

## Curriculum Vitae (as of Feb-2013)

### PERSONAL DATA

Name: Juri Knjazihhin (Yuri Knyazikhin in journal articles)  
Citizenship: USA  
Office Address: Department of Earth and Environment, College of Art and Sciences,  
Boston University, 675 Commonwealth Avenue, Boston, MA-02215,  
USA.  
Marital Status : Married, two sons.  
Office Telephone: 617-353-8843.  
Email: jknjazi@bu.edu  
Fax: 617-353-8399.  
URL: <http://cliveg.bu.edu/people/jknjazi.html>

### EDUCATION

Ph.D in Physics and Mathematics (1985), Tbilisi, Institute of Numerical Mathematics,  
Georgian Academy of Sciences. Dissertation: The Method of Discrete Ordinates and  
Linear-Algebraic Model of the Radiative Transfer.  
M.S. in Applied Mathematics (1978), Department of Mathematics, Tartu State University,  
Tartu, Estonia.

### EMPLOYMENT

Jan. 2003-present	Research Professor: Department of Geography, Boston University;
Dec. 1996-Dec.2002	Research Associate Professor: Department of Geography, Boston University;
Aug. 1992-Dec. 1996	Senior Lecture/Research Scientist: Institute of Bioclimatology, Georg August University of Göttingen, Germany;
Oct. 1991-Aug. 1992	Alexander von Humboldt Foundation Fellow: Institute of Bioclimatology, Georg August University of Göttingen, Germany;
July 1990-Oct. 1991	Senior Lecture/Research Scientist: Institute of Bioclimatology, Georg August University of Göttingen, Germany;
March 1986-July 1990	Senior Lecturer/Research Scientist: Department of Geophysics, Tartu University, Tartu, Estonia;
July 1978-March 1986	Lecturer /Research Scientist: Laboratory of Space Research, Institute of Astrophysics and Atmospheric Physics, Tartu, Estonia.

## **RESEARCH EXPERIENCE**

Passive and active remote sensing: algorithms, data analyses and the use of data in models  
3D radiative transfer in vegetation canopies, atmosphere and clouds  
Cloud-vegetation interaction  
Ground-based radiation measurements, micro-processes in forests.  
Numerical Mathematics.

## **HONOURS**

EOS MODIS Associate Science Team Member.

EOS MISR Science Team Member.

DoE ARM Science Team Member.

NASA LCLUC Science Team Member

NASA Group Achievement Award for MISR in recognition of outstanding skill, teamwork, and dedication leading to successful development, deployment, and operation of the MISR instrument, science, and data systems that constitute a unique new multi-angle imaging experiment.

NASA Goddard Space Flight Center Group Achievement Award for outstanding team work on the Earth Observing System (EOS) Aqua Mission Team in recognition of the talent, care, energy and devotion that this outstanding team of civil servants, contractors, scientists and academia put into the Aqua Mission.

Research results on cloud drop clustering supported by the NASA Radiation and DoE ARM Programs were highlighted in the FY07 "Our Changing Planet" (annual report of the US Climate Change Science Program).

## **PEER REFEREE**

Journals: Remote Sensing of Environment; Journal of Geophysical Research (Atmospheres); Geophysical Research Letters; IEEE Transactions on Geoscience and Remote Sensing; International Journal of Remote Sensing; Applied Numerical Mathematics, Agricultural and Forest Meteorology, Agronomie; Journal of Theoretical Biology;

Agencies: National Aeronautics and Space Administration, National Science Foundation

## **TEACHING**

GG645: Physical model in remote sensing (1999; 2002; 2004; 2006; 2009; 2012)

## **GRADUATE STUDENT GUIDANCE**

The total number of graduate students advised is 20. They are: Yu Zhang, Yuhong Tian, Nikolai Shabanov, Seth Hoffmann, Yujie Wang, Jiannan Hu, Svetlana Kotchenova, Dong Huang, Wenze Yang, Bin Tan, Sampo Smolander (Finland), Mitchell Schull, Sangram Ganguly, Arindam Samanta, Liang Xu, Pedro Latorre (Spain), Yan Yang, Jian Bi., Sungho Choi, Zhan Li

## CURRENT FUNDED PROJECTS

1. Look-Up-Table Based Approach for the Estimation of Global Leaf Area Index and Fraction of Absorbed PAR from MISR Data. JPL, Knyazikhin, PI, 03-2004 to 03-2013.
2. Study of Shortwave Spectra in Fully 3D Environment: Synergy Between Scanning Radars and Spectral Radiation Measurements, Knyazikhin, PI, NNX12AG03G, NASA, W. Wiscomber, 04-2012 to 03-2015.
3. Modest maintenance of Terra and Aqua MODIS LAI/FPAR products and research for transitioning to the VIIRS era. Myneni, PI; Knyazikhin, Co-PI; NNH09ZDA001N-TERRAQUA, NASA, D. E. Wickland, 202-358-0245, Diane.E.Wickland@nasa.gov, 2011 to 2014.
4. Global LAI/FPAR Earth System Data Records from NPP-VIIRS to Extend the EOS-MODIS Time Series. Myneni, PI; Knyazikhin, Co-PI; NNH10ZDA001N-NPP, NASA, D. E. Wickland, 202-358-0245, Diane.E.Wickland@nasa.gov, 2011 to 2014.

