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Geography 2  
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## Short presentation

Stephanie Horion is associate professor at the Dept. of Geosciences and Natural Resource Management (KU, Denmark), and recipient of the **Villum Young Investigator 2021** (DRYTIP - Drought induced tipping point in ecosystem functioning, <https://ign.ku.dk/english/drytip/>). She is also PI on the newly founded **Global Wetland Center** (Novo Nordisk Challenge Programme 2023).

Her research focuses on **Earth Observation of terrestrial ecosystems, global environmental change, tipping points and climate extremes.**

Between 2009 and 2012, she worked at **Joint Research Center of the European Commission** (JRC, Ispra), where she contributed to the development of the European and Global Drought Observatories.  
See less

## Employment

### Associate Professor

Geography 2  
København K, Denmark  
1 Jan 2016 → nu

### Postdoc

Geology  
København K, Denmark  
15 Apr 2012 → 2 Jan 2013

### Contract Agent FGIV

European Commission, Joint Research Centre  
Italy  
2 Mar 2009 → 29 Feb 2012

## Research outputs

### Delineating Standing Deadwood in High-Resolution RGB Drone Imagery

Möhrling, J., Mosig, C., Cheng, Y., Mahecha, M. D., Priego, O. P., Beloiu, M., Volpi, M., Horion, S., Latifi, H., Shafeian, E., Fassnacht, F., Montero, D., Zielewska-Büttner, K., Laliberté, E., Cloutier, M., Schmehl, M-T., Frick, A., Müller-Landau, H., Cushman, K.C., Hupy, J. & 11 others, Ma, Q., Su, Y., Khatri-Chhetri, P., Kruse, S., Frey, J., Schiefer, F., Junntila, S., Potts, A., Uhl, A., Rossi, C. & Kattenborn, T., 15 Mar 2024.

### High-resolution mapping of tree mortality in European forests

Cheng, Yan, Oehmcke, Stefan, Mosig, C., Beloiu, M., Kattenborn, T., Abel, Christin, Gominski, Dimitri Pierre Johannes, Nord-Larsen, Thomas, Fensholt, Rasmus & Horion, Stéphanie, 11 Mar 2024.

### Mapping Tree Mortality at Global Scale Using Sentinel-2

Mosig, C., Mahecha, M. D., Montero, D., Cheng, Y., Perez-Priego, O., Beloiu, M., Volpi, M., Horion, S., Latifi, H., Shafeian, E., Fassnacht, F., Ganz, S., Zielewska-Büttner, K., Laliberté, E., Cloutier, M., Schmehl, M-T., Frick, A., Müller-Landau, H., Cushman, K.C., Hupy, J. & 11 others, Ma, Q., Su, Y., Khatri-Chhetri, P., Kruse, S., Frey, J., Schiefer, F., Junntila, S., Potts, A., Uhl, A., Rossi, C. & Kattenborn, T., 11 Mar 2024.

### **Changes in vegetation-water response in the Sahel-Sudan during recent decades**

Lu, Tingting, Zhang, Wenmin, Abel, Christin, Horion, Stéphanie, Brandt, Martin Stefan, Huang, Ke & Fensholt, Rasmus, 2024, In: *Journal of Hydrology: Regional Studies*. 52, 10 p., 101672.

### **Increasing global ecosystem respiration between 1982 and 2015 from Earth observation-based modelling**

Tagesson, Håkan Torbern, Kelly, J., Schurgers, Guy, Tian, F., Ardö, J., Horion, Stéphanie, Ahlström, A., Olin, S. & Fensholt, Rasmus, 2024, In: *Global Ecology and Biogeography*. 33, 1, p. 116–130

### **Scattered tree death contributes to substantial forest loss in California**

Cheng, Yan, Oehmcke, Stefan, Brandt, Martin Stefan, Rosenthal, L., Das, A., Vrieling, A., Saatchi, S., Wagner, F., Mugabowindekwe, Maurice, Verbruggen, Wim, Beier, Claus & Horion, Stéphanie, 2024, In: *Nature Communications*. 15, 1, p. 1-13 641.

### **Simulated Tree-Grass Competition in Drylands Is Modulated by CO<sub>2</sub> Fertilization**

Verbruggen, Wim, Schurgers, Guy, Meunier, F., Verbeeck, H. & Horion, Stéphanie, 2024, In: *Earth's Future*. 12, 1, 19 p., e2023EF004096.

### **The success of ecological engineering projects on vegetation restoration in China strongly depends on climatic conditions**

Dou, Y., Tong, Xiaoye, Horion, Stéphanie, Feng, L., Fensholt, Rasmus, Shao, Q. & Tian, F., 2024, In: *Science of the Total Environment*. 915, 11 p., 170041.

