

CURRICULUM VITAE

NAME

JAN M.H. HENDRICKX, PhD, Ir.

ADDRESS

Department of Earth & Environmental Science
New Mexico Tech, Socorro, NM 87801
phone: (575) 835-5892
fax: (575) 835-6436
email: hendrick@nmt.edu
webpage: www.ees.nmt.edu/hendrickx/

EDUCATION

Ph.D.	1984	New Mexico State University Las Cruces NM, USA Major : Soil Physics Minors : Experimental Statistics, Numerical Methods
M.S.	1975	Agricultural University Wageningen Wageningen, The Netherlands Major : Civil Engineering & Irrigation Minors : Soil Physics, Theoretical Production Ecology
B.S.	1972	Agricultural University Wageningen Wageningen, The Netherlands Major : Civil Engineering & Irrigation

RESEARCH INTERESTS

The process of water and solutes movement through the vadose zone and the application of computer models to this process. Groundwater recharge and contamination in deserts, irrigated lands, and metropolitan areas. The application of remote sensing for determination of actual evapotranspiration and soil moisture. Irrigation and drainage for salinity management. The impact of spatial and temporal variability of soil physical properties on land mine detection sensors. The occurrence and effects of unstable wetting fronts. Use of electromagnetic induction methods for environmental surveys and non-invasive soil water content determination. Energy balance measurements using scintillometry.

AWARDS

Fellow of the Soil Science Society of America (2002)
Fulbright Scholar (2000)

PROFESSIONAL EXPERIENCE

2001 – present	Professor of Hydrology, New Mexico Tech
2003 – present	Adjunct Professor of Civil Engineering, New Mexico Tech
	Teaching of hydrology courses with emphasis on the processes in the vadose zone. Research on topics related to water flow and contaminant movement through the vadose zone in deserts, irrigated lands, and metropolitan areas. Electromagnetic induction techniques. Groundwater recharge. Salt balance of Rio Grande basin using chemical and isotope tracers. Environmental factors impacting detection of land mines. Vadose zone hydrology workshops in different countries in Latin America.
2004 – present	Senior Fellow of Ecology and Resource Management Center of Development Research Rheinische Wilhelm Friedrich University Bonn, Germany
	Soil moisture and actual evapotranspiration from remote sensing in the Volta Basin (Ghana, Burkina Faso) Water and salt management in the Khorzem (Uzbekistan).
1993 - 2001	Associate Professor of Hydrology, New Mexico Tech
1990 - 1993	Assistant Professor of Hydrology Department of Earth and Environmental Science New Mexico Tech Socorro, New Mexico
1988 - 1990	Agrohydrologist and Research Leader International Institute for Land Reclamation and Improvement/ILRI, Wageningen, The Netherlands. (Stationed at the International Waterlogging and Salinity Research Institute, Lahore, Pakistan)
	Simulation and evaluation of water and salt balances in arid regions. Study of drainage design criteria. Management of water quantity and quality in irrigated areas. Managing field and laboratory research.
1985 - 1988	Soil Physicist and Head Department of Soil Physics and Hydrology, Netherlands Soil Survey Institute Wageningen, The Netherlands.
	Study of solute movement in field soils, in particular the effects of unstable wetting fronts on the transport mechanism. Simulation and evaluation of regional soil moisture regimes. Responsible for field research and laboratory of soil physics and hydrology.
1984 - 1985	Research Agricultural Engineer Department of Agricultural Engineering, Texas A&M University College Station, Texas.
	Simulation of infiltration in irrigated and dryland agricultural fields. with finite element model. Research on soil moisture variability.
1981 - 1984	Research Assistant of Soil Physics New Mexico State University, Las Cruces, New Mexico

Spatial variability of soil water tension and soil water content. Water use of trickle irrigated chile peppers. Water balance along a transect in the Chihuahuan desert.

1979 - 1981

Irrigation Engineer and Research Leader
Department of Civil Engineering and Irrigation, Agricultural University
Wageningen, The Netherlands.
(Stationed at the Office du Niger, Segou, Mali, West-Africa)

Determination of water requirements for rice and sugarcane. Evaluation of furrow irrigation systems for sugarcane. Development of drainage design criteria for irrigated rice fields.

1978 - 1979

Irrigation and Drainage Engineer
Agrar und Hydrotechnik GmbH, Essen, Germany.

Consulting engineer. Different tasks: rainfall analysis for coastal region in Lybia, design of irrigation and drainage schemes. Use of areal photographs. Determination of peak runoff from 328 square km catchment area. Design and economic evaluation of flood protection dam and diversion drain. Survey of river transect.

1976 - 1978

Irrigation Engineer and OXFAM Volunteer
Program for the Application of Appropriate Technology - OXFAM
Campina Grande, Paraiba, Brazil.

Design of inexpensive trickle irrigation systems with wind powered water supply. Design criteria for rainwater harvesting cisterns for semi-arid northeastern Brazil.

1975 - 1976

Instructor, Department of Civil Engineering and Irrigation, Agricultural University Wageningen, Wageningen, The Netherlands

Teaching and evaluation of project based courses in irrigation engineering. Research on drip irrigation.

1973

Research Assistant
Institute for Land and Water Management Wageningen, The Netherlands

Investigation of compaction of sand soil during wetting.

1972

Research Assistant
Agricultural Experiment Station, Paramaribo, Suriname (South America)

Investigation of the effect of soil compaction on yield of soja beans. Design of experimental sprinkler systems with high uniformity of water application.