**PUBLICATION SUMMARY:** 100+ peer-reviewed journal articles; 2 books; 5 book chapters  
**ISI CITATION RECORD (Conference Proceedings are not included)**

	<i>1988 through</i>	<b>01/18/2013</b>	<b>02/20/2014</b>
Sum of the times cited		3,682	4,641
Average citation per journal article		41.84	52.15
Average citation per year		153.42	185.64
<b>h-index</b>		31	33

Times cited in Year 2011, 2012 and 2013: 526,563,534

## SCIENTIFIC PUBLICATIONS

(\*indicates publications of PhD or MS students)

1. Latorre-Carmona, P., **Knyazikhin, Y.**, Alonso, L., Moreno, J.F., Pla, F., & Yan, Y. (2014). On Hyperspectral Remote Sensing of Leaf Biophysical Constituents: Decoupling Vegetation Structure and Leaf Optics Using CHRIS-PROBA Data Over Crops in Barrax. *IEEE Geoscience and Remote Sensing Letters*, doi:10.1109/LGRS.2014.2305168
2. Tan, C., Samanta, A., Jin, X., Tong, L., Ma, C., Guo, W., Knyazikhin, Y., & Myneni, R.B. (2013). Using hyperspectral vegetation indices to estimate the fraction of photosynthetically active radiation absorbed by corn canopies. *International Journal of Remote Sensing*, doi: 10.1080/01431161.2013.853143.
3. **Knyazikhin, Y.**, Lewis, P., Disney, M.I., Möttus, M., Rautiainen, M., Stenberg, P., Kaufmann, R.K., Marshak, A., Schull, M.A., Latorre Carmona, P., Vanderbilt, V., Davis, A.B., Baret, F., Jacquemoud, S., Lyapustin, A., Yang, Y., & Myneni, R.B. (2013). Reply to Ollinger et al.: Remote sensing of leaf nitrogen and emergent ecosystem properties. *Proceedings of the National Academy of Sciences*, 110, E2438
4. **Knyazikhin, Y.**, Lewis, P., Disney, M.I., Stenberg, P., Möttus, M., Rautiainen, M., Kaufmann, R.K., Marshak, A., Schull, M.A., Latorre Carmona, P., Vanderbilt, V., Davis, A.B., Baret, F., Jacquemoud, S., Lyapustin, A., Yang, Y., & Myneni, R.B. (2013). Reply to Townsend et al.: Decoupling contributions from canopy structure and leaf optics is critical for remote sensing leaf biochemistry. *Proceedings of the National Academy of Sciences*, 110, E1075
5. **Knyazikhin, Y.**, Schull, M.A., Stenberg, P., Möttus, M., Rautiainen, M., Yang, Y., Marshak, A., Latorre Carmona, P., Kaufmann, R.K., Lewis, P., Disney, M.I., Vanderbilt, V., Davis, A.B., Baret, F., Jacquemoud, S., Lyapustin, A., & Myneni, R.B. (2013). *Hyperspectral remote sensing of foliar nitrogen content. Proceedings of the National Academy of Sciences*, 110, E185-E192.
6. Chiu, J.C., Marshak, A., Huang, C.H., Várnai, T., Hogan, R.J., Giles, D.M., Holben, B.N., O'Connor, E.J., **Knyazikhin, Y.**, & Wiscombe, W.J. (2012). Cloud droplet size and liquid water path retrievals from

- zenith radiance measurements: examples from the Atmospheric Radiation Measurement Program and the Aerosol Robotic Network. *Atmos. Chem. Phys.*, 12, 10313-10329.
7. Ganguly, S., Nemani, R.R., Zhang, G., Hashimoto, H., Milesi, C., Michaelis, A., Wang, W., Votava, P., Samanta, A., Melton, F., Dungan, J.L., Vermote, E., Gao, F., **Knyazikhin, Y.**, & Myneni, R.B. (2012). Generating global Leaf Area Index from Landsat: Algorithm formulation and demonstration. *Remote Sensing of Environment*, doi: 10.1016/j.rse.2011.1010.1032.
  8. Marshak, A., **Knyazikhin, Y.**, Christine Chiu, J., & Wiscombe, W.J. (2012). On spectral invariance of single scattering albedo for water droplets and ice crystals at weakly absorbing wavelengths. *Journal of Quantitative Spectroscopy and Radiative Transfer*, 113, 715-720.
  9. Samanta\*, A., **Knyazikhin, Y.**, Xu, L., Dickinson, R.E., Fu, R., Costa, M.H., Saatchi, S.S., Nemani, R.R., & Myneni, R.B. (2012). Seasonal changes in leaf area of Amazon forests from leaf flushing and abscission. *J. Geophys. Res.*, 117, G01015.
  10. Marshak, A., Knyazikhin, Y., Chiu, J.C., & Wiscombe, W.J. (2011). Spectrally Invariant Approximation within Atmospheric Radiative Transfer. *Journal of the Atmospheric Sciences*, 68, 3094-3111.
  11. Wang, Z., Schaaf, C.B., Lewis, P., **Knyazikhin, Y.**, Schull, M.A., Strahler, A.H., Yao, T., Myneni, R.B., Chopping, M.J., & Blair, B.J. (2011). Retrieval of canopy height using moderate-resolution imaging spectroradiometer (MODIS) data. *Remote Sensing of Environment*, 115, 1595-1601.
  12. Chiu, J.C., Marshak, A., **Knyazikhin, Y.**, & Wiscombe, W.J. (2010). Spectrally-invariant behavior of zenith radiance around cloud edges simulated by radiative transfer. *Atmospheric Chemistry and Physics*, 10, 11295-11303.
  13. Yu, Y., S. Saatchi, L. S. Heath, E. LaPoint, R. Myneni, and **Y. Knyazikhin**, Regional Distribution of Forest Height and Biomass from Multisensor Data Fusion, *J. Geophys. Res- Biogeosciences*, 115, G00E12, doi:10.1029/2009JG000995.
  14. Chiu, J. C., C. Huang, A. Marshak, I. Slutsker, D. M. Giles, B. N. Holben, **Y. Knyazikhin**, and W. J. Wiscombe (2010), Cloud optical depth retrievals from the Aerosol Robotic Network (AERONET) cloud mode observations, *Journal of Geophysical Research-Atmospheres*, 115, D14202, doi:10.1029/2009JD013121.
  15. Samanta, A., Ganguly, S., **Knyazikhin, Y.**, Nemani, R.R., & Myneni, R.B. (2010), Physical climate response to a reduction of anthropogenic climate forcing, *Earth Interaction*, Vol. 14, NO. 7, 1-11.
  16. Samanta, A., S. Ganguly, H. Hashimoto, S. Devadiga, E. Vermote, **Y. Knyazikhin**, R. R. Nemani, and R. B. Myneni (2010), Amazon forests did not green-up during the 2005 drought, *Geophys. Res. Lett.*, 37, L05401, doi:10.1029/2009GL042154.
  17. **Knyazikhin, Y.**, Schull, M.A., Xu, L., Myneni, R.B., and Samanta, A.S. (2010). Canopy spectral invariants, Part 1: A new concept in remote sensing of vegetation. *Journal of Quantitative Spectroscopy & Radiative Transfer*, doi:10.1016/j.jqsrt.2010.06.014.
  18. Schull, M.A., **Knyazikhin, Y.**, Xu, L., Samanta, A., Latorre Carmona, P., Lepine, L., Jenkins, J.P., Ganguly, S., & Myneni, R.B. (2010). Canopy spectral invariants, Part 2: Application to classification of forest types from hyperspectral data. *Journal of Quantitative Spectroscopy & Radiative Transfer*, doi:10.1016/j.jqsrt.2010.06.004.
  19. Marshak, A., **Knyazikhin, Y.**, Chiu, J. C. and Wiscombe, W. J. (2009). Spectral invariant behavior of zenith radiance around cloud edges observed by ARM SWS, *Geophys. Res. Lett.*, 36, L16802, doi:10.1029/2009GL039366.
  20. Chiu, J.C., A. Marshak, Y. Knyazikhin, P. Pilewskie, and W. J. Wiscombe, Physical interpretation of the spectral radiative signature in the transition zone between cloud-free and cloudy regions, *Atmospheric Chemistry and Physics*, Volume 9, Issue 4, 1419-1430, 2009.
  21. Ganguly, S., M. A. Schull, A. Samanta, N. V. Shabanov, C. Milesi, R. R. Nemani, Y. Knyazikhin, R. B. Myneni, Generating Vegetation Leaf Area Index Earth System Data Record from Multiple Sensors. Part 1: Theory, *Remote Sensing of Environment*, 112, 4333-4343, 2008.
  22. Ganguly, S., A. Samanta, M. A. Schull, N. V. Shabanov, C. Milesi, R. R. Nemani, Y. Knyazikhin, R. B. Myneni, Generating Vegetation Leaf Area Index Earth System Data Record from Multiple Sensors. Part 2: Implementation, Analysis and Validation, *Remote Sensing of Environment*, 112, 4318-4332, 2008.
  23. Garrigues, S., R. Lacaze, F. Baret, J. T. Morisette, M. Weiss, J. E. Nickeson, R. Fernandes, S. Plummer, N. V. Shabanov, R. B. Myneni, **Y. Knyazikhin**, and W. Yang, Validation and intercomparison of global Leaf Area Index products derived from remote sensing data, *J. Geophys. Res.*, 113, G02028, doi:10.1029/2007JG000635