### **Contrasting ecosystem vegetation response in global drylands under drying and wetting conditions**

Abel, Christin, Abdi, A. M., Tagesson, Håkan Torbern, Horion, Stéphanie & Fensholt, Rasmus, 2023, In: *Global Change Biology*. 29, 14, p. 3954-3969

### **Deep learning for mapping water bodies in the Sahel**

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### **MAPPING TREE MORTALITY IN CALIFORNIA FROM VERY HIGH RESOLUTION IMAGERY USING DEEP LEARNING**

Cheng, Yan, Oehmcke, Stefan, Brandt, Martin Stefan, Das, A., Rosenthal, L., Saatchi, S., Wagner, F., Vrieling, A., Verbruggen, Wim, Beier, Claus & Horion, Stéphanie, 2023.

### **Mapping and characterising tree mortality in California at individual tree level using deep learning**

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### **Quantifying Tree Mortality Drivers - a Case Study in a Boreal Forest**

Jääskeläinen, J., Junttila, S., O'Sullivan, H., Cheng, Yan, Horion, Stéphanie & Vastaranta, M., 2023, SSRN: Social Science Research Network, 50 p.

### **Satellite-based continental-scale inventory of European wetland types at 10m spatial resolution**

Kovács, Gyula Mate, Oehmcke, Stefan, Horion, Stéphanie, Gominski, Dimitri Pierre Johannes, Tong, Xiaoye & Fensholt, Rasmus, 2023. 1 p.

### **Seasonal-Trend Time Series Decomposition on Graphics Processing Units**

Serykh, Dmitry, Oehmcke, Stefan, Oancea, Cosmin Eugen, Masiliunas, D., Verbesselt, J., Cheng, Yan, Horion, Stéphanie, Gieseke, F. & Hinnerskov, Nikolaj Hey, 2023, *Proceedings - 2023 IEEE International Conference on Big Data, BigData 2023*. He, J., Palpanas, T., Hu, X., Cuzzocrea, A., Dou, D., Slezak, D., Wang, W., Gruca, A., Lin, J. C-W. & Agrawal, R. (eds.). IEEE, p. 5914-5923 10 p.

### **Simulated tree-grass competition in drylands is modulated by CO<sub>2</sub> fertilization**

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#### **Characterizing ecosystem change in wetlands using dense earth observation time series**

Kovács, Gyula Mate, Horion, Stéphanie & Fensholt, Rasmus, 2022, In: Remote Sensing of Environment. 281, 18 p., 113267.

#### **EMERGENCY FLOOD MAPPING IN AUSTRALIA WITH SENTINEL-1 AND SENTINEL-2 SATELLITE IMAGERY = CARTOGRAPHIE D'URGENCE DES INONDATIONS EN AUSTRALIE À PARTIR D'IMAGES SATELLITAIRES SENTINEL-1 ET SENTINEL-2**

Meyer, Rasmus Probst, Søgaard, M. G., Schødt, M. P., Horion, Stéphanie & Prishchepov, Alexander V., 2022, In: BSGl. 78, 1, p. 123-138 16 p.

#### **Global quantification of the bidirectional dependency between soil moisture and vegetation productivity**

Zhang, Wenmin, Wei, F., Horion, Stéphanie, Fensholt, Rasmus, Forkel, M. & Brandt, Martin Stefan, 2022, In: Agricultural and Forest Meteorology. 313, 9 p., 108735.

#### **Tracking sustainable restoration in agro-pastoral ecotone of northwest China**

Yang, L., Horion, Stéphanie, He, C. & Fensholt, Rasmus, 1 Dec 2021, In: Remote Sensing. 13, 24, 20 p., 5031.

#### **Contrasting responses of woody and herbaceous vegetation to altered rainfall characteristics in the Sahel**

Verbruggen, Wim, Schurgers, Guy, Horion, Stéphanie, Ardö, J., Bernardino, P. N., Cappelaere, B., Demarty, J., Fensholt, Rasmus, Kergoat, L., Sibret, T., Tagesson, Håkan Torbern & Verbeeck, H., 7 Jan 2021, In: Biogeosciences. 18, 1, p. 77-93 17 p.

#### **A physiology-based Earth observation model indicates stagnation in the global gross primary production during recent decades**

Tagesson, Håkan Torbern, Tian, F., Schurgers, Guy, Horion, Stéphanie, Scholes, R., Ahlström, A., Ardö, J., Moreno, A., Madani, N., Olin, S. & Fensholt, Rasmus, 2021, In: Global Change Biology. 27, 4, p. 836-854 19 p.