TEACHING

Graduate Courses at New Mexico Tech

Vadose Zone Hydrology

Physical processes governing fluid, vapor, and solute movement between the land surface and the water table. Determination of soil physical properties in the laboratory and the field. Measurement of soil water content and soil water tension. Spatial variability of soil properties. Unsaturated/saturated flow models. Multiphase flow.

Introduction to Remote Sensing

An introduction to the environmental physics relevant for the analysis of remote sensing images. Use of the software package ERDAS-IMAGINE.

Groundwater Hydrology

Fundamentals of groundwater hydrology. The hydrologic cycle, Darcy's law, aquifer parameters, steady and transient flow equations, well hydraulics, elementary multi-phase flow, groundwater recharge, watershed hydrology, geologic controls on groundwater flow, well construction, and groundwater chemistry and pollution.

Flow and Transport in Hydrologic Systems

Principles of flow and transport in groundwater aquifers, the vadose zone, and surface water bodies. Mass, momentum, and energy conservation. Storage, compressibility, capillarity, and Darcy's law in porous media. Single phase, two phase and Richard's equations approaches to flow in porous media. Flow in fractures and streams. Transport of non-reactive chemical species.

Hydrogeology

Case studies of hydrogeology presented by researchers and practitioners.

Surface Water Hydrology

Hydrologic cycle. Energy balance and water balance of watershed. Infiltration and runoff. Stream flow. Interaction between ground – and surface-water.

Quantitative Methods in Hydrology

Introduction to the methods of mathematical physics used in hydrologic science. Presented in the context of mathematical models of water and energy balances, fluid flow, and heat & solute transport. Application to aquifers, the vadose zone,

land-surface runoff, rivers, and the atmospheric boundary layer. Programming

with Matlab.

Atmospheric Dynamics, Rainfall Processes and Evapotranspiration

Principles of atmospheric processes with an emphasis on rainfall generation. Convection, orographic controls on precipitation, cyclogenesis and frontal storms. Environmental physics of evapotranspiration.

Graduate course at New Mexico State University

Soil Physics

Graduate and undergraduate courses at Agricultural University Wageningen

Land and Water Resources Management

Workshops on Vadose Zone Hydrology and Groundwater Contamination in Mexico, Colombia, Panama, and Venezuela (in Spanish).

PROFESSIONAL SERVICES

Memberships: ■ American Geophysical Union

- Soil Science Society of America
- National Ground Water Association
- American Society of Agricultural Engineers
- Asociación Latinoamericana de Hidrología Subterránea para el Desarrollo
- International Soil Science Society
- Royal Society of Agricultural Science of The Netherlands
- Gamma Sigma Delta, Phi Kappa Phi

Offices:

Organizer:	One-week International CUAHSI Workshop “Scintillometry for Validation and Calibration of Remote Sensing ET Algorithms: A Hands-On Workshop”. With Dr. Jan Kleissl. October 12-16, 2009.
Associate Editor	Soil Science Society of America Journal, Div. Soil Physics. 1993-1999.
Adjunct Professor Adjunct Professor	Faculty of Engineering, Autonomous University of Chihuahua, Chih., Mexico. Department of Agronomy and Horticulture, New Mexico State University, Las Cruces.
Member:	Committee on International Education at New Mexico Tech. 1992-present.
Participant:	Binational Committee for the Investigation of the Future of the Aquifer of Mexico City. 1992-1993.
Member:	UNESCO/IAH Project "Aquifer recharge in semi-arid areas". 1992-1996.
Organizer:	One-day Symposium “Use of noninvasive techniques for evaluating parameters in unsaturated systems”, AGU, San Francisco, dec. 1997. With Dr. B. Scanlon.
Organizer:	One-day Symposium "Non-Invasive Methods for Vadose Zone Characterization", Annual Soil Science Society of America Meeting, Cincinnati, OH. 1994
Member:	Task group 'Soils' of Dutch National Council for Agricultural Research 1986-1989
Member:	Dutch National Coordination Committee for Research on Water Resources Management. 1986-1988
Member:	Education Board of the Department of Civil Engineering and Irrigation, Agricultural University Wageningen. 1973-1976
Treasurer:	Agricultural Student Association of Wageningen. 1968-1969

LANGUAGES

Speaking:	Dutch, English, Spanish, German, French, Portuguese
Reading:	Dutch, English, Spanish, French, German, Portuguese
Writing:	Dutch, English, Spanish, French, German

