Dr. Philippe Rufin

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Professional Appointments

09/2021 – 09/2026 **F.R.S.-FNRS Postdoctoral Fellow**
Earth and Life Institute, UCLouvain, Louvain-La-Neuve (Belgium)
Earth Observation Lab, Humboldt-Universität Berlin (Germany)

- Mapping cropland, field sizes and their dynamics in smallholder landscapes in Sub-Saharan Africa using very-high-resolution satellite imagery and deep learning.
- Reference data collection in field using UAV imaging system.

04/2019 – 09/2021 **Postdoctoral Researcher**
Earth Observation Lab, Humboldt-Universität Berlin (Germany)

- Research focus on mapping agricultural land use and land use intensity parameters in tropical, sub-tropical, Mediterranean, and semi-arid environments, e.g. in Greece, Turkey, Uzbekistan, Brazil, Nigeria, and Kenya.
- Lecturer in applied remote sensing modules in B.Sc. Geography and M.Sc. Global Change Geography.

09/2017 – 03/2019
10/2014 – 05/2015 **Research Associate**
Earth Observation Lab, Humboldt-Universität Berlin (Germany)

- Research on the effects of irrigation dam construction on agricultural land systems.
- Lecturer in remote sensing, geoinformation, and statistics in B.Sc. Geography and M.Sc. Global Change Geography.

05/2014 – 11/2014 **Research Associate**
Integrated Research Institute on Transformations of
Human-Environment Systems (IRI THESys)
Humboldt-Universität Berlin (Germany)

- Research on social-ecological costs of dam and reservoir construction.
- Analyses of remotely sensed and ancillary geospatial data aiming to observe transforming land systems.

12/2011 – 04/2014 **Student Collaborator**
Land System Science Cluster
Humboldt-Universität Berlin (Germany)

- Supporting research on sustainable land management in the context of CarBioCial project, funded by the German Federal Ministry of Education and Research.
- Supporting the teaching of M.Sc. courses in advanced remote sensing and geoinformatics.

Education

11/2014 – 04/2019	Doctoral Studies in Geography Humboldt-Universität Berlin (Germany)

- Thesis „A global to regional scale assessment of dam-induced agricultural change by means of remote sensing“ (DOI: 10.18452/20125), referees Patrick Hostert, Volker Radeloff, and Claudia Künzer, graded Magna Cum Laude.
- Graduate Programme: Integrative Research Institute on Transformations of Human-Environment Systems (IRI THESys).

10/2011 – 05/2014	M.Sc. Physical Geography of Human-Environment-Systems Humboldt-Universität Berlin (Germany)

- Elective specialization on remote sensing, digital image processing, spatial statistics, and geoinformatics
- Valedictorian of the M.Sc. cohort in 2014.

10/2007 - 9/2011	B.A. Geography Humboldt-Universität Berlin (Germany)

- Elective specialization on remote sensing, digital image processing, classification algorithms and geographical information systems, spatial analyses, spatial statistics, and modeling.
- Basics in human and physical geography, social sciences as a secondary subject.

Teaching

10/2017 – 03/2021	Earth Observation M.Sc. Global Change Geography Humboldt-Universität zu Berlin
10/2019 – 03/2021	Introduction to Remote Sensing B.Sc. Geography Humboldt-Universität zu Berlin
03/2015 – 04/2015	Statistics for Geographers B.Sc. Geography Humboldt-Universität zu Berlin
04/2015 – 08/2015	Applied Geoinformation Science B.Sc. Geography Humboldt-Universität zu Berlin
10/2015 – 03/2016	Quantifying and understanding land change in social-ecological systems: Impacts of dam construction B.Sc. Geography Humboldt-Universität zu Berlin

Thesis Supervision

10/2016 – 09/2024	7 M.Sc. theses 6 B.Sc. theses

Awards & Distinctions

11/2023	Open Access Award Humboldt-Universität zu Berlin
06/2021	Finalist for Teaching Award Humboldt-Universität zu Berlin
04/2019	IRI THESys Graduate School Humboldt-Universität zu Berlin
04/2019	Best M.Sc. Student Award Humboldt-Universität zu Berlin

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Assignments

09/2024	Dissertation Committee Member Candidate: Atabek Umirbekov Humboldt-Universität zu Berlin
06/2024	Scientific Committee Member 43rd EARSeL Symposium
09/2024	Dissertation Committee Member Candidate: Batu Nacun Humboldt-Universität zu Berlin
09/2024	Dissertation Committee Member Candidate: Andrey Dara Humboldt-Universität zu Berlin