24. Dickinson, R.E., L. Zhou, Y. Tian, Q. Liu, T. Lavergne, B. Pinty, C. B. Schaaf, and Y. Knyazikhin (2008). A 3-dimensional Analytic Model for the Scattering of a Spherical Bush, *J. Geophys. Res.*, Volume 113, Issue D20, Article Number: D20113, 2008.
25. Huang\*, D., **Knyazikhin, Y.**, Wang\*, W., Deering, D. W., Stenberg, P., Shabanov, N., & Myneni, R.B. (2008). Stochastic transport theory for investigating the three-dimensional canopy structure from space measurements, *Remote Sens. Environ.*, 112, 35-50, 2008.
26. Schull\*, M. A., S. Ganguly\*, A. Samanta\*, D. Huang\*, N. V. Shabanov, J. Jenkins, J.C. Chiu, A. Marshak, J.B. Blair, R.B. Myneni and **Y. Knyazikhin** (2008) Physical interpretation of the correlation between multi-angle spectral data and canopy height, *Geophys. Res. Lett.*, 34, doi:10.1029/2007GL031143.
27. Shabanov, N.V., D. Huang\*, **Y. Knyazikhin**, R.E. Dickinson, and R.B. Myneni, Stochastic radiative transfer model for mixture of discontinuous vegetation canopies. *J. Quant. Spectroscop. Radiat. Trans.*, 107, 236-262, 2007.
28. Myneni, R.B., Yang\*, W., Nemani, R. R., Huete, A. R., Dickinson, R. E., **Knyazikhin, Y.**, Didan, K., Fu, R., Juárez, R. I. N., Saatchi, S. S., Hashimoto, H., Ichii, K., Shabanov, N. V., Tan\*, B., Ratana, P., Privette, J. L., Morisette, J. T., Vermote, E. F., Roy, D. P., Wolfe, R. E., Friedl, M. A., Running, S. W., Votava, P., El-Saleous, N., Devadiga, S., Su, Y., and Salomonson, V. V. Large Seasonal Swings in Leaf Area of Amazon Rainforests, *PNAS*, 4820-4823, Mar 2007.
29. Hu\*, J., Su\*, Y., Tan\*, B., Huang\*, D., Yang\*, W., Bull, M.A., Martonchik, J.V., Diner, D.J., **Knyazikhin, Y.**, & Myneni, R.B., Analysis of the MISR LAI/FPAR product for spatial and temporal coverage, accuracy and consistency, *Remote Sensing of Environment*, 107, 334-347, Mar 2007.
30. Huang\*, D., Y. Knyazikhin, R. E. Dickinson, M. Rautiainen, P. Stenberg, M. Disney, P. Lewis, A. Cescatti, Y. Tian, W. Verhoef, J. V. Martonchik, and R. B. Myneni, Canopy spectral invariants for remote sensing and model applications, *Remote Sens. Environ.*, 106, 106-122, 2007.
31. Yang\*, V, N.V. Shabanov, D. Huang\*, W. Wang\*, R.E. Dickinson, R.R. Nemani, **Y. Knyazikhin**, and R.B. Myneni, Analysis of Leaf area Index Product from Combination of MODIS and Aqua Data, *Remote Sens. Environ.*, 104, 297-312, 2006.
32. Ahl, D.E., S.T. Gower, S.N. Burrows, N.V. Shabanov, R.B. Myneni, & **Y. Knyazikhin**, Monitoring spring canopy phenology of a deciduous broadleaf forest using MODIS, *Remote Sens. Environ.*, 104: 88-95, 2006.
33. Tan\*, B., Woodcock, C. E., Hu\*, J., Zhang, P., Ozdogan, M., Huang\*, D., Yang\*, W., **Knyazikhin, Y.**, & Myneni, R. B., The impact of geolocation offsets on the local spatial properties of MODIS data: Implications for validation, compositing, and band-to-band registration, *Remote Sens. Environ.*, 105, 98-114, 2006.
34. Chiu, J. C., A. Marshak, **Y. Knyazikhin**, W. J. Wiscombe, H. W. Barker, J. C. Barnard, and Y. Luo (2006), Remote sensing of cloud properties using ground-based measurements of zenith radiance, *J. Geophys. Res.*, 111, D16201, doi:10.1029/2005JD006843.
35. Huang\*, D., W. Yang\*, B. Tan\*, M. Rautiainen, P. Zhang\*, J. Hu\*, N. Shabanov, S. Linder, **Y. Knyazikhin**, & R. B. Myneni, The Importance of Measurement Error for Deriving Accurate Reference Leaf Area Index Maps for Validation of Moderate-Resolution Satellite LAI Products. *IEEE Trans. Geosci. Remote Sens.*, vol. 44, Nr. 7, 1866-1871, July 2006.
36. Yang\*, W., B. Tan\*, D. Huang\*, M. Rautiainen, N.V. Shabanov, Y. Wang\*, J.L. Privette, K.F. Huemmrich, R. Fensholt, I. Sandholt, M. Weiss, D.E. Ahl, S.T. Gower, R.R. Nemani, **Y. Knyazikhin**, & R.B. Myneni (2005). MODIS Leaf Area Index Products: From Validation to Algorithm Improvement. *IEEE Trans. Geosci. Remote Sens.*, vol. 44, No. 7, 1885-1898, July 2006.
37. Yang\*, W., D. Huang\*, B. Tan\*, J. C. Stroeve, N. V. Shabanov, **Y. Knyazikhin**, R. R. Nemani, & R. B. Myneni Analysis of Leaf Area Index and Fraction of PAR Absorbed by Vegetation Products from the Terra MODIS Sensor: 2000-2005. *IEEE Trans. Geosci. Remote Sens.*, vol. 44, No. 7, 1829-1842, 2006.
38. Tan\*, B, Hu\*, J., Huang\*, D., Yang\*, W., Zhang, P., Shabanov, N.V., **Knyazikhin, Y.**, Nemani, R.R., & R.B. Myneni, Assessment of the broadleaf crops Leaf Area Index product from the Terra MODIS instrument, *Agricultural and Forest Meteorology*, , 135, ,124-134, 2005.
39. Huemmrich, K.F., J.L., Privette, M. Mukelabai, R.B., Myneni, **Y. Knyazikhin**, Time-Series Validation of MODIS Land Biophysical Products in a Kalahari Woodland, Africa. *International Journal of Remote sensing*, 26 (19), 4381-4398, 2005.
40. Diner, D.J., Braswell, B.H., Davies, R., Gobron N., Hu, J., Jin, Y., Kahn, R.A., **Knyazikhin, Y.**, Loeb, N., Muller, J.P., Nolin, A.W., Pinty, B., Schaaf, C.B., Seiz, G., & Stroeve, J. The value of multiangle measurements for retrieving structurally and radiatively consistent properties of clouds, aerosols, and surfaces, *Remote Sens. Environ.*, 97, 495-518, 2005.