COMPUTER SCIENCE

Languages:	FORTRAN, CSMP, APL
Packages:	SAS, Mathlab, Minitab, ERDAS Imagine

Models: HYDRUS1D, HYDRUS2D, SWAT, WORM, CXTFIT, FLOWPATH

REFEREED PUBLICATIONS IN SCIENTIFIC JOURNALS AND BOOKS

1. Saddiq, M.H., J.M.H. Hendrickx, P.J. Wierenga, and M.Y. Hussain. 1985. Spatial variability of soil water tension in an irrigated soil. *Soil Science* 140:126-132.
2. Wierenga, P.J., and J.M.H. Hendrickx. 1985. Yield and quality of drip irrigated chile peppers. *Agric. Water Managem.* 9:339-356.
3. Hendrickx, J.M.H., N.H. Vink, and T. Fayinke. 1986a. Water requirement for irrigated rice in a semi-arid region in West Africa. *Agric. Water Managem.* 11:75-90.
4. Hendrickx, J.M.H., P.J. Wierenga, M.S. Nash, and D.R. Nielsen. 1986b. Boundary location from texture, soil moisture, and infiltration data. *Soil Sci. Soc. Am. J.* 50:1515-1520.
5. Wierenga, P.J., J.M.H. Hendrickx, M.H. Nash, L. Daugherty, and J. Ludwing. 1987. Variation of soil and vegetation with distance along a transect in the Chihuahuan desert. *J. of Arid Environm.* 13:53-63.
6. Bannink, M.H., J.M.H. Hendrickx, and B.J. Bles. 1988. Quantitative evaluation of large areas in respect of vulnerability to moisture deficit. *Soil Survey and Land Evaluation* 8:47-63.
7. Hendrickx, J.M.H., L.W. Dekker, M.H. Bannink, and H.C.v. Ommen. 1988a. Significance of soil survey for agrohydrological studies. *Agric. Water Managem.* 14:195-208.
8. Hendrickx, J.M.H., L.W. Dekker, and P.A.C. Raats. 1988b. Formation of sand columns caused by unstable wetting fronts. *Grondboor en Hamer* 6:173-175.
9. Hendrickx, J.M.H., P.J. Wierenga, and N.S. Urquhart. 1988c. Optimal design of field experiments for determination of production functions. *Soil Sci. Soc. Am. J.* 52:494-499.
10. Vroon, H.R.J., L.W. Dekker, and J.M.H. Hendrickx. 1988. A method for measuring hydraulic properties of brittle soil horizons. *Soil Sci. Soc. Am. J.* 52:292-295.
11. Bannink, M.H., L.W. Dekker, J.M.H. Hendrickx, and H.C.v. Ommen. 1989. Seepage through moorland pool bottoms. A sensitivity analysis. *H2O* 22:456-459,464.
12. Van Ommen, H.C., R. Dijksma, J.M.H. Hendrickx, L.W. Dekker, J. Hulshof, and M.v.d. Heuvel. 1989. Experimental assessment of preferential flow paths in a field soil. *J. of Hydrology* 105:253-262.
13. Hendrickx, J.M.H. 1990. Determination of hydraulic soil properties Chapter 3, p. 42-93, *In* M. G. Anderson and T. P. Burt, eds. *Process studies in hillslope hydrology*. John Wiley and Sons.
14. Hendrickx, J.M.H., and P.J. Wierenga. 1990. Variability of soil water tension in a trickle-irrigated chile pepper field. *Irr. Science* 11:23-30.
15. Hendrickx, J.M.H., P.J. Wierenga, and M.S. Nash. 1990. Variability of soil water tension and soil water content. *Agric. Water Managem.* 18:135-148.
16. Van Dam, J.C., J.M.H. Hendrickx, H.C.v. Ommen, M.H. Bannink, M.T.v. Genuchten, and L.W. Dekker. 1990. Water and solute movement in a coarse-textured water-repellent field soil. *J. of Hydrology* 120:359-379.
17. Hendrickx, J.M.H., and L.W. Dekker. 1991. Experimental evidence of unstable wetting fronts in homogeneous non-layered soils, p. 22-31, *In* T. J. Gish and A. Shiromohammadi, eds. *ASAE National Symposium on Preferential Flow*, Chicago IL.
18. Hendrickx, J.M.H., S. Khan, M.H. Bannink, D. Birch, and C. Kidd. 1991a. Numerical analysis of groundwater recharge through stony soils using limited data. *J. of Hydrology* 127:173-192.
19. Hendrickx, J.M.H., F.M. Phillips, J.L. Wilson, and R.S. Bowman. 1991b. The vadose zone: an educational frontier in hydrology, p. 285-294 *Proc. Intern. Symposium on Hydrology and Water Resources Education and Training: The Challenges to meet at the turn of the XX1 Century*. Water Resources Publications, Littleton, CO, Chihuahua, Mexico.
20. Hendrickx, J.M.H., C.R. Ritzema, L.W. Dekker, O.H. Boersma, W. Hamminga, and J.W.H.v.d. Kolk. 1991c. Volumetric sampling with an improved soil-core sampler. *Soil Sci. Soc. Am. J.* 55:1792-1795.
21. Dekker, L.W., and J.M.H. Hendrickx. 1992. Columns, cones, and toadstools of sand. *Duin* 15:19-21.
22. Hendrickx, J.M.H. 1992. Book Review of *Groundwater Recharge. A guide to understanding and estimating natural recharge* by David N. Lerner, Arie S. Issar, and Ian Simmers. *J. of Environmental Quality* 21:512.
23. Hendrickx, J.M.H., B. Baerends, Z.I. Raza, M. Sadiq, and M.A. Chaudhry. 1992. Soil salinity assessment by electromagnetic induction on irrigated land. *Soil Sci. Soc. Am. J.* 56:1933-1941.
24. Hendrickx, J.M.H., L.W. Dekker, and O.H. Boersma. 1993. Unstable wetting fronts in water repellent field soils. *J. of Environmental Quality* 22:109-118.
25. Ritsema, C.J., L.W. Dekker, J.M.H. Hendrickx, and W. Hamminga. 1993. Preferential flow mechanism in a water repellent sandy soil. *WATER RESOURCES RESEARCH* 29:2183-2194.
26. Hendrickx, J.M.H., C.D. Grande, B.A. Buchanan, and R.E. Bretz. 1994a. Electromagnetic induction for restoration of saline environments in New Mexico. Chapter 13, p. 247-265, *In* R. K. Bhada, et al., eds.

