Daorui Han

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EDUCATION

Ph.D. in Ecology (C-N Management in Agro-ecosystem) **2018.6**
Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences.

M.S. in Ecology (Carbon sequestration in alpine grassland) **2012.6**
Northwest Institute of Plateau Biology, Chinese Academy of Sciences.

B.S. in Ecology **2009.6**
Binzhou University.

CURRENT POSITION

2019.11-present Postdoctoral researcher in School of Geography, South China Normal University, Guangzhou, China.
Content: a) participated in the 'Second Tibetan Plateau Scientific Expedition and Research Program' and conducted organic carbon mapping on the Tibetan plateau; 2) used multiple sourced data estimating SOC changes in China's cropland and detecting changes of the driving factors during the last 40 years.

ADDITIONAL RESEARCH EXPERIENCE

2016.9-2017.11 Visiting PhD student
Participated in a joint PhD student program and visited the NREL lab at Colorado State University. (with Prof. Rich T. Conant)
Content: Learned the Daycent model and used parallel computation and model method to predict regional C or N budgets under different management practices in the North China Plain in China.

2016.3-2016.6 Visiting PhD student
Visited the department of soil science (Lehrstuhl für Bodenkunde) at Technical University of Munich. (TUM, with Dr. Martin Wiesmeie and Prof. I Kogel-Knabner).
Content: Learned the Random Forest model using R and used random forest model to detect the impacts of various environmental factors and management practices on regional soil organic carbon and nitrogen changes for a 30-year period.

PROCESSING ARTICLES

- Xiang Zeng, Zhongmin Hu, Anping Chen, Wenping Yuan, Guolong Hou, **Daorui Han**, Minqi Liang, Kai Di, Ruochen Cao. Recent decline in the sensitivity of vegetation productivity to precipitation across global terrestrial ecosystems. (Second round review)

REVIEWED PUBLICATIONS

2022

- **Han D.**, Hu Z., Wang X., Wang T., Chen A., Weng Q., et al. Shift in controlling factors of carbon stocks across biomes on the Qinghai-Tibetan Plateau. Environ Res Lett 2022;17:074016. https://doi.org/10.1088/1748-9326/ac78f5.
- Cao, R., Huang, H., Wu, G., **Han, D.**, Jiang, Z., Di, K., & Hu, Z. (2022). Spatiotemporal variations in the ratio of transpiration to evapotranspiration and its controlling factors across terrestrial biomes. Agricultural and Forest Meteorology, 321, 108984. https://doi.org/10.1016/j.agrformet.2022.108984

2021

- Liang, M., Cao, R., Di, K., **Han, D.**, & Hu, Z. (2021). Vegetation resistance and resilience to a decade‐long dry period in the temperate grasslands in China. Ecology and Evolution, 11(15), 10582‐10589. https://doi.org/10.1002/ece3.7866

2020

- Jiang, Z-Y, Hu, Z-M, Lai, DYF, **Han,D-R**,…Guo, M-Y. Light grazing facilitates carbon accumulation in subsoil in Chinese grasslands: A meta-analysis. Glob Change Biol. 2020; 26: 7186– 7197. https://doi.org/10.1111/gcb.15326

2018

- **Han, D.**, Wiesmeier, M., Conant, R. T., Kühnel, A., Sun, Z., Kögel-Knabner, I., … Ouyang, Z. (2018). Large soil organic carbon increase due to improved agronomic management in the North China Plain from 1980s to 2010s. Global Change Biology, 24(3): 987-1000. https://doi.org/10.1111/gcb.13898
- Hou, R., Ouyang, Z., Han, D., & Wilson, G. V. (2018). Effects of field experimental warming on wheat root distribution under conventional tillage and no‐tillage systems. Ecology and Evolution, 8(5), 2418-2427. https://doi.org/10.1002/ece3.3864

2017

- Cong, P., Ouyang, Z., Hou, R., & **Han, D**. (2017). Effects of application of microbial fertilizer on aggregation and aggregate-associated carbon in saline soils. Soil and Tillage Research, 168(Supplement C), 33–41. https://doi.org/10.1016/j.still.2016.12.005
- Guo, L., Sun, Z., Ouyang, Z., **Han, D**., & Li, F. (2017). A comparison of soil quality evaluation methods for Fluvisol along the lower Yellow River. CATENA, 152(Supplement C), 135–143. https://doi.org/10.1016/j.catena.2017.01.015