41. Shabanov, N.V., Kotchenova\*,S., Huang\*, D., Yang\*, W., Tan\*, B., **Knyazikhin, Y.**, Myneni, R.B., Ahl, D.E., Gower, S.T., Huete, A., Aragão, L.E. O.C., and Shimabukuro, Analysis and optimization of the modis leaf area index algorithm retrievals over broadleaf forests, *IEEE Trans. Geosci. Remote Sens.*, vol. 43, No. 8, 1855-1865, Aug 2005.
42. **Knyazikhin, Y.**, A. Marshak, M. Larsen, W. J. Wiscombe, J.V. Martonchik, and R.B. Myneni, Small-scale drop size variability: Impact on Estimation of Cloud Optical Properties, *J. Atmos. Sci.*, Vol. 62, No.7, Part 2, 2555-2567, 2005.
43. Tan\*, B., J. Hu\*, P. Zhang\*, D. Huang\*, N. Shabanov, M. Weiss, **Y. Knyazikhin**, and R. B. Myneni, Validation of MODIS LAI product in croplands of Alpillis, France, *J. Geophys. Res.*, 110, D01107, doi:10.1029/2004JD004860, 2005.
44. Marshak, A., **Y. Knyazikhin**, M. Larsen, and W. J. Wiscombe, Small-scale drop size variability: Empirical models for drop-size-dependent clustering in clouds, *J. Atmos. Sci.*, 62, 551-558, 2005.
45. Tian, Y., R. E. Dickinson, L. Zhou, X. Zeng, Y. Dai, R. B. Myneni, **Y. Knyazikhin**, X. Zhang, M. Friedl, H. Yu, W. Wu, and M. Shaikh, Comparison of seasonal and spatial variations of LAI/FPAR from MODIS and Common Land Model. *J. Geophys. Res.*, 109, D01103, D01103, doi:10.1029/2003JD003777, 2004.
46. Kotchenova\*, S.A., X. Song, N. V. Shabanov, C. S. Potter, **Y. Knyazikhin**, and R. B. Myneni, Lidar remote sensing for modeling gross primary production of deciduous forests, *Remote Sens. Environ.* 92: 158-172, 2004
47. Wang\*, Y., C. E. Woodcock, W. Buermann, P. Stenberg, P. Voipio, H. Smolander, T. Häme, Y. Tian, J. Hu, **Y. Knyazikhin**, R. B. Myneni, Evaluation of the MODIS LAI algorithm at a coniferous forest site in Finland, *Remote Sens. Environ.* 91: 114-127, 2004.
48. Marshak, A., **Y. Knyazikhin**, K.D, Evans, and W.J. Wiscombe, The "RED versus NIR" plane to retrieve broken-cloud optical depth from ground-based measurements, *J. Atmos. Sci.* Vol. 61, No.15, 1911-1925, 2004.
49. Kotchenova\* S.Y., Shabanov, N.V., **Knyazikhin, Y.**, Davis, A.B., Dubayah R., and Myneni, R.B., Modeling lidar with time-dependent stochastic radiative transfer theory for remote estimation of forest structure, *J. Geophys. Res.*, 108, Art. No. 4484, 17539-17549, 2003.
50. Hu\*, J., B. Tan\*, N. Shabanov, K. A. Crean, J. V. Martonchik, D. J. Diner, Y. **Knyazikhin**, and R. B. Myneni, Performance of the MISR LAI and FPAR Algorithm: A Case Study In Africa, *Remote Sens. Environ.* 88: 324-340, 2003.
51. Strub, G., Schaepman, M. E., **Knyazikhin, Y.**, Itten, K. I., Evaluation of Spectrodirectional Alfalfa Canopy Data Acquired During DAISEX'99, *IEEE Trans. Geosci. Remote Sens.*, 41, No. 5, 1034-1042, 2003.
52. Wang\*, Y, W. Buermann\*, P. Stenberg, P. Voipio, H. Smolander, T. Häme, Y. Tian\*, J. Hu\*, **Y. Knyazikhin**, and R. B. Myneni, A New Parameterization of Canopy Spectral Response to Incident Solar Radiation: Case Study with Hyperspectral Data from Pine Dominant Forest, *Remote Sens. Environ.*, 85: 304-315, 2003.
53. Shabanov\*, N.V., Y. Wang\*, W. Buerman\*, J. Dong\*, S. Hoffman\*, G.R. Smith\*, Y. Tian\*, **Y. Knyazikhin**, and R.B. Myneni, Effect of foliage spatial heterogeneity in the MODIS LAI and FPAR algorithm over broadleaf forests, *Remote Sens. Environ.*, 85, 410-423, 2003.
54. Combal, B., Baret, F., Weiss, M., Trubuil, A., Mace, D., Pragnere, A., R.B. Myneni, and **Y. Knyazikhin**. Retrieval of canopy biophysical variables from bi-directional reflectance using prior information to solve the ill-posed problem. *Remote Sems. Environ.*, 84, No. 1, 1-15, 2003.
55. Tian\*, Y., Y. Wang\*, Y. Zhang\*, Y. **Knyazikhin**, J. Bogaert, and Myneni, R. B., Radiative transfer based scaling of LAI/FPAR retrievals from reflectance data of different resolutions. *Remote Sens. Environ.*, 84, No. 1, 143-159, 2003.
56. Tian\*, Y., C. E. Woodcock, Y. Wangv, J. L. Privette, N. V. Shabanov\*, L. Zhou\*, Y. Zhang\*, W. Buermann\*, J. Dong\*, B. Veikkanen, T. Hame, M. Ozdogan, **Y. Knyazikhin**, and R. B. Myneni, Multiscale Analysis and Validation of MODIS LAI Product 1. Uncertainty Assesment, *Remote Sens. Environ.*, 83, No. 3, 414-430, 2002.
57. Tian\*, Y., C. E. Woodcock, Y. Wang\*, J. L. Privette, N. V. Shabanov\*, L. Zhou\*, Y. Zhang\*, W. Buermann\*, J. Dong\*, B. Veikkanen, T. Hame, M. Ozdogan\*, **Y. Knyazikhin**, and R. B. Myneni, Multiscale Analysis and Validation of MODIS LAI Product 2. Usampling Strategy, *Remote Sens. Environ.*, 83, No. 3, 431-441, 2002.
58. **Knyazikhin, Y.**, A. Marshak, W.J. Wiscombe, J. Martonchik, and R.B. Myneni, A missing solution to the tansport equation and its effect on stimation of cloud absorptive properties, *J. Atmos. Sci.*, Vol. 59, No.24, 3572-5385, 2002.