- Waste-management: From Risk to Remediation, Vol. 1. ECM Press, Albuquerque, New Mexico.
27. Hendrickx, J.M.H., J.L. Nieber, and P. Siccama. 1994b. Effect of tensiometer cup size on soil water tension variability. *Soil Science Society of America Journal* 58:309-315.
 28. Hendrickx, J.M.H., and F.M. Phillips. 1994. Book Review of *Water Resources in the Arid Realm* by Clive Agnew and Ewan Anderson. *Journal of Geological Education* 42:294-295.
 29. Sheets, K.R., J.P. Taylor, and J.M.H. Hendrickx. 1994. Rapid salinity mapping by electromagnetic induction for determining riparian restoration potential. *Restoration Ecology* 2:242-246.
 30. Sheets, K.R., and J.M.H. Hendrickx. 1995. Non-invasive soil water content measurement using electromagnetic induction. *WATER RESOURCES RESEARCH* 31:2401-2409.
 31. Hendrickx, J.M.H., and T. Yao. 1996. Prediction of wetting front stability in dry field soils using soil and precipitation data. *Geoderma* 70:265-280.
 32. Yao, T., and J.M.H. Hendrickx. 1996. Stability of wetting fronts in homogeneous soils under low infiltration rates. *Soil Science Society of America Journal* 60:20-28.
 33. Borchers, B., T. Uram, and J.M.H. Hendrickx. 1997. Tikhonov regularization for determination of depth profiles of electrical conductivity using non-invasive electromagnetic induction measurements. *Soil Science Society of America Journal* 61:1004-1009.
 34. Hendrickx, J.M.H., and G. Walker. 1997. Chapter 2 Recharge from precipitation, p. 19-114, *In* I. Simmers, ed. *Recharge of phreatic aquifers in (semi)-arid areas*. Balkema, Rotterdam, The Netherlands.
 35. Mohanty, B.P., R.S. Bowman, J.M.H. Hendrickx, and M.T.v. Genuchten. 1997. New piecewise-continuous hydraulic functions for modeling preferential flow in an intermittent-flood irrigated field. *WATER RESOURCES RESEARCH* 33:2049-2064.
 36. Mohanty, B.P., R.S. Bowman, J.M.H. Hendrickx, J. Simunek, and M.T.v. Genuchten. 1998. Preferential transport of nitrate to a tile drain in an intermittent flood irrigated field: model development and experimental evaluation. *WATER RESOURCES RESEARCH* 34:1061-1076.
 37. Hopmans, J.W., J.M.H. Hendrickx, and J.S. Selker. 1999. Emerging measurement techniques for vadose zone characterization, p. 279-317, *In* M. B. Parlange and J. W. Hopmans, eds. *Vadose Zone Hydrology: cutting across disciplines*. Oxford University Press, New York.
 38. Jaramillo, D.F., L.W. Dekker, C.J. Ritsema, and J.M.H. Hendrickx. 2000. Occurrence of soil water repellency in arid and humid climates. *J. of Hydrology* 231/232:105-114.
 39. Das, B.S., J.M.H. Hendrickx, and B. Borchers. 2001. Modeling transient water distributions around landmines in bare soils. *Soil Science* 166:163-173.
 40. Du, X.H., T. Yao, W.D. Stone, and J.M.H. Hendrickx. 2001. Stability analysis of the unsaturated water flow equation: 1. Mathematical derivation. *WATER RESOURCES RESEARCH* 37:1869-1875.
 41. Hendrickx, J.M.H., and M. Flury. 2001. Uniform and preferential flow mechanisms in the vadose zone, p. 149-187, *In* D. A. Feary, ed. *Conceptual models of flow and transport in the fractured vadose zone*. National Research Council, National Academy Press, Washington, D.C.
 42. Yao, T., and J.M.H. Hendrickx. 2001. Stability analysis of the unsaturated water flow equation: 2. Experimental Verification. *WATER RESOURCES RESEARCH* 37:1875-1881.
 43. Hendrickx, J.M.H., B. Borchers, D.L. Corwin, S.M. Lesch, A.C. Hilgendorf, and J. Schlue. 2002a. Inversion of soil conductivity profiles from electromagnetic induction measurements: theory and experimental verification. *Soil Science Society of America Journal* 66:673-685.
 44. Hendrickx, J.M.H., and R.G. Kachanoski. 2002. Nonintrusive electromagnetic induction, p. 1301-1310, *In* J. Dane and C. Topp, eds. *Methods of soil analysis. Part 1*. Soil Science Society of America Madison, Wisconsin.
 45. Hendrickx, J.M.H., J. Wraith, R.G. Kachanoski, and D.L. Corwin. 2002b. Solute content and concentration, p. 1253-1322, *In* J. Dane and C. Topp, eds. *Methods of soil analysis. Part 1*. Soil Science Society of America Madison, Wisconsin.
 46. Kachanoski, R.G., E. De Jong, and J.M.H. Hendrickx. 2002. Nonintrusive water content measurement in the field, p. 497-501, *In* J. Dane and C. Topp, eds. *Methods of soil analysis. Part 1*. Soil Science Society of America Madison, Wisconsin.
 47. Hendrickx, J.M.H., S.-H. Hong, T. Miller, B. Borchers, and J.B. Rhebergen. 2003a. Soil effects on ground penetrating radar (GPR) detection of buried non-metallic mines., p. 191-198, *In* C. S. Bristow and H. M. Jol, eds. *Ground Penetrating Radar: Applications in Sedimentology*, Vol. 211. Geological Society, London, U.K.
 48. Hendrickx, J.M.H., F.M. Phillips, and J.B.J. Harrison. 2003b. Chapter 5. Water flow processes in arid and semi-arid vadose zones, p. 151-210, *In* I. Simmers, ed. *Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones*, Vol. 23. A.A. Balkema Publishers, Lisse, The Netherlands.