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Research Grants

11/2024	ESA Digital Twin Component Grand volume: ~3M€ Role: Co-PI, PI: Dr. Gohar Ghazaryan
10/2023	FRS-FNRS Postdoctoral Researcher Grant Grant volume: 3 years Post Doc position Role: PI
06/2023	ESA Third Party Mission Data Grant Grant volume: SPOT data for ~22,000 € Role: PI
02/2015	Elsa Neumann Foundation Ph.D. Scholarship Grant volume: 3 years Ph.D. position Role: PI

Supporting Grants

06/2019	Digital Teaching Grant PI: Dr. Philippe Rufin, bologna.lab 1 year student collaborator
06/2018	Travel Grant IRI THESys, Humboldt-Universität zu Berlin Funding for conference participation
06/2015	Q-Team Grant PI: Dr. Philippe Rufin, bologna.lab 1,000 € for research-based learning

Peer-Reviewed Articles

Rufin, P., Wang, S., Lisboa, S. N., Hemmerling, J., Tulbure, M. G., & Meyfroidt, P. (accepted). Taking it further: Leveraging pseudo labels for field delineation across label-scarce smallholder regions. *International Journal of Applied Earth Observation and Geoinformation.*

Jänicke, C., Wesemeyer, M., Chiarella, C., Lakes, T., Levers, C., Meyfroidt, P., Müller, D., Pratzer, M., & Rufin, P. (2024). Can we estimate farm size from field size? An empirical investigation of the field size to farm size relationship. *Agricultural Systems*, *220*, 104088. https://doi.org/10.1016/j.agsy.2024.104088

Meyfroidt, P., Abeygunawardane, D., Baumann, M., Bey, A., Buchadas, A., Chiarella, C., Junquera, V., Kronenburg García, A., Kuemmerle, T., Le Polain De Waroux, Y., Oliveira, E., Picoli, M., Qin, S., Rodriguez García, V., & Rufin, P. (2024). Explaining the emergence of land-use frontiers. *Royal Society Open Science*, *11*(7), 240295. https://doi.org/10.1098/rsos.240295

Chiarella, C., Rufin, P., Abeygunawardane, D., Bey, A., Lisboa, S. N., Zavale, H., & Meyfroidt, P. (2024). Impacts of large-scale forestry investments on neighboring small-scale agriculture in northern Mozambique. *Land Use Policy*, *145*, 107251. https://doi.org/10.1016/j.landusepol.2024.107251

Pratzer, M., Meyfroidt, P., Antongiovanni, M., Aragon, R., Baldi, G., Czaplicki Cabezas, S., De La Vega-Leinert, C. A., Dhyani, S., Diepart, J.-C., Fernandez, P. D., Garnett, S. T., Gavier Pizarro, G. I., Kalam, T., Koulgi, P., Le Polain De Waroux, Y., Marinaro, S., Mastrangelo, M., Mueller, D., Mueller, R., …, Rufin, P., … Kuemmerle, T. (2024). An actor-centered, scalable land system typology for addressing biodiversity loss in the world's tropical dry woodlands. *Global Environmental Change*, *86*, 102849. https://doi.org/10.1016/j.gloenvcha.2024.102849

Salomão, C., Alsleben, J., Rufin, P., & Hostert, P. (2024). Mapping hydropower expansion and cash crop dynamics in Colombia using Landsat time series. *Geocarto International*, *39*(1), 2322064. https://doi.org/10.1080/10106049.2024.2322064

Frantz, D., Rufin, P., Janz, A., Ernst, S., Pflugmacher, D., Schug, F., & Hostert, P. (2023). Understanding the robustness of spectral-temporal metrics across the global Landsat archive from 1984 to 2019 – a quantitative evaluation. *Remote Sensing of Environment*, *298*, 113823. https://doi.org/10.1016/j.rse.2023.113823

Reis, T. N. P. dos, Ribeiro, V., Garrett, R. D., Kuemmerle, T., Rufin, P., Guidotti, V., Amaral, P. C., & Meyfroidt, P. (2023). Explaining the stickiness of supply chain relations in the Brazilian soybean trade. *Global Environmental Change*, *78*(344), 102633. https://doi.org/10.1016/j.gloenvcha.2022.102633

Friis, C., Hernández-Morcillo, M., Baumann, M., Coral, C., Frommen, T., Ghoddousi, A., Loibl, D., & Rufin, P. (2023). Enabling spaces for bridging scales: Scanning solutions for interdisciplinary human-environment research. *Sustainability Science*. https://doi.org/10.1007/s11625-022-01271-3

Rufin, P., Bey, A., Picoli, M., & Meyfroidt, P. (2022). Large-area mapping of active cropland and short-term fallows in smallholder landscapes using PlanetScope data. *International Journal of Applied Earth Observation and Geoinformation*, *112*(1), 102937. https://doi.org/10.1016/j.jag.2022.102937