59. Myneni, R.B., Hoffman\*, S., **Knyazikhin, Y.**, Privette, J. L., Glassy, J., Tian\*, Y., Wang\*, Y., Song, X., Zhang\*, Y., Smith\*, G. R., Lotsch\*, A., Friedl, M., Morisette, J. T., Votava, P., Nemani, R. R., and Running, S. W., Global products of vegetation leaf area and fraction absorbed par from year one of MODIS data, *Remote Sems. Environ.*, 83, No. 1-2, 214-231, 2002.
60. Privette, J.L., Myneni, R.B., **Knyazikhin, Y.**, Mukufute, M., Roberts, G., Tian, Y., Wang, Y., and Leblanc, S.G., Early Spatial and Temporal Validation of MODIS LAI Product in Africa, *Remote Sems. Environ.*, 83, No. 1-2, 232-243, 2002.
61. Lyapustin, A., and **Y. Knyazikhin**, Green's function method for the radiative transfer problem. 2. Spatially heterogeneous anisotropic surface, *Applied Optics*, Vol. 41, No. 27, 5600-5606, September 2002.
62. Bogart, J., R.B. Myneni, and **Y. Knyazikhin**, A mathematical comment on the formulae for the aggregation index and the shape index, *Landscape Ecol.*, 17, 87-90, 2002.
63. Shabanov\*, N.V., Zhou\*, **Y. Knyazikhin**, C.J. Tucker, and R.B. Myneni, Analysis of interannual changes in northern vegetation activity observed in AVHRR data during 1981 to 1994, *IEEE Trans. Geosci. Remote Sens.*, 40, 115-130, 2002.
64. Zhang\*, Y., Y. Tian\*, R.B. Myneni, **Y. Knyazikhin**, and C.E. Woodcock, Assessing the information content of multiangle satellite data for mapping biomes. I. Statistical Analysis, *Remote Sems. Environ*, 80, 418-434, 2002.
65. Zhang\*, Y., N. Shabanov\*, **Y. Knyazikhin**, R.B. Myneni, Assessing the information content of multiangle satellite data for mapping biomes. II. Theory, *Remote Sens. Environ*, 80, 435-446, 2002.
66. Wang\*, Y., Tian\*, Y., Zhang\*, Y., El-Saleous, N., **Knyazikhin, Y.**, Vermote, E., and Myneni, R., Investigation of Product Accuracy as a Function of Input and Model Uncertainties: Case Study with SeaWIFS and MODIS LAI/FPAR Algorithm, *Remote Sems. Environ*, 78:296-311, 2001.
67. Lyapustin, A., and **Knyazikhin, Y.**, Green's Function Method for the Radiative Transfer Problem. I. Homogeneous non-Lambertian Surface, *Applied Optics-LP*, 40(21), 3495-3501, July 2001.
68. Panferov, O., **Y. Knyazikhin**, R.B. Myneni, J. Szarzynski, S. Engwald, K. G. Schnitzler, and G. Gravenhorst, The role of canopy structure in the spectral variation of transmission and absorption of solar radiation in vegetation canopies, *IEEE Trans. Geosci. Remote Sens.*, vol. 39, No 2, 241-253, February 2001.
69. Gobron, N., B. Pinty, M. M. Verstraete, J. V. Martonchik, **Y. Knyazikhin**, and D. J. Diner, The potential of multiangular spectral measurements to characterize land surfaces: conceptual approach and exploratory application, *J. Geophys. Res.*, 105, 17539-17549, 2000.
70. Kaufmann, R. K., L. Zhou\*, **Y. Knyazikhin**, N. V. Shabanov\*, R. B. Myneni, and C. J. Tucker, Effect of orbital drift and sensor changes on the time series of AVHRR vegetation index data, *IEEE Trans. Geosci. Remote Sens.*, vol. 38, No. 6, 2584-2597, Nov 2000.
71. Marshak, A., **Y. Knyazikhin**, A. Davis, W. Wiscombe, and P. Pilewskie, Cloud-vegetation interaction: use of Normalized Difference Cloud Index for estimation of cloud optical thickness, *Geophys. Res. Lett.*, vol. 27, No. 12, 1695-1698, June 15 2000.
72. Tian\*, Y., Y. Zhang\*, **Y. Knyazikhin**, D. Dedieu, R.B.Myneni, J.M. Glassy, and S.W. Running, Prototyping of MODIS LAI and FPAR algorithm with LASUR and LANDSAT data, *IEEE Trans. Geosci. Remote Sens.*, vol. 38, No 5, 2387-2401, Sep 2000.
73. Zhang\*, Y., Y. Tian\*, **Y. Knyazikhin**, J. V. Martonchick, D. J. Diner, M. Leroy, and R. B. Myneni, Prototyping of MISR LAI and FPAR algorithm with POLDER data over Africa, *IEEE Trans. Geosci. Remote Sens.*, vol. 38, No 5, 2402-2418, Sep 2000.
74. Kimes, D. **Y. Knyazikhin**, J. Privette, A. Abuelgasim, F. Gao, Inversion methods for physically-based models, *Remote Sens. Environ*, vol. 18, 381-440, 2000.
75. **Knyazikhin, Y.**, and A. Marshak, Mathematical aspects of BRDF modelling: adjoint problem and Green's function, *Remote Sens. Rew*, vol. 18, 263-280, 2000.
76. Shabanov\*, N. V., **Y. Knyazikhin**, F. Baret, and R. B. Myneni, Stochastic modeling of radiation regime in discontinuous vegetation canopy, *Remote Sens. Environ*, 74, 125-144, 2000.
77. Weiss, M., F. Baret, R. B. Myneni, A. Pragnere, and **Y. Knyazikhin**, Investigation of a model inversion technique to estimate canopy biophysical variables from spectral and directional data, *Agronomie*, 20, 3-22, 2000.
78. Gravenhorst, G., **Y. Knyazikhin**, J. Kranigk, G. Mießen, O. Panferov and K.-G. Schnitzler, Göttingen, Is forest albedo measured correctly? *Meteorologische Zeitschrift*, N.F.8, 107-114 (August 1999), Gebrüder Borntraeger, Berlin, Stuttgart 1999.