49. Moayyad, B., S.A. Bawazir, J.P. King, S.-h. Hong, and J.M.H. Hendrickx. 2003a. Groundwater depth and arid zone riparian evapotranspiration, p. 188-195, *In* I. Simmers, ed. Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones, Vol. 23. A.A. Balkema Publishers, Lisse, The Netherlands.
50. Moayyad, B., S.A. Bawazir, J.P. King, S. Hong, and J.M.H. Hendrickx. 2003b. Groundwater depth and arid zone riparian evapotranspiration, p. 188-195, *In* I. Simmers, ed. Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones, Vol. 23. A.A. Balkema Publishers, Lisse, The Netherlands.
51. Phillips, F.M., J. Hogan, S. Mills, and J.M.M. Hendrickx. 2003. Environmental tracers applied to quantifying causes of salinity in arid-region rivers: Preliminary results from the Rio Grande, southwestern USA, p. 327-334, *In* A. S. Alsharhan and W. W. Wood, eds. Water Resource Perspectives: Evaluation, Management, and Policy. Elsevier Science, Amsterdam.
52. Rodríguez-Marín, G., J.B.J. Harrison, J. Simunek, and J.M.H. Hendrickx. 2003. Simulation of water flow through indurated calcic horizons, p. 182-188, *In* I. Simmers, ed. Understanding water in a dry environment. Hydrological processes in arid and semi-arid zones, Vol. 23. A.A. Balkema Publishers, Lisse, The Netherlands.
53. Hall, L.M., J.R. Brainard, R.S. Bowman, and J.M.H. Hendrickx. 2004. Determination of Solute Distributions in the Vadose Zone Using Downhole Electromagnetic Induction. *Vadose Zone Journal*. 3:1207-1214.
54. Miller, T.W., J.M.H. Hendrickx, and B. Borchers. 2004. Radar detection of buried landmines in field soils. *Vadose Zone J* 3:1116-1127.
55. Zhou, X., H. Xie, and J.M.H. Hendrickx. 2004. Statistical evaluation of remotely sensed snow-cover products with constraints from streamflow and SNOTEL measurements. *Remote Sensing of Environment* 94:214-231.
56. Calvo Gobbeti, L.E., F.L. Ogden, and J.M.H. Hendrickx. 2005. Infiltration in the Upper Rio Chagres basin, Panama: The soil conservation service "curve numbers", p. 139-148, *In* R. S. Harmon, ed. The Rio Chagres: A multidisciplinary profile of a tropical watershed, Vol. 52. Springer, Dordrecht, The Netherlands.
57. Harrison, J.B.J., J.M.H. Hendrickx, D. Vega, and L.E.C. Gobbeti. 2005. Soils of the Upper Rio Chagres Basin, Panama: soil character and variability in two first order drainages, p. 97-112, *In* R. S. Harmon, ed. The Rio Chagres: A multidisciplinary profile of a tropical watershed, Vol. 52. Springer, Dordrecht, The Netherlands.
58. Hendrickx, J.M.H., W.G.M. Bastiaanssen, E.J.M. Noordman, S. Hong, and L.E. Calvo Gobbeti. 2005a. Estimation of regional actual evapotranspiration in the Panama Canal watershed, p. 315-324, *In* R. S. Harmon, ed. The Rio Chagres: A multidisciplinary profile of a tropical watershed, Vol. 52. Springer, Dordrecht, The Netherlands.
59. Hendrickx, J.M.H., G. Rodríguez-Marín, R.T. Hicks, and J. Simunek. 2005b. Modeling study of produced water release scenarios American Petroleum Institute Publishing Services.
60. Hendrickx, J.M.H., D. Vega, J.B.J. Harrison, P. Rojas, L.E.C. Gobbeti, and T.W. Miller. 2005c. Hydrology of hillslope soils in the Upper Rio Chagres watershed, Panama, p. 113-138, *In* R. S. Harmon, ed. The Rio Chagres: A multidisciplinary profile of a tropical watershed, Vol. 52. Springer, Dordrecht, The Netherlands.
61. Van Dam, R.L., B. Borchers, and J.M.H. Hendrickx. 2005. Strength of landmine signatures under different soil conditions: implications for sensor fusion. *International Journal of Systems Science* 36:573-588 DOI: 10.1080/00207720500147800
62. Xie, H., X. Zhou, E.R. Vivoni, J.M.H. Hendrickx, and E.E. Small. 2005. GIS-based NEXRAD Stage III precipitation database: automated approaches for data processing and visualization. *Computers & Geosciences* 31:65-76.
63. Hendrickx, J.M.H., N. Alkov, S.-h. Hong, R.L. Van Dam, J. Kleissl, H. Shannon, J. Meason, B. Borchers, and R.S. Harmon. 2006a. New Mexico Tech landmine, UXO, IED detection sensor test facility: measurements in real field soils. *Proc. International Society for Optical Engineering*, SPIE 6217:278-289.
64. Hendrickx, J.M.H., S.-h. Hong, J. Friesen, H. Compaore, N.C. van de Giesen, C. Rodgers, and P.L.G. Vlek. 2006b. Mapping energy balance fluxes and root zone soil moisture in the White Volta Basin using optical imagery. *Proc. International Society for Optical Engineering*, SPIE 6239:238-249.
65. Van Dam, R.L., J.B.J. Harrison, C.L. Rittel, J.M.H. Hendrickx, and B. Borchers. 2006a. Magnetic soil properties at two arid to semi-arid sites in the Western United States. *Proc. International Society for Optical Engineering*, SPIE 6217:205-215.
66. Van Dam, R.L., J.M.H. Hendrickx, and B. Borchers. 2006b. Effect of magnetite on GPR for detection of buried