2016

- **Han, D**., Sun, Z., Li, F., Hou, R., Li, J., Ouyang, Z., … Cao, C. (2016). Changes and controlling factors of cropland soil organic carbon in North China Plain over a 30-year period. Plant and Soil, 403(1-2): 437-453. https://doi.org/10.1007/s11104-016-2803-7

2015

- Guo, X., **Han, D.**, Du, Y., Xu, X., Zhang, F., Li, Y., … Cao, G. (2015). Effects of Landuse Change on CH4 Soil-Atmospheric Exchange in Alpine Meadow on the Tibetan Plateau. Polish Journal of Environmental Studies, 24, 1593–1602. https://doi.org/10.15244/pjoes/36181
- Guo, X., Du, Y., Li, J., Liu, S., Han, D., Li, Y., … Cao, G. (2015). Aerobic Methane Emission from Plant: Comparative Study of Different Communities and Plant Species of Alpine Meadow. Polish Journal of Ecology, 63(2), 223–232. https://doi.org/10.3161/15052249PJE2015.63.2.006

2012

- Guo XW, **Han DR**, Du YG, Lin L, Zhang FW, Li YK, Li J, Liu SL, Cao GM. Methane Flux of Dominant Species of Alpine Meadow on the Qinghai-Tibetan Plateau. Journal of Mountain Science, 2012, 04: 470-477. [In Chinese with English abstract]
- Lin L, Li YK, Zhang FW, Guo XW, **Han DR**, Li J, Cao GM. Principal Component Analysis on Alpine *Kobresia humilis* Meadow Degradation Succession in Qinhai-Tibetan Plateau. Chinese Journal of Grassland, 2012,01: 24-30. [In Chinese with English abstract]
- Li YK, Zhang FW, Lin L, Wang X, Cao GM, Guo XW, **Han DR**, Chen GC. Spatiotemporal Variation in Soil Nutrient of *Stipa purpurea* Steppe Fenced in the Qinghai Lake Region. Chin. J. Appl. Environ. Biol., 2012, 01: 23-29. [In Chinese with English abstract]
- Lin L, Zhang FW, Li YK, **Han DR**, Guo XW, Cao GM. The Soil Carbon and Nitrogen Storage and C/N Metrological Characteristics of Chemistry in *Kobresia humilis* Meadow in Degradation Succession Stage. Chinese Journal of Grassland, 2012, 03: 42-47. [In Chinese with English abstract]
- Li J, Du YG, Zhang FW, Guo XW, **Han DR**, Liu SL, Cao GM. Mattic Epipedon Impact on Water Conservation in Alpine Meadow. Acta Agrestia Sinica, 2012, 05: 836-841. [In Chinese with English abstract]
- Lin L, Li YK, Cui Y, Zhang FW, **Han DR**, Guo XW, Li J, Cao GM. Relationship Between Dissolved Nitrogen and Plant Biomass in Qing-Tibet Plateau Typical Vegetation Types. Journal of Mountain Science, 2012, 06: 721-727. [In Chinese with English abstract]
- Du YG, Cui XY, Xu QM , **Han DR**, Guo XW, Cao GM. Spatial Characteristics of Soil Organic Matter and As Content in Source Regions of Yangtze River and Yellow River. Chinese Journal of Grassland, 2012, 05: 24-29. [In Chinese with English abstract]

2011

- **Han DR**, Cao GM, Guo XW, Zhang WF, Li YK, Lin L, Li J, Tang YH, Gu S. The potential of carbon sink in alpine meadow ecosystem on the Qinghai-Tibetan Plateau. Acta Ecologica Sinica, 2011, 31 (24) : 7408-7417. [In Chinese with English abstract]
- Zhang WF, **Han DR**, Guo XW, Li YK, Cao GM. Response of Potential Carbon Sequestration Capacity to Different Land Use Patterns in *Achnatherum splendens*

Grassland in Qinghai-Tibetan Plateau. Acta Bot.Boreal.-Occident.Sin. 2011,09:1866-1872. [In Chinese with English abstract]

- Guo XW, Han DR, Zhang WF, Li YK, Lin L, Li J, Cao GM. The Response of Potential Carbon Sequestration Capacity to Different Land Use Patterns in Alpine Rangeland. ACTA AGRESTIA SINICA, 2011,05: 740-745. [In Chinese with English abstract]

