Innovative Tools for Environmental Analysis Applied to Desertification**" within the project "FormDES - Training on Drought and Desertification for the Officer of Local Administrations" (funded by the Italian National Committee to Combat Drought and Desertification - Ministry of Environment).
December 2006 *Università degli Studi di Sassari, Italy*	"**GIS and Remote Sensing**" within the training activities of the project "Demonstrative Project on Strategies to Combat Desertification in Arid Lands with Direct Involvement of Local Agropastoral Communities in North Africa" (funded by European Commission - SMAP II Program).
January 2004 *Università degli Studi di Sassari, Italy*	"**Data Warehouse**" within the Master "F-RIADE" in the frame of the project "RIADE - Integrated Research for the Application of Innovative Technologies and Processes to Combat Desertification" (funded by the Italian Ministry of University and Research).
March 2003 *Scuola Agraria del Parco di Monza, Italy*	"**GIS for the management of forestry and urban parks**".

Selected talks at conferences

Coffee Agrosystems and Climate Change. EGU General Assembly 2023, Vienna, 14-19 April 2024.

Can manure trade make an effective contribution towards sustainable P cycles in Swiss agroecosystems? 9th International Phosphorus Workshop, Zurich, Switzerland, 8-12 July 2019.

A regional modelling tool to assess the risk of accumulation of nutrients, trace metals and pesticides in agricultural soils (iMSoil). Jahrestagung der Bodenkundlichen Gesellschaft der Schweiz (BGS). Geneva, Switzerland, 4-5 February 2016.

Spatially explicit modelling of nutrient and trace element inputs to agricultural soils. International Conference on Land Use and Water Quality – Agricultural Production and the Environment, Vienna, Austria, 21-24 September 2015.

An Early Warning System for soil quality. 3rd Programme Conference NRP68, Montreaux, Switzerland, 12-13 November 2015.

An integrated Modelling framework to monitor and predict trends of agricultural management (iMSoil) - The Land Management Model (LMM). 12th Swiss Geoscience Meeting, Fribourg, Switzerland, 21-22 November 2014.

An integrated Modelling framework to monitor and predict trends of agricultural management (iMSoil). European Geophysical Union EGU General Assembly, Vienna, Austria, 27 April - 2 May 2014.

Sensitivity analysis, calibration and validation of EPIC for modelling soil nutrients and organic carbon dynamics in Swiss agro-ecosystems. International conference "Soils in Space and Time", Ulm, Germany, 30 September - 4 October 2013.

Additional training

Scientific excursion to Mongolia. Geology, Mining, Soil, Gobi-Desert Plant Species, Agriculture, and Land Use. Organized by Undrakh-Od Baatar, Soil Scientist, Research Institute of Animal Husbandry and Grassland, Soil Division, Mongolian Academy of Science. 23 July - 07 Aug 2018.

EAWAG Summer School in Environmental System Analysis. Lecturers: Peter Reichert, Carlo Albert, Dmitri Kavetski (EAWAG, Zurich, Switzerland). Zurich, Switzerland, 4-8 June 2012.

Integrated models and Decision Support Systems for spatial planning and desertification. Lecturer: H. Van Delden (RIKS, Maastricht, The Netherlands). Sassari, Italy, 11-12 May 2009.

Modelling Regional Soil Erosion Risk: Theory and Application. Lecturers: M.J. Kirkby and B.J. Irvine (School of Geography, University of Leeds, UK). Sassari, Italy, 16-20 February 2009.

An Overview of EPIC and the Last Development in EPIC Model. Lecturers: J.R. Williams and E.M. Steglich (AgriLife-BREC, Temple, Texas). Sassari, Italy, 23-26 September 2008.

Languages

Mother tongue **Italian**

Other languages

	Understanding		Speaking		Writing
	Listening	Reading	Interaction	Production	
English	C1	C1	C1	C1	C1
Spanish	C1	C1	C1	C1	C1
French	B2	C1	B1	B1	B1
German	A2	A2	A1	A1	A1

Skills

Social skills

Ability to work in multicultural international teams, adapt to unforeseen situation, promote participation.

Technical skills

Soil survey, physical and chemical soil analysis, soil cartography.

Geographic Information Systems: ArcGIS, QGIS.

Programming languages: R, MATLAB, FORTRAN, SQL.

Development of biophysical models. Expert user of the models EPIC, APEX, SWAT.

Good oral and written communication skills.

Other skills

Acting for theatre and cinema. Mountaineering, outdoor sports. Volunteering for nature conservation projects.

Driving licence

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