- landmines. Proc. International Society for Optical Engineering, SPIE 6217:172-181.
67. Xie, H., X. Zhou, J.M.H. Hendrickx, E. Vivoni, H. Guan, Y. Tian, and E. Small. 2006. Evaluation of NEXRAD Stage III precipitation data over a semiarid region. *Journal of the American Water Resources Association* 42:1-20.
 68. Hendrickx, J.M.H., J. Kleissl, J.D. Gómez-Vélez, S.-h. Hong, J.R. Fábrega-Duque, D. Vega, H.A. Moreno-Ramírez, and F.L. Ogden. 2007. Scintillometer networks for calibration and validation of energy balance and soil moisture remote sensing algorithms. Proc. International Society for Optical Engineering, SPIE 6565:65650W.
 69. Hogan, J.F., F.M. Phillips, S.K. Mills, J.M.H. Hendrickx, J. Ruiz, J.T. Chesley, and Y. Asmerom. 2007. Geologic origins of salinization in a semi-arid river: the role of sedimentary basin brines. *Geology* 35:1063-1066 doi: 10.1130/G23976A.1.
 70. Kleissl, J., H. Moreno, J.M.H. Hendrickx, and J. Simunek. 2007. HYDRUS simulations of soil surface temperatures. Proc. International Society for Optical Engineering, SPIE 6553:65530W 1-12.
 71. Akramkhanov, A., R. Sommer, C. Martius, J.M.H. Hendrickx, and P.L.G. Vlek. 2008. Comparison and sensitivity of measurement techniques for spatial distribution of soil salinity. *Irrigation and Drainage Systems* 22:115-126 DOI 10.1007/s10795-008-9043-9.
 72. Allen, R.G., J.M.H. Hendrickx, D. Toll, M. Anderson, W. Kustas, and J. Kleissl. 2008a. From high overhead: ET measurement from remote sensing. *Southwest Hydrology* 7:30-32.
 73. Allen, R.G., M. Tasumi, R. Trezza, C.W. Robison, M. Garcia, D. Toll, K. Arsenault, J.M.H. Hendrickx, and J. Kjaersgaard. 2008b. Comparison of evapotranspiration images derived from MODIS and Landsat along the Middle Rio Grande ASCE-EWRI Conference ASCE, Hawaii.
 74. Compaoré, H., J.M.H. Hendrickx, S.-h. Hong, J. Friesen, N.C. van de Giesen, C. Rodgers, J. Szarzynski, and P.L.G. Vlek. 2008. Evaporation mapping at two scales using optical imagery in the White Volta Basin, Upper East Ghana *Physics and Chemistry of the Earth, Parts A/B/C* 33:127-140, doi:10.1016/j.pce.2007.04.021.
 75. Friesen, J., C. Rodgers, P.G. Oguntunde, J.M.H. Hendrickx, and N.v.d. Giesen. 2008. Hydrotape-based protocol to determine average soil moisture over large areas for satellite calibration and validation - With results from an observation campaign in the Volta Basin, West Africa. *IEEE Transactions on Geoscience and Remote Sensing* 46:1995 - 2004 DOI 10.1109/TGRS.2008.916638.
 76. Hendrickx, J.M.H., A. Molina, D. Diaz, M. Grasmueck, H.A. Moreno, and R.D. Hernández. 2008c. Humanitarian IED clearance in Colombia. Proc. International Society for Optical Engineering, SPIE 6953:69530C DOI: 10.1117/12.782303.
 77. Hendrickx, J.M.H., H. Xie, J.B.J. Harrison, B. Borchers, and J. Simunek. 2008d. Global prediction of thermal soil regimes. Proc. International Society for Optical Engineering, SPIE 6953:69530Y DOI: 10.1117/12.782251.
 78. Kleissl, J., J. Gomez, S.-H. Hong, J.M.H. Hendrickx, T. Rahn, and W.L. Defoor. 2008. Large aperture scintillometer intercomparison study. *Boundary Layer Meteorol.* 128:133–150, DOI 10.1007/s10546-008-9274-1.
 79. van Dam, R.L., J.M.H. Hendrickx, J.B.J. Harrison, and R.S. Harmon. 2008. Towards a model for predicting magnetic susceptibility of bedrock regolith and soils. Proc. International Society for Optical Engineering, SPIE 6953:69530Z DOI: 10.1117/12.777861.
 80. Hendrickx, J.M.H., N.R. Pradhan, S.-h. Hong, F.L. Ogden, A.R. Byrd, and D. Toll. 2009a. Improvement of hydrologic model soil moisture predictions using SEBAL evapotranspiration estimates. Proc. International Society for Optical Engineering, SPIE 7303:730311.
 81. Hendrickx, J.M.H., B. Rabus, D.C. Romero, H. Wehn, J.B.J. Harrison, S.-h. Hong, B. Borchers, and J. Slater. 2009b. Preliminary validation of Radarsat2 surface soil moisture estimates. Proc. International Society for Optical Engineering, SPIE 7303:730310.
 82. Hong, S.-h., J.M.H. Hendrickx, and B. Borchers. 2009a. Up-scaling of SEBAL derived evapotranspiration maps from Landsat (30 m) to MODIS (250 m) scale. *J. of Hydrology* 370:122-138; doi:10.1016/j.jhydrol.2009.03.002
 83. Frisbee, M.D., F.M. Phillips, A.R. Campbell, and J.M.H. Hendrickx. 2009a. Modified passive capillary samplers for collecting samples of snowmelt infiltration for stable isotope analysis in remote, seasonally inaccessible watersheds 1: laboratory evaluation. *Hydr. Processes* 24:825-833.
 84. Frisbee, M.D., F.M. Phillips, A.R. Campbell, J.M.H. Hendrickx, and E.M. Engle. 2009b. Modified passive capillary samplers for collecting samples of snowmelt infiltration for stable isotope analysis in remote, seasonally inaccessible watersheds 2: field evaluation. *Hydr. Processes* 24:834-849.
 85. Hong, S.-h., J.M.H. Hendrickx, and B. Borchers. 2009. Up-scaling of SEBAL derived evapotranspiration maps