2010

- Lin L, Cao GM, Li YK, Zhang FW, Guo XW, **Han DR**. Effects of Human Activities on Organic Carbon Storage in the *Kobresia humilis* Meadow Ecosystem on the Tibetan Plateau. Acta Ecologica Sinica, 2010, 15: 4012-4018. [In Chinese with English abstract]
- Cao GM, Lin L, Zhang FW, Li YK, **Han DR**, Long RJ. A Review of Maintenance, Loss and Recovery of Stability of Alpine *Kobresia humilis* Meadow on Tibetan Plateau. Pratacultural Science, 2010, 08: 34-38. [In Chinese with English abstract]
- Cao GM, Long RJ, Zhang FW, Li YK, Lin L, Guo XW, **Han DR**, Li J. A Method to Estimate Carbon Storage Potential in Alpine *Kobresia* Meadows on the Qinghai-Tibetan Plateau. Acta Ecologica Sinica, 2010, 23: 6591-6597. [In Chinese with English abstract]

SKILLS

Programming

R, SAS, MS Office VBA, Etc.

R package development

'GWML' package (Geographically weighted local ML, currently only used random forest method) Used for detecting local controlling factors of the independent variables and further to explore the heterogeneity of controlling factors.

Data processing methods:

Machine learning algorithms (Random Forest; Xgboost; ANN, etc.), Principle component analysis, Repeated ANOVA analysis, Factor analysis, Kriging interpolation, Monte Carlo uncertainty analysis, Mann-Kendall trend analysis, etc.

Geochemical analysis methods:

Soil organic carbon/nitrogen/phosphorous analysis; plant root distribution monitoring (root scanner); soil aggregation classification, etc.

TRAINING

2021.10 Participated in the 5th "Geospatial Big Data and Cloud Computation" training course on the theme of 'Deep integration of remote sensing cloud computing and industrial applications in the context of carbon neutrality'. (Online)

2021.5 Joined the 4th training course: New Advances in Land Carbon Cycle Modeling, hosted by Yiqi Luo's lab, Northern Arizona University (Online)

GRANTS

2020-2022 Postdoctoral Science Foundation. 'Soil organic carbon changes of China's cropland over the last 40 years'.

2017.11-2018.7 Hosted the project "Agricultural Revitalization Plan of Nenjiang River Basin in Heilongjiang Province".

Content: 1) investigated the main factors that constrain the sustainability of agriculture in the Heilongjiang Nenjiang River basin. 2) Design and conduct agriculture experiments in the main crops (i.e. maize, rice, potato, soybean, and vegetables) in Heilongjiang province.

Purpose: 1) Tried to explore a sustainable way for agriculture in this area, especially its soil fertility. 2) Formulated agricultural development strategies to comprehensively improve the development of the agricultural industry in the region.

ADDITIONAL ACADEMIC EXPERIENCES

2013.5-2016.6 Participated in "'Bohai Barn' Science and technology demonstration project" from China's Ministry of Science and Technology. (~6,000,000$)

Content: Experiment management and data analysis. Tried to 1) improve soil fertility and crop yield of the low-medium cropland in the coastal plain in the North China Plain (33 000 km^2 in area) to maintain food security in the future; 2) detect soil structure change and SOC formation processes in saline soils; 3) built a systematic method to reduce low-medium fields and enhance production.

Influence: The crop production was largely increased after using our cropland management system. China's vice-Premier Yang-Wang visited our field station.

PRESENTATIONS

2020.11 Daorui Han (2020) 'SOC changes in China's croplands during the last 40 years', 19th ecology congress of China. (remote)

2015.9 Daorui Han (2015) 'changes and controlling factors of soil organic carbon in North China Plain over 30 years', the 8th Japan-China-Korea graduate student forum" in Tsukuba university in Japan.

TEACHING AND STUDENTS ADVISING

2020-present Lecture: 'Global change ecology' at South China Normal University

Mentor two undergraduate students in their dissertations:

1) Jiaming Zeng, bachelor, South China Normal University,

Title: ‘Nitrogen use reduction potential under straw returning in the NCP, China’

2) Zhanyi Lin, bachelor, South China Normal University

Title: ‘Validation on SOC changes based on equivalent soil mass method’