

CONFERENCE PROGRAM

Joint AGU Chapman/SSSA Outreach Conference

“Application of GIS, Remote Sensing, Geostatistics, and Solute Transport Modeling to the Assessment of Nonpoint Source Pollutants in the Vadose Zone”

October 19-24, 1997

Riverside, CA
Mission Inn

Conveners: Dennis L. Corwin, Ph.D., USDA-ARS, U.S. Salinity Laboratory
Prof. Timothy R. Ellsworth, University of Illinois
Prof. Keith Loague, Stanford University

SUNDAY, OCTOBER 19, 1997

6:00-10:00 PM REGISTRATION (Location To Be Announced)
WELCOME RECEPTION (Location To Be Announced)

All Oral Presentation Sessions will take place in the Music Room at the Mission Inn

(PLEASE NOTE: * denotes presenter)

MONDAY, OCTOBER 20, 1997

OPENING REMARKS and WELCOME

8:00-8:05 AM Introductions, Opening Remarks and Dedication; Dennis L. Corwin

8:05-8:15 AM

Welcome to U.S. Salinity Laboratory and Joint AGU Chapman/SSSA Outreach Conference; M. C. Shannon, Director of the U.S. Salinity Laboratory, Riverside, CA

INTRODUCTORY SESSION

Presiding Chair: Keith Loague

8:15-9:15 AM

Introductory Keynote Address: Politics, Technology, and Environmental Policy-Making
J. L. King*

9:15-10:00 AM

Keynote: Future Trends in Commercial GIS Software for Application to Environmental Assessment Problems
R. Vaughan*

10:00-10:30 AM BREAK

10:30-11:00 AM

Invited: Estimating a Societal Value of Earth Science Information in the Assessment of Nonpoint Source Pollutants

R. L. Bernknopf*

11:00-11:15 AM

Pesticides in the Nation's Ground Water: Initial Results From the National Water-Quality Assessment

J. E. Barbash*, D. W. Kolpin, R. J. Gilliom

11:15-11:30 AM

Groundwater Quality Over 40 Years in the Oxnard Aquifer, Ventura County, California

N. N. Brown, S. B. Bachman, T. J. Thompson, N. Larsen

11:30 AM-1:00 PM LUNCH

SESSION I: INTEGRATED INFORMATION TECHNOLOGY APPROACHES TO NONPOINT SOURCE POLLUTION PROBLEMS

Presiding Chair: John Norman

1:00-1:45 PM

Keynote: Current and Future Trends in the Development of Integrated Methodologies for Assessing Non-point Source Pollutants

J. P. Wilson*

1:45-2:00 PM

Spatially and Temporally Explicit Modeling of Drainwater Quality for Arid Irrigated Agriculture

M. V. Finco*, G. F. Hepner

2:00-2:15 PM

Regional Soil Nitrogen Behaviors and Soil Water and Nitrogen Management

Y. Huang, Y. Li

2:15-2:30 PM

A GIS Computerized Application of an Assessment System for Potential Groundwater Contamination From Agricultural Pesticide Use in North Dakota

J. F. Nowatzki*, B. Seelig

2:30-2:45 PM

Characterization of Insular Scale Near-Surface Hydrologic Response: Kaho'olawe, Hawaii

E. C. Wahlstrom*, K. Loague

2:45-3:15 PM BREAK

SESSION I: Continued

Presiding Chair: Harold van Es

3:15-3:30 PM

Modeling Nitrate in a GIS Framework for Policy-Makers in the UK

N. A. Mirza, T. M. Addiscott

3:30-3:45 PM

Contamination and Sustainability of Australia's Groundwater Resources

C. J. Chartres*, G. Jacobson, W. R. Evans, J. Bauld, J. R. Kellett

3:45-4:00 PM

Risk Analysis for Dryland Salinity Development in the Murray-darling Basins Using Spatial Analysis of Digital Elevation Models, Physically Based Water Balance Models and Remote Sensing

R. Salama*, T. Hatton

4:00-4:15 PM

Changes in Soil Water Distribution During a Dormant Season on a Small Catchment in Central Pennsylvania

A. S. Rogowski, J. L. Bagnell

4:15-4:30 PM

Using GIS and Remote Sensing to Model Non Point Source Pollution in an East Central Illinois Watershed

W. J. Northcott*, S. E. Walker, R. A. C. Cooke, J. K. Mitchell, M. C. Hirschi

4:30-4:45 PM

Delineation of Potential Sites for Mega-hog Farms

A. Verma, R. A. C. Cooke, M. C. Hirschi, J. K. Mitchell, G. McIsaac

4:45-5:00 PM

Use of Capacitance Probe to Develop Field Estimation of Soil Water Budget Components