- from Landsat (30 m) to MODIS (250 m) scale. *J. of Hydrology* 370:122-138; doi:10.1016/j.jhydrol.2009.03.002
86. Kleissl, J., S.-h. Hong, and J.M.H. Hendrickx. 2009. New Mexico scintillometer network. Supporting remote sensing and hydrologic and meteorological models. *Bulletin American Meteorological Society* 90:207-218, DOI:10.1175/2008BAMS2480.1.
 87. Hong, S.-h., J.M.H. Hendrickx, and B. Borchers. 2010. Down-scaling of SEBAL derived evapotranspiration map from MODIS (250 m) to Landsat(30 m) scale. *Int. J. Remote Sensing*:in press.
 88. Allen, R.G., J.M.H. Hendrickx, W.G.M. Bastiaanssen, J. Kjaersgaard, and A. Irmak. 2010. Status and continuing challenges in operational remote sensing of ET. 5th National Decennial Irrigation Conference.
 89. Hendrickx, J.M.H., J.B.J. Harrison, B. Borchers, G. Rodriguez-Marin, S. Howington, and J. Ballard. 2010. High-resolution soil moisture mapping using operational optical satellite imagery. *Proc. International Society for Optical Engineering, SPIE* 7664:7303 - 91.

OTHER REFEREED PUBLICATIONS

1. Hendrickx, J.M.H. 1984. Experimental design and results of water use studies for trickle-irrigated chile pepper. Ph.D. dissertation, New Mexico State University, Las Cruces, NM.
2. Hendrickx, J.M.H., F.M. Phillips, J.L. Wilson, and R.S. Bowman. 1991. The vadose zone: an educational frontier in hydrology, p. 285-294 *Proc. Intern. Symposium on Hydrology and Water Resources Education and Training: The Challenges to meet at the turn of the XX1 Century*. Water Resources Publications, Littleton, CO, Chihuahua, Mexico.
3. Hendrickx, J.M.H., and T.-m.M. Yao. 1996. Wetting front instability in the vadose zone of New Mexico's soils New Mexico Water Resources Research Institute, New Mexico State University, Las Cruces NM.
4. Kearns, A.K., and J.M.H. Hendrickx. 1998. Temporal variability of diffuse groundwater recharge in New Mexico New Mexico Water Resources Research Institute, New Mexico State University, Las Cruces NM.
5. Hendrickx, J.M.H., B.S. Das, and B. Borchers. 1999. Modeling distributions of water and dielectric constants around land mines in homogeneous soils. *Proc. International Society for Optical Engineering, SPIE* 3710:728-738.
6. Borchers, B., J.M.H. Hendrickx, B.S. Das, and S.-H. Hong. 2000. Enhancing dielectric contrast between land mines and the soil environment by watering: modeling, design, and experimental results. *Proc. International Society for Optical Engineering, SPIE* 4038:993-1000.
7. Hendrickx, J.M.H., B. Borchers, J. Woollsey, L.W. Dekker, C. Ritsema, and S. Paton. 2001. Spatial variability of dielectric properties in field soils. *Proc. International Society for Optical Engineering, SPIE* 4394:398-408.
8. Hong, S.-H., T. Miller, H. Tobin, B. Borchers, J.M.H. Hendrickx, H. Lensen, P. Schwering, and B. Baertlein. 2001. Impact of soil water content on landmine detection using radar and thermal infrared sensors. *Proc. International Society for Optical Engineering, SPIE* 4394:409-416.
9. Lensen, H.A., P.B.W. Schwering, G. Rodríguez-Marín, and J.M.H. Hendrickx. 2001. Measurements and modeling of soil water distribution around landmines in natural soil. *Proc. International Society for Optical Engineering, SPIE* 4394:417-427.
10. Šimůnek, J., J.M.H. Hendrickx, and B. Borchers. 2001. Modeling transient temperature distributions around landmines in homogeneous bare soils. *Proc. International Society for Optical Engineering, SPIE* 4394:387-397.
11. Hong, S.-H., T.W. Miller, B. Borchers, J.M.H. Hendrickx, H.A. Lensen, P.B.W. Schwering, and S.P.V.d. Broek. 2002. Land mine detection in bare soils using thermal infrared sensors. *Proc. International Society for Optical Engineering, SPIE* 4742:43-50.
12. Miller, T.W., B. Borchers, J.M.H. Hendrickx, S.-H. Hong, H.A. Lensen, P.B.W. Schwering, and J.B. Rhebergen. 2002. Effect of soil moisture on land mine detection using ground penetrating radar. *Proc. International Society for Optical Engineering, SPIE* 4742:281-290.
13. Rhebergen, J.B., H.A. Lensen, P.B.W. Schwering, G. Rodríguez-Marín, and J.M.H. Hendrickx. 2002. Soil moisture distribution around land mines and the effect on relative permittivity. *Proc. International Society for Optical Engineering, SPIE* 4742:269-280.
14. Hendrickx, J.M.H., R.L. Van Dam, B. Borchers, C. J., H.A. Lensen, and R.S. Harmon. 2003. Worldwide distribution of soil dielectric and thermal properties. *Proc. International Society for Optical Engineering, SPIE* 5089:1158-1168.
15. Van Dam, R.L., B. Borchers, and J.M.H. Hendrickx. 2003a. Soil effects on thermal signatures of buried nonmetallic landmines. *Proc. International Society for Optical Engineering, SPIE* 5089:1210-1218.