79. Diner, D. J., G. P. Asner, R. Davies, **Y. Knyazikhin**, J.P. Muller, A. W. Nolin, B. Pinty, C. B. Schaaf, and J. Stroeve, New directions in Earth observing: Scientific application of multi-angle remote sensing, *Bulletin of the American Meteorological Society*, vol. 80, 11, 2209-2228, 1999.
80. Justice, O., E. Vermote, J.R.G. Townshend, R. Defries, D. P. Roy, D.K. Hall., V.V. Salomonson, J. L. Privette, G. Riggs, A. Strahler, W. Lucht, R.B. Myneni, **Y. Knyazikhin**, S. W. Running, R. R. Nemani, Z. Wan., A. R. Heube, W. van Leeuwen, R. E. Wolfe, L. Giglio, J.-P. Muller, P. Lewis, and M. J. Barnsley, The moderate resolution imaging spectroradiometer (MODIS): Land remote sensing for global research, *IEEE Trans. Geosci. Remote Sens.*, vol. 36, Nr. 4, 1228-1249, 1998.
81. **Knyazikhin, Y.**, J.V., Martonchik, R. B. Myneni, D.J. Diner, and S.W. Running, 1998. Synergistic algorithm for estimating vegetation canopy leaf area index and fraction of absorbed photosynthetically active radiation from MODIS and MISR data. *J. Geophys. Res.*, 32257-32276, 1998.
82. **Knyazikhin, Y.**, J.V. Martonchik, D.J.Diner, R.B. Myneni, M.M. Verstraete, B.Pinty, and N. Gobron, 1998. Estimation of vegetation canopy leaf area index and fraction of absorbed photosynthetically active radiation from atmosphere corrected MISR data, *J. Geophys. Res.*, 103(D24), 32239-32256, 1998.
83. **Knyazikhin, Y.**, J. Kranigk, R.B. Myneni, O.Panfyorov, and G.Gravenhorst, Influence of small-scale structure on radiative transfer and photosynthesis in vegetation cover, *J. Geophys. Res.*, 103(D6), 6133-6144, 1998.
84. Martonchik, J.V., D.J.Diner, B.Pinty, M.M.Verstraete, R.B.Myneni, **Y.Knyazikhin**, and H.R.Gordon, Determination of land and ocean reflective, radiative and biophysical properties using multi-angle imaging, *IEEE Trans. Geosci. Remote Sens.*, 36:1266-1281, 1998.
85. **Knyazikhin, Y.**, Miessen, G., Panfyorov, O and Gravenhorst, G., Small-Scale Study of Three-Dimensional Distribution of Photosynthetically Active Radiation in a Forest, *Agric. For. Meteorol.*, 88:215-239, 1997.
86. **Knyazikhin, Y.**, Kranigk, J., Miessen, G., Panfyorov, O, Vygodskaya, N. and Gravenhorst, G., Modelling Three-Dimensional Distribution of Photosynthetically Active Radiation in Sloping Coniferous Stands. *Biomass and Bioenergy*, 11:189-200, 1996.
87. **Knyazikhin, Y.** and Kurth, W., Modelling Morphological Development of Forest Canopy and Radiative Transfer. In: Terrestrial Ecosystem Research Network Germany, Abstracts of key lectures and posters, Part 1: FZW, München, 21.-23.3, 1994.
88. Gravenhorst, G., **Knyazikhin, Y.**, Kranigk, J and Schulze, D., Stahlungsverteilung und bioklimatologische Standortfaktoren in der Langen Bramke (Radiation distribution and site factors in the forest Langen Bramke), *Berichte des Forschungszentrum Waldökosysteme*, Göttingen, Reihe B., 37:421-430, 1994.
89. **Knyazikhin Y.**, Marshak A., Schulze D., Myneni R. and Gravenhorst G., Optimisation of Solar Radiation Input in Forest Canopy as a Tool for Planting Patterns of Trees. *Transport Theory and Statist. Phys.*, 23:671-700, 1994.
90. **Knyasikhin, J.**, Kranigk, J., Panfyorov, O., Mießen, G. and Gravenhorst, G., Modellierung des dreidimensionalen Strahlungsfeldes in Waldbeständen (Modelling the three-dimensional radiative field in forest stands). *Angewandte Landschaftsökologie*.(in German), 1993.
91. **Knyazikhin Y. V.**, Marshak A. L. and Myneni, R. B., Interaction of Photons in a Canopy of Finite Dimensional Leaves. *Remote Sens. Envir.*, 39:61-74, 1992.
92. Roll M., Reinart M. and **Knyazikhin Y.**, Retrieval of Scattering Phase Function from Sky Brightness Distribution Data. *Trans. of Estonian Academy of Sci: Phys. Math.*, 40:279-287, 1991.
93. **Knyazikhin Y. V.**, Marshak A. L. and Myneni, R. B., Interaction between Photons and Leaf Canopies. *Proceedings of IGARS'91, Helsinki University of Technology, Finland:1533-1536*, 1991.
94. Myneni R.B., Marshak A.L. and **Knyazikhin Y. V.**, Transport Theory for a Leaf Canopy of Finite Dimensional Scattering Centers. *J.Quant. Spectrosc. Radiat. Transfer*, 46:259- 280, 1991.
95. Voloschenko A.M., **Knyazikhin Y.**, Shutyaev V.P., A Report at the All-Union Seminar "On the Numerical Methods of Solving the Transport Equation." *Trans. of Estonian Academy of Sci: Phys. Math.*, 40, 1991 (in Russian).
96. Avaste O.A., **Knyazikhin Y.**, Reinart M. On the Determination of the Scattering Indicatrix by Photographic-Photometry Method. *Trans. XIVth Scientific Lecturing on Cosmonautics. Inst. Appl. Math. Acad. Sci. USSR, Moscow*, 1992 (in Russian).
97. Avaste O.A., **Knyazikhin Y.**, Conditional Albedo for Single Scattering. *Trans. of Acad. of Sci. USSR: Atmospheric and Ocean Phys.* 26:594-601 (in Russian, translated into English in 1991, pp. 438-443), 1990.



