PERSONAL INFORMATION

Rastislav Skalský

Work: Schlossplatz 1, A-2361 Laxenburg, Austria

ORCID: 0000-0002-0983-6897

SCOPUS: 6506746263

Date of birth 03/06/1976 | Nationality Slovak

WORK EXPERIENCE

2012 - present

Research Scholar

IIASA – International Institute for Applied Systems Analyses, Biodiversity and Natural Resources Program (BNR), Agriculture, Forestry, and Ecosystem Services Research Group (AFE), Schlossplatz 1, Laxenburg, Austria, www.iiasa.ac.at (till 2020 as Ecosystem Services & Management program)

- process-based modelling of agro-ecosystems at global and continental level with focus on crop production and biogeochemical cycling in plat-soil-atmosphere system,
- soil, topography, land cover, land use data analysis,
- bio-physical models up-scaling and uncertainty assessment,
- database and GIS data processing in different environments,
- model/data interface development, testing and maintenance,
- project task lead & project management, conference and meetings attendance/organization, publication of research results,

Business or sector Research

1999 - 2023

Research Scientist

NPPC-VUPOP – National Agricultural and Food Centre – Soil Science and Conservation Research Institute, Trenčianska 55, 821 09 Bratislava, Slovakia, https://www.nppc.sk/

- policy-relevant interpretation of national-wide soil and landscape data for different purposes (LFA, CAP, EIONET, national needs, key national expert for LFA delineation in 2011-2014),
- environmental modelling – soil and landscape data coupling and process-based models up-scaling mostly focused on simulation of water regime of soil and soil organic carbon balance at local, regional, and national scales,
- soil survey, soil classification, soil mapping at local and regional levels,
- maintenance of national soil information system datasets with focus on National Agricultural Soils Inventory data digitization and implementation,
- staff leading, lead of Department of soil information systems (2003-2005), deputy-lead of Department of Paedology and Pedogeography (2005-2012),
- project task lead & project management, conference and meetings attendance/organization, publication, and dissemination of research results,
- international representation, national focal point for International Network of Soil Information Institutes (INSII), a decision support body of Global Soil Partnership (GSP) secretariat at UN Food & Agricultural Organization (FAO), 2015-2023.

Business or sector Research, Decision support, Environmental protection

XI/2020 – II/2021

Research Scientist

VURV v.v.i. – Crop Research Institute – Division of Crop Management Systems, Drnovská 507/73, 161 06 Praha 6 – Ruzyně, Czech Republic, www.vurv.cz

Business or sector Research, Decision support, Environmental protection

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EDUCATION AND TRAINING

1999 – 2008

Philosophiae Doctor (PhD.)

Philosophie Doctor PhD.

Comenius University, Faculty of Natural Science, Department of Soil Science, Bratislava, Slovakia (external post-graduate program)

- Soil science and environment,
- soil and landscape survey,
- soil science knowledge & soil information in GIS,
- digital soil mapping,
- large-scale grided process-based modelling of soil-plant-atmosphere interactions.

1994 – 1999

Magister of Environmental Sciences (Mgr.)

Master of Science (MSc.)

Comenius University, Faculty of Natural Science, Department of Soil Science, Bratislava, Slovakia (combined BSc. and MSc. program)

- soil genesis,
- soil – plant interactions,
- soil classification and soil & vegetation survey.

PERSONAL SKILLS

Mother tongue(s): Slovak

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
Czech	C2	C2	C1	C1	C1

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication skills

- communication in multi-disciplinary teams,
- communication in multi-cultural teams,
- moderation/facilitation of communications/meetings,
- written communications (email/posts/blogs),

Organisational / managerial skills

- staff leading (leader of small organisational units)
- small group coordination (current and former project team leaderships)
- supervision (current and past supervisions of junior researchers)

Job-related skills

- data analyses in GIS and database environments,
- data synthesis, visualisations, and interpretation,
- running process-based crop models and maintaining spatial data infrastructures,
- summarising and presenting outputs of a research,
- soil and landscape field survey and (conventional) mapping,