A. A. Fares*, A. K. Alva

5:00-5:05 PM SESSION I Announcements and Closing Remarks

7:00-9:00 PM CONFERENCE BANQUET (Music Room)

TUESDAY, OCTOBER 21, 1997

SESSION II: SUBSURFACE SOLUTE TRANSPORT MODELING OF NONPOINT SOURCE POLLUTANTS

Presiding Chair: Philippe Baveye

8:00-8:45 AM

Keynote: Opportunites, Limitations and Current Trends in Modeling of Subsurface Architecture and Aquifer Vulnerability

G. E. Fogg

8:45-9:00 AM

A Computational Study of Solute Leaching in a Heterogeneous Field Exhibiting Preferential Flow

G. H. de Rooij, P. de Vries

9:00-9:15 AM

Role of Macropore Continuity and Tortuosity on Water and Solute Transport Under Transient Condition
S. E. Allarie-Leung*, S. C. Gupta, and J. F. Moncrief

9:15-9:30 AM

Reliability of Contaminant Transport Models in Sanitary Landfills
P. R. Thomas*

9:30-9:45 AM

Fear and Loathing in Fresno: DBCP Contaminated Groundwater
K. Loague, R. H. Abrams*

9:45-10:15 BREAK

10:15-10:45 AM

Invited: Multicomponent Chemical Modeling of Nonpoint Source Pollutants at Field, Regional and Global Scales
D. L. Suarez*

10:45-11:15 AM

Invited: Modeling Subsurface Contaminant Reactions and Transport at the Watershed Scale
J.-P. Gwo*, G. V. Wilson, P. M. Jardine, E. F. D'Azevedo

11:15-11:45 AM

Invited: Risk Assessment in Space and Time of Nematicide Leaching in a Costa Rican Banana Plantation
J. J. Stoorvogel, J. Bouma

11:45 AM-1:30 PM LUNCH

SESSION II: Continued

Presiding Chair: Graham Fogg

1:30-2:15 PM

Keynote: Stochastic Solute Transport Modeling of Regional Non-point Source Pollution
W. A. Jury*, M. Flury

2:15-2:30 PM

Identification of "Type" Transfer Functions for Regional-Scale Assessment of Non-Point Source Groundwater Contamination in Fresno County, California
I. T. Stewart*, K. Loague

2:30-2:45 PM

Statistical and Sensitivity Analysis of Two-Dimensional Transport in Variably Saturated Porous Media
S. Boateng*, J. D. Cawlfieeld

2:45-3:15 PM BREAK

3:15-3:30 PM

Stochastic Simulation of Herbicide Transport in Heterogeneous Unsaturated Fields

Q. J. Wu*

3:30-3:45 PM

Non-point Source Pollution on the Field Scale: Heterogeneity and Uncertainty

T. Harter*, D. Zhang, S. Ezzedine

3:45-4:15 PM

Invited: Validation Approaches for Field-, Basin-, A and Regional-Scale Water Quality Models

D. J. Mulla*, T M Addiscott

4:15-4:45 PM

Invited: Beyond the Vadose Zone: The Role of Land-Plant-Atmosphere Models

J. M. Norman*, M. C. Anderson

4:45-5:00 PM SESSION II Announcements and Closing Remarks

6:30-7:00 PM POSTER SET-UP

7:00-9:30 PM POSTER/COMPUTER DEMONSTRATIONS (Location to be Announced)

Presiding Poster Session Chair: Dennis L. Corwin

1) Environmental and Economic Viability of Precision and Sustainable Farming

T. J. Gish*, W. P. Dulaney, C. S. T. Daughtry

2) Why is Measurement of Pollutant Concentration in Discharges From Tile Drain Systems Problematic, and Can GIS-Based Vadose Zone Flow Modeling Help to Address this Problem?