#### **Abrupt Change in Dryland Ecosystem Functioning: Recent Advances and Lessons Learnt from the U-TURN Project**

Horion, Stéphanie, Verbruggen, Wim, Bernardino, P., Souverijns, N., de Keersmaecker, W., Fensholt, Rasmus, Schurgers, Guy, van de Kerchove, R., Verbeeck, H., Verbesselt, J. & Somers, B., 2021, *IGARSS 2021 - 2021 IEEE International Geoscience and Remote Sensing Symposium, Proceedings*. Institute of Electrical and Electronics Engineers Inc., p. 1394-1397 4 p. (International Geoscience and Remote Sensing Symposium (IGARSS), Vol. 2021-July).

#### **MAPPING SAHELIAN ECOSYSTEM VULNERABILITY TO VEGETATION COLLAPSE: VEGETATION MODEL OPTIMIZATION**

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#### **Sensitivity of Gross Primary Production in Tropical Savannas to Drought Timescales**

Abdi, A., Horion, Stéphanie & Fensholt, Rasmus, 2021. 1 p.

#### **Temporal changes and dynamics of dryland ecosystem variables and their relation to aridity**

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#### **The human–environment nexus and vegetation–rainfall sensitivity in tropical drylands**

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#### **An updated assessment of Ireland's wave energy resource using satellite data assimilation and a revised wave period ratio**

O'connell, R., De Montera, L., Peters, J. L. & Horion, Stéphanie, 1 Nov 2020, In: Renewable Energy. 160, p. 1431-1444 14 p.

### **Thirty Years of Land Cover and Fraction Cover Changes over the Sudano-Sahel Using Landsat Time Series**

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### **Supplementary material to "Contrasting responses of woody and herbaceous vegetation to altered rainfall characteristics in the Sahel"**

Verbruggen, Wim, Schurgers, Guy, Horion, Stéphanie, Ardö, J., Bernardino, P. N., Cappelaere, B., Demarty, J., Fensholt, Rasmus, Kergoat, L., Sibret, T., Tagesson, Håkan Torbern & Verbeeck, H., 2 Jul 2020

### **Global-scale characterization of turning points in arid and semi-arid ecosystems functioning**

Bernardino, P., De Keersmaecker, W., Fensholt, Rasmus, Verbesselt, J., Somers, B. & Horion, Stéphanie, 1 May 2020. 2 p.

### **How global dryland vegetation dynamics relate to changing climatic conditions and anthropogenic dynamics**

Abel, Christin, Horion, Stéphanie, Tagesson, Håkan Torbern, De Keersmaecker, W., Seddon, A. W. R., Abdi, A. M. & Fensholt, Rasmus, 1 May 2020, In: 22nd EGU General Assembly, held online 4-8 May, 2020. 22, 7723.

### **Forest management in southern China generates short term extensive carbon sequestration**

Tong, Xiaowei, Brandt, Martin Stefan, Yue, Y., Ciais, P., Jepsen, Martin Rudbeck, Penuelas, J., Wigneron, J. P., Xiao, X., Song, X. P., Horion, Stéphanie, Rasmussen, Kjeld, Saatchi, S., Fan, L., Wang, K., Zhang, B., Chen, Z., Wang, Y., Li, X. & Fensholt, Rasmus, 2020, In: Nature Communications. 11, 1, 10 p., 129.

### **Global-scale characterization of turning points in arid and semi-arid ecosystem functioning**

Bernardino, P. N., De Keersmaecker, W., Fensholt, Rasmus, Verbesselt, J., Somers, B. & Horion, Stéphanie, 2020, In: Global Ecology and Biogeography. 29, 7, p. 1230-1245 16 p.

### **Recent divergence in the contributions of tropical and boreal forests to the terrestrial carbon sink**

Tagesson, Håkan Torbern, Schurgers, Guy, Horion, Stéphanie, Ciais, P., Tian, F., Brandt, Martin Stefan, Ahlström, A., Wigneron, J., Ardö, J., Olin, S., Fan, L., Wu, Z. & Fensholt, Rasmus, 2020, In: Nature Ecology & Evolution. 4, p. 202-209 8 p.

### **Uncovering Dryland Woody Dynamics Using Optical, Microwave, and Field Data—Prolonged Above-Average Rainfall Paradoxically Contributes to Woody Plant Die-Off in the Western Sahel**

Bernardino, P. N., Brandt, Martin Stefan, De Keersmaecker, W., Horion, Stéphanie, Fensholt, Rasmus, Storms, I., Wigneron, J., Verbesselt, J. & Somers, B., 2020, In: Remote Sensing. 12, 14, 21 p., 2332.