98. Myneni, R., Marshak, A. and **Knyazikhin, Y.**, Transport Theory for Media with Finite Dimensional Scattering Centers. Proceedings of IGARS'90, Washington, D.C., pp. 1385-1386, 1990.
99. Avaste O.A., **Knyazikhin Y.**, The Inverse Problem of Determining the Scattering Indicatrix. Trans. XIIIth Scientific Lecturing on Cosmonautics. Inst. Appl. Math., Acad. Sci. USSR, Moscow, 1990. (in Russian).
100. **Knyazikhin Y.** On the Solvability of Plane-Parallel Problems in the Theory of Radiation Transport. USSR Computer Maths. and Math. Phys. 30:557-569 (Russian, translated into English in 1991, pp. 145-154), 1990.
101. **Knyazikhin Y.** Seidel Iteration in Transport Theory. Transport Theory and Statist. Phys. 16, 5&6:429-446, 1989.
102. Voloschenko A.M., **Knyazikhin Y.** Shutyaev V.P., A Report on the All-Union Seminar "On the Numerical Methods of Solving the Transport Equation." Trans. of Estonian Academy of Sci: Phys. Math., 38: 231-232, 1989. (in Russian).
103. Avaste O.A., **Knyazikhin Y.**, On the Determination of the Phase Function in the Thick Optical Layers. In: Remote Sensing Aboard the Orbital Complex "SalYt-7-Kosmos-1686-SoYz-T14". Acad. Sci. ESSR, Tartu, Estonia, pp. 124-140, 1989 (in Russian with English abstract).
104. **Knyazikhin Y.**, On a Class of Iteration Methods in Linear Transport Theory. USSR Comp. Maths. and Math. Phys., 28:1321-1331 (Russian, translated into English in 1990, p.27- 34), 1988.
105. Avaste O.A., **Knyazikhin Y.**, Determination of the Scattering Phase Function from Radiation Scattering Measurements. Trans. of Acad. of Sci. USSR: Atmospheric and Ocean Phys. 24: 702-710 (Russian, translated into English in 1989, p.513-518), 1988.
106. **Knyazikhin Y.**, Seidel's Mthod for the Transport Equation with Anisotropic Scattering in  $R^3$ . USSR Computer Math. and Math. Phys. 28: 917-925 (Russian, translated into English in 1989, p.198-205), 1988.
107. **Knyazikhin Y.**, On the Convergence of the Seidel Iterative Method to Solve Operator Equation. Trans. of Estonian Academy of Sci: Phys. Math., 36: 246-250 10 (in Russian with English abstract), 1987.
108. **Knyazikhin Y.**, The Method of the Discrete Ordinates Solution of the Radiative Transfer Equation in the Homogeneous Plane-Parallel Anisotropically Scattered Atmosphere. Part 2. Trans. of Estonian Academy of Sci: Phys. Math., 32: 185-197 10 (in Russian with English abstract), 1983.
109. **Knyazikhin Y.**, The Method of the Discrete Ordinates Solution of the Radiative Transfer Equation in the Homogeneous Plane-Parallel Anisotropically Scattered Atmosphere. Part 1. Trans. of Estonian Academy of Sci: Phys. Math., 31:1-10 (in Russian with English abstract), 1982.
110. **Knyazikhin Y.**, On the Effect of Calculating Errors in Solving the Inverse Problem of Astrophysics for Absorbing Components of the Atmosphere. Trans. of Estonian Academy of Sci: Phys. Math., 30: 239-246 (in Russian with English abstract), 1981.
111. **Knyazikhin Y.**, The Determination of Water Vapour Concentration from the Space Measurements of the Vertical Brightness Profiles of the Atmosphere. Trans. of Estonian Academy of Sci: Phys. Math., 30: 140-145 (in Russian with English abstract), 1981.
112. Avaste O.A., Antyufeev V.S., Vainikko G.M., **Knyazikhin Y.V.** et.al., The Retrieval of Altitude Profile of Water Vapour Concentration from Space Measurements. In: Atmospheric-Optical Phenomena According to the Observations Carried out Aboard the Scientific Orbital Station "Salyut". Tartu: Acad. Sci. ESSR, pp. 91-99 (in Russian with English abstract), 1981.
113. **Knyazikhin Y.**, The Structure of the Solution of Systems of Integral Equations Connected with the Approximate Solution of the Radiative Transfer Problems. Trans. of Tartu Univ., 500: 73-91 (in Russian with English abstract), 1979.