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Computer skills
- active MS Office suite user (Word, Excel, Outlook, PowerPoint, SharePoint)
- active MS Teams user
- working with MS Access
- working with ESRI ArcGIS
- working with SQL for applications
- Visual Basic for applications (basic)
- Python for applications (basic)
- R package (basic)
- QGIS (basic)

Other skills
- organization of events (meetings, seminars, field trips)
- active driver

ADDITIONAL INFORMATION

Projects

Most important running and past research projects

IIASA:

(2023 – 2026) **AI4SoilHealth** - the European Union's HORIZON project Accelerating collection and use of soil health information using AI technology to support the Soil Deal for Europe and EU Soil Observatory, IIASA principal researcher for the partner's organization, project task lead,

(2022 – 2026) **LAMASUS** - the European Union's HORIZON project Land Management for Sustainability, IIASA research team member,

(2022 – 2026) **ALFAWETLANDS** - the European Union's HORIZON project Wetland restoration for the future wetlands, IIASA research team member,

(2017 – 2020) **CIRCASA** - the European Union's Horizon 2020 project Coordination of International Research Cooperation on soil CArbon Sequestration in Agriculture, IIASA research team member,

(2017 – 2021) **RESTORE+** - International Climate Initiative (IKI) project on restoration or utilization of degraded/marginal land in Indonesia and Brazil, IIASA research team member,

(2016 – 2019) **GROW Observatory** - the European Union's Horizon 2020 research and innovation programme under grant agreement No 690199 on scaling-up the citizen driven environmental monitoring in the domain of land cover and land use change, IIASA research team member,

(2014 – 2020) **IMBALANCE P** – European Research Council (ERC) grant project focused on various aspects of global phosphorous balance, IIASA research team member,

(2012 – 2016) **IMPACT2C** – EU 7th FP research project focused on analysis of early impact of 2°C warming in Europe in different sectors, IIASA research team member.

NPPC-VUPOP:

(2020 – 2023) **EJP Soil** - the European Union's Horizon 2020 project to create an enabling environment to enhance the contribution of agricultural soils to key societal challenges, NPPC-VUPOP research team member, institutional principal investigator for work package and internal project CarboSeq,

(2019 – 2023) **URANOS** - EU operation program research and innovation project by Slovak Research Agency (VA) on data and knowledge support for decision-making systems and strategical planning of climate change adaptation and minimising soil degradation in agricultural landscape, principal researcher for partner organization,

(2018-2020) **CGMS-SK** (Crop Yield Forecast in Actual Agricultural Season) – contract with Slovak Ministry of Agriculture on operation, and development of modelling system, NPPC-VUPOP principal researcher,

(2018 – 2019) **Evaluation of CAP Rural Development Program** – contract with Ministry of Agriculture and Rural Development on to Soil erosion and Soil Organic Carbon in Programming Period 2015 – 2020, NPPC-VUPOP research team member,

(2016 – 2018) **FACES** – Erasmus+ project on creating the international digital platform and database for the soil classification information exchange critically needed for the teaching in environmental sciences, NPPC-VUPOP research team member,

(2015 – 2019) **ENVISOC** – Slovak Research and Development Agency project on environmental evaluation of soil organic carbon regulation in different ecosystems, NPPC-VUPOP research team member,

(2012 – 2015) **C-FORLAND** –focused on soil organic carbon inventory in forestry and agricultural sectors and its balance in context of IPCC reporting, NPPC-VUPOP principal researcher,

(2011 – 2014) **Less Favourable areas (LFA) delimitation** as a part of Common Agricultural Policy of EC (CAP) implementation at national level, national key expert, soil information and GIS expert,

(2012 – 2013) **KPP-Info CS** – Slovak Research and Development Agency (APVV) project of bilateral Czech

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and Slovak collaboration in field of National Agricultural Soil Inventory data implementation into information system and its publication, NPPC-VUPOP and national principal researcher,

(2010 – 2012) **GS-Soil** - eContentPlus action project, work focused on national soil data harmonization across the EU, (INSPIRE directive best practice network), NPPC-VUPOP research team member, Soil harmonization working package team leader within NPPC-VUPOP,