16. Van Dam, R.L., B. Borchers, J.M.H. Hendrickx, and R.S. Harmon. 2003b. Effects of soil water content and texture on radar and infrared landmine sensors: implications for sensor fusion. Proc. International Conference on Requirements and Technologies for the Detection, Removal, and Neutralization of Landmines and UXO 1:107-114.
17. Rhebergen, J.B., H.A. Lensen, R. Van Wijk, J.M.H. Hendrickx, R.L. Van Dam, and B. Borchers. 2004. Prediction of soil effects on GPR signatures. Proc. International Society for Optical Engineering, SPIE 5415:705-715.
18. Van Dam, R.L., B. Borchers, J.M.H. Hendrickx, and S.-H. Hong. 2004a. Controlled field experiments of wind effects on thermal signatures of buried and surface-laid land mines. Proc. International Society for Optical Engineering, SPIE 5415:648-657.
19. Van Dam, R.L., J.M.H. Hendrickx, B. Borchers, S. Hong, T.W. Miller, and R.S. Harmon. 2004b. A controlled outdoor test site for evaluation of soil effects on land mine detection sensors. Proc. International Society for Optical Engineering, SPIE 5415:1335-1344.
20. Van Dam, R.L., J.M.H. Hendrickx, J.B.J. Harrison, B. Borchers, D.I. Norman, S.A. Ndur, C. Jasper, P. Niemeyer, R. Nartey, D. Vega, L. Calvo, and J.E. Simms. 2004c. Spatial variability of magnetic soil properties. Proc. International Society for Optical Engineering, SPIE 5415:665-676.
21. Fleming, K., J.M.H. Hendrickx, and S.-h. Hong. 2005. Regional mapping of root zone soil moisture using optical satellite imagery. Proc. International Society for Optical Engineering, SPIE 5811:159-170.
22. Hendrickx, J.M.H., B. Borchers, S.-h. Hong, J.B.J. Harrison, L.M. Hall, R.S. Bowman, and R.L. Van Dam. 2005a. Electromagnetic induction for environmental restoration and hydrological characterization. *Fast Times* 10:35.
23. Hendrickx, J.M.H., J.B.J. Harrison, R.L.v. Dam, B. Borchers, D.I. Norman, C.D. Dedzoe, B.O. Antwi, R.D. Asiamah, C. Rodgers, P. Vlek, and J. Friesen. 2005b. Magnetic soil properties in Ghana. Proc. International Society for Optical Engineering, SPIE 5794:165-176.
24. Hendrickx, J.M.H., and S.-h. Hong. 2005. Mapping sensible and latent heat fluxes in arid areas using optical imagery. Proc. International Society for Optical Engineering, SPIE 5811:138-146.
25. Hong, S.-h., J.M.H. Hendrickx, and B. Borchers. 2005. Effect of scaling transfer between evapotranspiration maps derived from LandSat 7 and MODIS images. Proc. International Society for Optical Engineering, SPIE 5811:147-158.
26. Schaap, M.G., and J.M.H. Hendrickx. 2005. Dielectric relaxation effects on permittivity of surface soils. Proc. International Society for Optical Engineering, SPIE 5794:135-143.
27. Simms, J.E., R.L. Van Dam, and J.M.H. Hendrickx. 2005. Classification of magnetic susceptibility anomalies and their relevance to UXO detection. *Fast Times* 10:48-51.
28. Van Dam, R.L., B. Borchers, and J.M.H. Hendrickx. 2005a. Methods for prediction of soil dielectric properties: a review. Proc. International Society for Optical Engineering, SPIE 5794:188-197.
29. Van Dam, R.L., J.B.J. Harrison, J.M.H. Hendrickx, B. Borchers, R.E. North, J.E. Simms, C. Jasper, C.W. Smith, and Y. Li. 2005b. Variability of magnetic soil properties in Hawaii. Proc. International Society for Optical Engineering, SPIE 5794:157-164.
30. Van Dam, R.L., J.M.H. Hendrickx, J.B.J. Harrison, and B. Borchers. 2005c. Conceptual model for prediction of magnetic properties in tropical soils. Proc. International Society for Optical Engineering, SPIE 5794:177-187.
31. Van Dam, R.L., J.M.H. Hendrickx, H. Tobin, and B. Borchers. 2005d. Environmental effects on landmines and UXO detection sensors. *Fast Times* 10:36.