## BOOKS AND CHAPTERS IN EDITED MONOGRAPHS

1. Davis, A.B., and **Y. Knyazikhin**, A Primer in Three-Dimensional Radiative Transfer. In: A. Marshak and A.B. Davis [Eds.], *“Three Dimensional Radiative Transfer in the Cloudy Atmosphere,”* Springer-Verlag, pp. 153-242, 2005.
2. **Knyazikhin, Y.**, A. Marshak, and R.B. Myneni, Three-Dimensional Radiative Transfer in Vegetation Canopies and Cloud-Vegetation Interaction, In: A. Marshak and A.B. Davis [Eds.], *“Three Dimensional Radiative Transfer in the Cloudy Atmosphere,”* Springer-Verlag, pp. 617-652, 2005.
3. Ross, J., **Knyazikhin, Y.**, Kuusk, A., Marshak, A. and Nilson, T., Mathematical Modelling of the Solar Radiation Transfer in Plant Canopies. Gidrometeoizdat, St.Peterburg, 195 pp., 1992 (in Russian with English abstract).
4. **Knyazikhin, Y.**, and A. Marshak, Fundamental Equations of Radiative Transfer in Leaf Canopies and Iterative Methods for their Solution. In: R.B. Myneni and J. Ross [Eds.], *“Photon-Vegetation Interactions: Applications in Plant Physiology and Optical Remote Sensing”*, Springer-Verlag, pp. 9-44, 1991.
5. Myneni, R.B., Marshak, A. and **Knyazikhin, Y.**, Method of Discrete Ordinates. In: R.B. Myneni and J. Ross [Eds.], *“Photon-Vegetation Interactions: Applications in Plant Physiology and Optical Remote Sensing”*, Springer-Verlag, pp.45-100, 1991.
6. **Knyazikhin, Y.**, and A. Marshak, The Method of Discrete Ordinates for the Solution of the Transport Equation (the Algebraic Model, the Rate of Convergence). Valgus, Tallinn, Estonia, 160 pp., 1987 (in Russian).
7. Myneni, R., **Knyazikhin, Y.**, & Shabanov, N. (2011). Leaf Area Index and Fraction of Absorbed PAR Products from Terra and Aqua MODIS Sensors: Analysis, Validation, and Refinement Land Remote Sensing and Global Environmental Change. In B. Ramachandran, C.O. Justice & M.J. Abrams (Eds.), *Land Remote Sensing and Global Environmental Change* (pp. 603-633). New York: Springer.