(2008-2013) **URBAN-SMS** – Interreg Programme 2007 - 2013 Central Europe project, work on developing a comprehensive urban soil management strategy for municipalities to consider the value of soils and their different functions, NPPC-VUPOP research team member,

(2008 – 2011) **CC-TAME** – EU 7. FP project, work focused on building-up the EU level soil and landscape data infrastructure for bio-physical modelling and geographical data management, NPPC-VUPOP team principal researcher and working package coordination,

(2006 – 2009) **GEO-BENE** – EU 6. FP project, work focused on building-up the global level soil and landscape data infrastructure for bio-physical modelling and geographical data management, NPPC-VUPOP team coordination,

(2005 – 2006) **MEUSIS-SK** – contract with EC JRC for providing geographically and semantically harmonized national data on soil, NPPC-VUPOP research team member, deliverable lead,

(2003 – 2006) **INSEA** – EU 6. FP project, work focused on EU level soil and landscape data infrastructure for bio-physical modelling and geographical data management NPPC-VUPOP research team member.

VURV v.v.i.:

(XI/2020 – II/2021) **Mobility of Researchers to Support New Trends and Methods in Agricultural Research** – EU Operational Programme Research project by Czech Ministry of Education, senior visiting scientist

Soil and landscape survey experiences (NPPC-VUPOP):

FACES (2016) Slovak field trip preparation, instructor

LUCAS (2015) land cover/land use survey, soil sampling, field surveyor,

LUCAS (2012) land cover/land use survey, soil sampling, field surveyor,

(2010, 2011) local-level soil inventory in the municipality Selice – soil description, soil sampling, soil map compilation, principal field surveyor,

(2010, 2011) creation and testing of the soil survey manual for the 1:10.000 soil maps update, principal researcher,

LUCAS (2009) land cover/land use survey, soil sampling, field surveyor,

2007 – 2010 soil survey for the land reclamation projects (municipality level), field surveyor,

CMS-P (2007) soil profiles description and documentation, soil sampling for the national soil monitoring system, field surveyor,

LUCAS (2007) land cover/land use survey, topsoil properties description, field surveyor,

BIOSOIL (2006) soil profiles description and documentation, soil sampling for the international forest soil monitoring system, field surveyor,

(2005 – 2008) local-level soil inventory in the Gemerská Hôrka municipality surroundings – soil description, soil sampling, soil map compilation, PhD. thesis project,

(2003, 2004) soil profiles description and documentation, soil sampling for the regional soil and pedo-geochemical maps of Lučenec-Rimava and Záhorská nížina regions, field surveyor;

CMS-P (2002) soil profiles description and documentation, soil sampling for the national soil monitoring system, field surveyor,

1999 - 2003 soil survey for the land reclamation projects and Land Evaluation maps update (municipality level), field surveyor,

Publications

Selected peer-reviewed journal publications:

Escobar Lanzuela, N. , Seber, G., Skalský, R. , Wögerer, M., Jung, M. & Malina, R. (2024). Spatially-explicit land use change emissions and carbon payback times of biofuels under the carbon offsetting and reduction scheme for international aviation. Science of the Total Environment 948, e174635. 10.1016/j.scitotenv.2024.174635.

Wang, X., Wang, S., Folberth, C. , Skalský, R. , Li, H., Liu, Y. & Balkovič, J. (2024). Limiting global warming to 2 °C benefits building climate resilience in rice-wheat systems in India through crop calendar management. Agricultural Systems 213, e103806. 10.1016/j.agsy.2023.103806.

Skalský, R. , Barančíková, G., Makovníková, J., Koco, Š., Halas, J. & Kobza, J. (2024). Regional topsoil organic carbon content in the agricultural soils of Slovakia and its drivers, as revealed by the most recent national soil monitoring data. Environmental Challenges 14, e100816. 10.1016/j.envc.2023.100816.