Rufin, P., Peña-Guerrero, M. D., Umirbekov, A., Wei, Y., & Müller, D. (2022). Post-Soviet changes in cropping practices in the irrigated drylands of the Aral Sea basin. *Environmental Research Letters*, *17*(9), 095013. https://doi.org/10.1088/1748-9326/ac8daa

Frantz, D., Hostert, P., Rufin, P., Ernst, S., Röder, A., & van der Linden, S. (2022). Revisiting the Past: Replicability of a Historic Long-Term Vegetation Dynamics Assessment in the Era of Big Data Analytics. *Remote Sensing*, *14*(3), 597. https://doi.org/10.3390/rs14030597

Oliveira, H. F. M., Fandos, G., Zangrandi, P. L., do Nascimento Bendini, H., Silva, D. C., Muylaert, R. L., Marinho-Filho, J. S., Fonseca, L. M. G., Rufin, P., Schwieder, M., & others. (2022). Crops, caves, and bats: Deforestation and mining threaten an endemic and endangered bat species (Lonchophylla: Phyllostomidae) in the Neotropical savannas. *Hystrix, the Italian Journal of Mammalogy*. https://doi.org/10.4404/hystrix-00541-2022

Rufin, P., Frantz, D., Yan, L., & Hostert, P. (2021). Operational Coregistration of the Sentinel-2A/B Image Archive Using Multitemporal Landsat Spectral Averages. *IEEE Geoscience and Remote Sensing Letters*, *18*(4), 712–716. https://doi.org/10.1109/LGRS.2020.2982245

Rufin, P., Rabe, A., Nill, L., & Hostert, P. (2021). GEE Time Series Explorer for QGIS – Instant Access to Petabytes of Earth Observation Data. *ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, *XLVI-4/W2-2021*, 155–158. https://doi.org/10.5194/isprs-archives-XLVI-4-W2-2021-155-2021

Borona, P., Busch, F., Krueger, T., & Rufin, P. (2021). Uncertainty in Drought Identification Due to Data Choices, and The Value of Triangulation. *Water*, *13*(24), 3611. https://doi.org/10.3390/w13243611

Ibrahim, E. S., Rufin, P., Nill, L., Kamali, B., Nendel, C., & Hostert, P. (2021). Mapping Crop Types and Cropping Systems in Nigeria with Sentinel-2 Imagery. *Remote Sensing*, *13*(17), 3523. https://doi.org/10.3390/rs13173523

Rufin, P., Müller, D., Schwieder, M., Pflugmacher, D., & Hostert, P. (2021). Landsat time series reveal simultaneous expansion and intensification of irrigated dry season cropping in Southeastern Turkey. *Journal of Land Use Science*, *3*(3), 1–17. https://doi.org/10.1080/1747423X.2020.1858198

Rufin, P., Gollnow, F., Müller, D., & Hostert, P. (2019). Synthesizing dam-induced land system change. *AMBIO*, *92*, 90. https://doi.org/10.1007/s13280-018-01144-z

Rufin, P., Frantz, D., Ernst, S., Rabe, A., Griffiths, P., Özdoğan, M., & Hostert, P. (2019). Mapping Cropping Practices on a National Scale Using Intra-Annual Landsat Time Series Binning. *Remote Sensing*, *11*(3), 232. https://doi.org/10.3390/rs11030232

Bendini, H. N., Garcia Fonseca, L. M., Schwieder, M., Sehn Körting, T., Rufin, P., Del Arco Sanches, I., Leitão, P. J., & Hostert, P. (2019). Detailed agricultural land classification in the Brazilian Cerrado based on phenological information from dense satellite image time series. *International Journal of Applied Earth Observation and Geoinformation*, *82*, 101872. https://doi.org/10.1016/j.jag.2019.05.005

Rufin, P., Levers, C., Baumann, M., Jägermeyr, J., Krueger, T., Kuemmerle, T., & Hostert, P. (2018). Global-scale patterns and determinants of cropping frequency in irrigation dam command areas. *Global Environmental Change*, *50*, 110–122. https://doi.org/10.1016/j.gloenvcha.2018.02.011

Müller, H., Rufin, P., Griffiths, P., de Barros Viana Hissa, Letícia, & Hostert, P. (2016). Beyond deforestation: Differences in long-term regrowth dynamics across land use regimes in southern Amazonia. *Remote Sensing of Environment*, *186*, 652–662. https://doi.org/10.1016/j.rse.2016.09.012