### **Understanding Turning Points in Dryland Ecosystem Functioning (U-TURN)**

Horion, Stéphanie, Bernardino, P., De Keersmaecker, W., Fensholt, Rasmus, Lhermitte, S., Schurgers, Guy, Souverijns, N., Van De Kerchove, R., Verbeeck, H., Verbesselt, J., Verbruggen, Wim & Somers, B., 2020.

### **Ecological engineering projects increased vegetation cover, production, and biomass in semiarid and subhumid Northern China**

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### **Mapping European ecosystem change types in response to land-use change, extreme climate events, and land degradation**

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### **Towards improved remote sensing based monitoring of dryland ecosystem functioning using sequential linear regression slopes (SeRGS)**

Abel, Christin, Horion, Stéphanie, Tagesson, Håkan Torbern, Brandt, Martin Stefan & Fensholt, Rasmus, 2019, In: Remote Sensing of Environment. 224, p. 317-332 16 p.

**Disaggregation of SMOS soil moisture over West Africa using the Temperature and Vegetation Dryness Index based on SEVIRI land surface parameters**

Tagesson, Håkan Torbern, Horion, Stéphanie, Nieto, H., Fornies, V. Z., Gonzalez, G. M., Bulgin, C. E., Ghent, D. & Fensholt, Rasmus, 2018, In: Remote Sensing of Environment. 206, p. 424-441 18 p.

**Drylands under pressure: vegetation modeling of dryland ecosystems in the Sahel**

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**Increased vegetation growth and carbon stock in China karst via ecological engineering**

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**Massively-parallel break detection for satellite data**

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**A new method for large-scale assessment of change in ecosystem functioning in relation to land degradation**

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**Modelling spatial and temporal dynamics of gross primary production in the Sahel from earth-observation-based photosynthetic capacity and quantum efficiency**

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**Assessing European ecosystem stability to drought in the vegetation growing season**

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**Very high CO<sub>2</sub> exchange fluxes at the peak of the rainy season in a West African grazed semi-arid savanna ecosystem**

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**Global-scale mapping of changes in ecosystem functioning from earth observation-based trends in total and recurrent vegetation**

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**Deriving seasonal dynamics in ecosystem properties of semi-arid savanna grasslands from in situ-based hyperspectral reflectance**

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**Evaluating temporal consistency of long-term global NDVI datasets for trend analysis**

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**Optimized extraction of daily bio-optical time series derived from MODIS/Aqua imagery for Lake Tanganyika, Africa**

Horion, Stéphanie, Bergamino, N., Stenuite, S., Descy, J., Plisnier, P., Loisel, S. A. & Cornet, Y., 15 Apr 2010, In: Remote Sensing of Environment. 114, 4, p. 781-791 11 p.

**Spatio-temporal dynamics of phytoplankton and primary production in Lake Tanganyika using a MODIS based bio-optical time series**

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**Limnological variability and pelagic fish abundance (*Stolothrissa tanganyicae* and *Lates stappersii*) in Lake Tanganyika**

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**Spatial aggregation of low resolution satellite data for the monitoring of vegetation response to climatic stresses: Analysis of the spatial heterogeneity of aggregated entities**  
Horion, Stéphanie, Eerens, H., Tychon, B. & Cornet, Y., 1 Jul 2007, In: European Space Agency, (Special Publication) ESA SP. SP-636

## Activities

### **Member of PhD committee, Lund University**

Horion, Stéphanie (Examiner)  
31 Mar 2023

### **Chair of PhD assessment committee, University of Copenhagen**

Horion, Stéphanie (Examiner)  
21 Feb 2023

### **MSc examination, University of Cape Town, Faculty of Science**

Horion, Stéphanie (Examiner)  
17 Feb 2023

### **ETH Zürich, Distance Exam, observer**

Horion, Stéphanie (Examiner)  
9 Feb 2023

### **Chair of PhD assessment committee, University of Copenhagen**

Horion, Stéphanie (Examiner)  
10 May 2022

### **European Geophysical Union (External organisation)**

Horion, Stéphanie (Member)  
1 Jan 2021 → 31 Dec 2080

### **Organization of Remote sensing seminar, IGN, University of Copenhagen**

Horion, Stéphanie (Participant)  
1 Jan 2020 → 31 Dec 2023

### **Land Degradation and Development (Journal)**

Horion, Stéphanie (Editor)  
2018 → ...

## Prizes

### **EGU Young Scientist Outstanding Poster Paper (YSOPP)**

Horion, Stéphanie (Recipient), 2010

### **EMS Tromp Award 2017**

Horion, Stéphanie (Recipient), Jul 2017

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