Ippolito, T., Balkovič, J., Skalský, R., Folberth, C. Krisztin, T. & Neff, J. (2023). Predicting spatiotemporal soil organic carbon responses to management using EPIC-IIASA meta-models. Journal of Environmental Management 344, e118532. 10.1016/j.jenvman.2023.118532.

Ermolieva, T., Havlik, P. , Derci Augustynczik, A.L., Boere, E., Frank, S. , Kahil, T. , Wang, G., Balkovič, J. , Skalský, R. , Folberth, C. et al. (2023). A Novel Robust Meta-Model Framework for Predicting Crop Yield Probability Distributions Using Multisource Data. Cybernetics and Systems Analysis 10.1007/s10559-023-00620-z.

Cornu, S., Keesstra, S., Bispo, A., Fantappie, M., van Egmond, F., Smreczak, B., Wawer, R., Pavlů, L., Sobocká, J., Bakacsi, Z. et al. (2023). National soil data in EU countries, where do we stand? European Journal of Soil Science 74 (4), e13398. 10.1111/ejss.13398.

Wang, X., Folberth, C. , Skalský, R. , Wang, S., Chen, B., Liu, Y., Chen, J., & Balkovič, J. (2022). Crop calendar optimization for climate change adaptation in rice-based multiple cropping systems of India and Bangladesh. Agricultural and Forest Meteorology 315 e108830. 10.1016/j.agrformet.2022.108830.

Carr, T.W., Balkovič, J. , Dodds, P.E., Folberth, C. , & Skalský, R. (2021). The impact of water erosion on global maize and wheat productivity. Agriculture, Ecosystems & Environment 322 e107655. 10.1016/j.agee.2021.107655.

Jägermeyr, J., Müller, C., Ruane, A.C., Elliott, J., Balkovič, J. , Castillo, O., Faye, B., Foster, I., Folberth, C. , Franke, J.A., Fuchs, K., Guarin, J.R., Heinke, J., Hoogenboom, G., Iizumi, T., Jain, A.K., Kelly, D., Khabarov, N. , Lange, S., Lin, T.-S., Liu, W., Mialyk, O., Minoli, S., Moyer, El.J., Okada, M., Phillips, M., Porter, C., Rabin, S.S., Scheer, C., Schneider, J.M., Schyns, J.F., Skalský, R. , Smerald, A., Stella, T., Stephens, H., Webber, H., Zabel, F., & Rosenzweig, C. (2021). Climate impacts on global agriculture emerge earlier in new generation of climate and crop models. Nature Food 2 873-885. 10.1038/s43016-021-00400-y.

Kostková, M., Hlavinka, P., Pohanková, E., Kersebaum, K. C., Nendel, C., Gobin, A., Olesen, J. E., Ferrise, R., Dibari, C., Takáč, J., Topaj, A., Medvedev, S., Hoffmann, M. P., Stella, T., Balek, J., Ruiz-Ramos, M., Rodríguez, A., Hoogenboom, G., Shelia, V., Ventrella, D., Giglio, L., Sharif, B., Oztürk, I., Rötter, R. P., Balkovič, J. , Skalský, R. , Moriondo, M., Thaler, S., Žalud, Z., & Trnka, M. (2021). Performance of 13 crop simulation models and their ensemble for simulating four field crops in Central Europe. The Journal of Agricultural Science 159 (1-2) 69-89. 10.1017/S0021859621000216.

Carr, T.W., Balkovič, J. , Dodds, P.E., Folberth, C. , Fulajtar, E., & Skalský, R. (2020). Uncertainties, sensitivities and robustness of simulated water erosion in an EPIC-based global gridded crop model. Biogeosciences 17 (21) 5263-5283. 10.5194/bg-17-5263-2020.

Folberth C , Khabarov N , Balkovic J , Skalsky R , Visconti P, Ciais P, Janssens I, Peñuelas J, et al. (2020). The global cropland sparing potential of high-yield farming. Nature Sustainability 3: 281-289. DOI:10.1038/s41893-020-0505-x.