Müller, H., Rufin, P., Griffiths, P., Barros Siqueira, Auberto José, & Hostert, P. (2015). Mining dense Landsat time series for separating cropland and pasture in a heterogeneous Brazilian savanna landscape. *Remote Sensing of Environment*, *156*, 490–499. https://doi.org/10.1016/j.rse.2014.10.014

Rufin, P., Müller, H., Pflugmacher, D., & Hostert, P. (2015). Land use intensity trajectories on Amazonian pastures derived from Landsat time series. *International Journal of Applied Earth Observation and Geoinformation*, *41*, 1–10. https://doi.org/10.1016/j.jag.2015.04.010

Selected Conference Contributions

Rufin, P., Thomas, L. F., Lisboa, S. N., Ribeiro, N., Sitoe, A., Hostert, P., Meyfroidt, P. (2024): National-level crop field delineation in Mozambique using 1.5 m resolution SPOT data and transfer learning with pseudo labels. ESA EO 4 Africa Symposium. ESA, Frascati, Italy.

Rufin, P. (2024): Leveraging Earth Observation for Characterizing Heterogeneous Farming Systems in Sub-Saharan Africa. IAMO Forum. Leibniz Institute of Agricultural Development in Transition Economies, Halle, Germany.

Rufin, P., Meyfroidt, P. (2023): Transfer learning for smallholder field delineation and field size estimation in Sub-Saharan Africa. Tropentag. Leibniz Centre for Agricultural Landscape Research. Berlin, Germany.

Rufin, P., Picoli, M., Bey, A., Ubisse, Y., Nogueira Lisboa, S., Sitoe, A., Meyfroidt, P. (2022): Mapping field sizes in smallholder agriculture of Sub-Saharan Africa: assessing pathways to overcome the mismatch between spatial resolution and field size. European Space Agency's Living Planet Symposium, Bonn, Germany.

Rufin, P., Rabe, A., Nill, L., Hostert, P. (2021): GEE Timeseries Explorer for QGIS – Instant access to petabytes of Earth observation data. FOSS4G Buenos Aires 2021.

Müller, D., Rufin, P., Dara, A., Krause, C., Peña-Guerrero, M.D., Schmitz, T., Umirbekov, A., Wei, Y. (2021): Post-Soviet changes in irrigated crop production in the Amu Darya Basin. vEGU General Assembly 2021

Bendini, H., Soares, A., Rufin, P., Schwieder, M., Rodrigues, M., Maretto, R., Korting, T., Leitao, P., Sanches, I., Fonseca, L., Hostert, P. (2020): Applying a Phenological Object-Based Image Analyzes (PHENOBIA) for Agricultural Land Classification: A Study Case in the Brazilian Cerrado. IGARSS 2020 - IEEE International Geoscience and Remote Sensing Virtual Symposium.

Rufin, P., Schwieder, M., Bendini, H., Frantz, D., Ernst, S., Rabe, A., Griffiths, P., Özdoğan, M., Hostert, P (2020): Mapping Cropping Practices on a National Scale Using Intra-Annual Landsat Time Series Binning (terrabrasilis.dpi.inpe.br/workshopfip2020/). Research on Vegetation and Agriculture Mapping in the Brazilian Biomes. INPE São José dos Campos, Brazil.

Rufin, P., Frantz D., Dierkes H., Pflugmacher D., Röder A., Hostert P. (2019): Mapping Olive Tree Cover Using Land Surface Phenology Derived From Sentinel-2A/B Time Series. European Space Agency's Living Planet Symposium, Milan, Italy.

Frantz, D., Hostert, P., Ernst, S., Rufin, P., Röder, A., van der Linden, S. (2019): Land Use 2.0: how dense time series and phenometrics have improved the monitoring of long-term vegetation dynamics in Mediterranean rangelands. European Space Agency's Living Planet Symposium, Milan, Italy.

Hostert, P., Baumann, M., Gerten, D., Kuemmerle, T., van der Linden, S., Lucht, W., Rufin, P. (2019): Quantifying a planetary land systems boundary. GLP Open Science Meeting, Bern, Switzerland.

Rufin, P., Frantz, D., Rabe, A., Hostert, P. (2019): Landsat time series for mapping cropland management at the national scale in Turkey. 3rd joint EARSel & NASA LULCC Workshop, Crete, Greece

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Peer-Reviews for International Journals

26+ reviews for Remote Sensing of Environment, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, International Journal of Applied Earth Observation and Geoinformation, Remote Sensing in Ecology and Conservation, GIScience & Remote Sensing, International Journal of Remote Sensing, Water Resources Research, Applied Geography, World Development, Remote Sensing, Agronomy, Nature Sustainability, Science