Flach R, Skalsky R , Folberth C , Balkovic J , Jantke K, & Schneider UA (2020). Water productivity and footprint of major Brazilian rainfed crops – A spatially explicit analysis of crop management scenarios. Agricultural Water Management 233: e105996. DOI:10.1016/j.agwat.2019.105996.

Skalsky, R., Koco, S., Barancikova, G., Tarasovicova, Z., Halas, J., Koleda, P., Makovnikova, J., Guttekova, M., Tobiasova, E., Gomoryova, E. & Takac, J, 2020. Land cover and land use change driven dynamics of soil organic carbon in north-east Slovakian croplands and grasslands between 1970-2013. Ekologia (Bratislava), vol. 39, No. 2, p. 159 – 173, DOI:10.2478/eko-2020-0012

Keith Paustian,Sarah Collier,Jeff Baldock,Rachel Burgess,Jeff Creque,Marcia DeLonge,Jennifer Dungait,Ben Ellert,Stefan Frank,Tom Goddard,Bram Govaerts,Mike Grundy,Mark Henning,R. César Izaurralde,Mikuláš Madaras,Brian McConkey,Elizabeth Porzig,Charles Rice,Ross Searle,Nathaniel Seavy,Rastislav Skalsky,William Mulhern &Molly Jahn (2019). Quantifying carbon for agricultural soil management: from the current status toward a global soil information system. Carbon Management 10 (6): 567-587. DOI:10.1080/17583004.2019.1633231.

Folberth C , Baklanov A , Balkovic J , Skalsky R, Khabarov N , & Obersteiner M (2019). Spatio-temporal downscaling of gridded crop model yield estimates based on machine learning. Agricultural and Forest Meteorology 264: 1-15. DOI:10.1016/j.agrformet.2018.09.021.

Zhang J, Balkovic J, Azevedo L, Skalsky R, Bouwman AF, Xu G, Wang J, Xu M, et al. (2018). Analyzing and modelling the effect of long-term fertilizer management on crop yield and soil organic carbon in China. *Science of the Total Environment* 627: 361-372. DOI:10.1016/j.scitotenv.2018.01.090.

Balkovic J, Skalsky R, Folberth C, Khabarov N, Schmidt E, Madaras M, Obersteiner M, & van der Velde M (2018). Impacts and Uncertainties of +2°C of Climate Change and Soil Degradation on European Crop Calorie Supply. *Earth's Future 6 (3):* 373 -395. DOI:10.1002/2017EF000629.

Zhang J, Balkovic J, Azevedo L, Skalsky R, Bouwman AF, Xu G, Wang J, Xu M, et al. (2018). Analyzing and modelling the effect of long-term fertilizer management on crop yield and soil organic carbon in China. *Science of the Total Environment 627*: 361-372. DOI:10.1016/j.scitotenv.2018.01.090.

Folberth C, Skalsky R, Moltchanova E, Balkovic J, Azevedo L, Obersteiner M, & van der Velde M (2016). Uncertainty in soil data can outweigh climate impact signals in crop yield simulations. *Nature Communications 7*: art.no.11872. DOI:10.1038/ncomms11872.

Tobiašová, E., Barančíková, G., Gomoryová, E., Makovníková, J., Skalský, R., Halas, J., Koco, Š., Tarasovičová, Z., Takáč, J., Špaňo, M. (2016) Labile forms of carbon and soil aggregates. *Soil and Water Research 4 (11):* 259 – 266. doi: 10.17221/182/2015-SWR

Xiong W, Skalsky R, Porter CH, Balkovic J, Jones JW, & Yang D (2016). Calibration induced uncertainty of the EPIC model to estimate climate change impact on global maize yield. *Journal of Advances in Modeling Earth Systems 8* (3): 1358-1375. DOI:10.1002/2016MS000625.

Ma K, Liu J, Balkovič J, Skalsky R, Azevedo L, & Kraxner F (2016). Changes in soil organic carbon stocks of wetlands on China's Zoige plateau from 1980 to 2010. *Ecological Modelling 327*: 18-28. DOI:10.1016/j.ecolmodel.2016.01.009.

Elshout P.M.F., Van Zelm R., Balkovic J., Obersteiner M., Schmid E., Skalsky R., Van Der Velde M., Huijbregts M.A.J. (2015) Greenhouse-gas payback times for crop-based biofuels *Nature Climate Change*, 5 (6) , pp. 604-610. ISSN 1758-678X

van der Velde, M. Folberth,C. Balkovic,J. Ciais, P. Fritz,S. Janssens,I.A. Obersteiner,M. See,L. Skalsky,R. Xiong,W. Penuelas,J. (2014). African crop yield reductions due to increasingly unbalanced Nitrogen and Phosphorus consumption. *Global Change Biology*, 20(4):1278-1288

Balkovič, J., van der Velde, M., Skalsky, R., Xiong, W., Folberth, Ch., Khabarov, N., Smirnov, A., Mueller, N.D., Obersteiner, M., 2014. Global wheat production potentials and management flexibility under the representative concentration pathways, *Global and Planetary Change*, 122: 107 - 121

Xiong,W. Balkovic,J. van der Velde,M. Zhang,X. Izaurralde,R.C. Skalsky,R. Lin,E. Mueller,N. Obersteiner,M. (2014). A calibration procedure to improve global rice yield simulations with EPIC. *Ecological Modelling*, 273:128-139

Xiong,W. van der Velde,M. Holman,I.P. Balkovic,J. Lin,E. Skalsky,R. Porter,C. Jones,J. Khabarov,N. Obersteiner,M., 2014. Can climate-smart agriculture reverse the recent slowing of rice yield growth in China? *Agriculture, Ecosystems & Environment*, 196:125-136

Balkovic,J. van der Velde,M. Schmid,E. Skalsky,R. Khabarov,N. Obersteiner,M. Sturmer,B. Xiong,W. (2013). Pan-European crop modelling with EPIC: Implementation, up-scaling and regional crop yield validation. *Agricultural Systems*, 120:61-75

Balkovic,J. Rampasekova,Z. Hutar,V. Sobocka,J. Skalsky,R. (2013). Digital soil mapping from conventional field soil observations. *Soil and Water Research*, 8(1):13-25

Barančíková,G. Makovníková,J. Skalský,R. Tarasovičová,Z. Nováková,M. Halás,J. Koco,Š. Gutteková,M. (2013). Changes in organic carbon pool in agricultural soils and its different development in individual agro-climatic regions of Slovakia. *Agriculture (Poľnohospodárstvo)*, 59:9–20

Barančíková,G. Makovníková,J. Skalský,R. Tarasovičová,Z. Nováková,M. Halás,J. Gutteková,M. Koco,Š. (2012) Simulation of Soil Organic Carbon Changes in Slovak Arable Land and their Environmental Aspects. *Soil and Water Research*, 7:45-51

Havlik P, Schneider U.A, Schmid E, Bottcher H, Fritz S, Skalsky R, Aoki K, De Cara S, Kindermann G, Kraxner F, Leduc S, McCallum I, Mosnier A, Sauer T, Obersteiner M., 2011. Global land-use implications of first and second generation biofuel targets. *Energy Policy*, 39(10):5690-5702

Balkovič,J. Schmid,E. Skalský,R. Nováková, M. (2011). Modelling Soil Organic Carbon Changes on Arable Land under Climate Change – A Case Study Analysis of the Kočín Farm in Slovakia. *Soil and Water Research*, 6:30–42

Membership

- **Socieatas Pedologica Slovaca** (Soil science association of Slovakia), member of steering committee, 2015-today
- **Slovak Society for Agricultural**, Forestry, Food, and Veterinary research, member of steering committee, 2012-2019,
- **Slovak Academy of Agricultural Science**, member of committee for Soil science and soil protection, 2004-2023,
- **International Union of Soil Science Society**, member from 2005

Recognitions

- Recognition from the Researchers Recognition Committee of Slovak Academy of Science on fulfilling the criteria for the **scientific degree 2a – independent (senior) research scientist** in field of Agricultural sciences, 2016

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