P. J. Vaughan*, D. L. Suarez, J. Simunek, D. L. Corwin, J. D. Rhoades

3) Comparison of Opus and GLEAMS in Simulating Spatial Variability of Pesticide Movement in a Field Soil
C. D. Heatwole*, S. Zacharias, N. Persaud

4) Spatial and Temporal Variability in Groundwater Nitrate Distribution: A Detailed Field Study and Non-point Source Tracer Test

M. C. Ryan*, J. McLellan, J. Harman, B. Gillham, S. Shiff

5) Regional-Scale Simulation of Cadmium in Agricultural Soils of Central Europe

P. R. Jaffe*, B. W. Shimada

6) GIS-Based Model of Salt Loading to the Groundwater for Irrigated, Agricultural Soil

D. L. Corwin*, P. J. Vaughan, M. Carrillo, J. D. Rhoades, D. Cone

7) A Statewide Methodology for Assessing the Magnitude of Nonpoint Nitrogen Pollution From Fertilized Turfgrass

E. Nizeyimana*, B. M. Evans, G. W. Petersen

8) Identification of Critical Non-point Source Pollution Areas with Topographically-Based Distributed Water-shed Modeling

T. A. Endreny, E. F. Wood

9) Agriculture Sustainability: The Case of Macchiatonda (Rome, Italy) Natural Reservoir

A. Leone, F. Preti, M. N. Ripa

10) Continuous Monitoring of in Situ Soil Water Content Using Capacitance Probes

A. A. Fares*, A. K. Alva

11) A Dynamical Systems Approach to Concentration-Discharge Modeling of Unsaturated-Saturated Flow to Streams

C. J. Duffy*

12) Measurements of Soil Water Potential at Depths to 30 Meters Using Tensiometers

J. M. Hubbell*, J. B. Sisson

13) Agrochemical Pollution of Water Resources Under Tropical Intensive Agricultural Systems in Thailand, Malaysia and Australia

R. Salama*, A. Kamnalrut, A. bin Yusoff

9:30-10:00 PM POSTER DISMANTLE

WEDNESDAY, OCTOBER 22, 1997

SESSION III: SPATIAL STATISTICS, GEOSTATISTICS AND UNCERTAINTY ANALYSIS

Presiding Chair: David Mulla

8:00-8:45 AM

Keynote: The Role of Spatio-Temporal Statistical Modeling in Non-point Environmental Assessment

D. E. Myers*

8:45-9:00 AM

Geostatistical Assessment of the Risk of Soil Contamination by Heavy Metals and its Incorporation in the Delineation of Hazardous Areas

P. Goovaerts*

9:00-9:15 AM

Representation of Contaminant Transport in a New Mexico Watershed Using Statistical, Flow, and Transport Modeling

N. M. Becker*, J. M. Irvine

9:15-9:30 AM

Development and Evaluation of an Empirical Modeling Approach to Determine Spatial Vulnerability of Pesticide Movement to Ground Water in California

J. Troiano*, J. Marade,

9:30-10:00 AM BREAK

SESSION III: Continued

Presiding Chair: Donald Myers

10:00-10:15 AM

Geostatistical Models for Integrating Soft Data in Spatial Uncertainty Assessment

P. C. Kyriakidis*

10:15-10:30 AM

Estimates of Soil Nitrate Distributions Using Cokriging With Pseudo-Crossvariograms

R. Zhang, P. Shouse, S. Yates

10:30-10:45 AM

Non-Ergodic Reactive Transport of Non-point Source Pollutants in a Variable Water Content Unsaturated Porous Media

S. Ezzedine*, T. Harter

10:45-11:00 AM

Uncertainty in a Regional-Scale Assessment of Cadmium Accumulation in the Netherlands

A. Tiktak, A. Leijnse, H. A. Vissenberg

11:00-11:15 AM

Uncertainty in Modelling Soil Acidification at a European Scale - Part I: Methodology

E. J. Pebesma*, J. Kros, G. B. M. Heuvelink

11:15-11:30 AM

Uncertainty in Modelling Soil Acidification at a European Scale Part II: Application

J. Kros*, E. J. Pebesma, G. J. Reinds, P. F. Finke, D. Wladis

11:30-11:45 AM

Impact of Reducing Data Uncertainties in Regional-Scale Assessments of Non-point Source Groundwater Contamination for the Island of Tenerife

R. Djaz-Djaz*, K. Loague

11:45 AM-12:00 PM

Application of First-Order Reliability Analysis for Qualifying the Risk of Water Contamination From Cryptosporidium parvum Oocysts

L. Yeghiazarian, C. D. Montemagno*

12:00-1:30 PM LUNCH

SESSION IV: TRANSFER FUNCTIONS, ESTIMATION METHODS AND

PARAMETERIZATION

Presiding Chair: Art Warrick

1:30-2:00 PM

Invited: The Current Status of Pedo-Transfer Functions: Their Accuracy, Reliability, and Utility in Field and Regional Scale Modeling

Y. A. Pachepsky*, W. J. Rawls, D. J. Timlin

2:00-2:30 PM

Invited: Applications of Artificial Neural Networks for Developing Pedotransfer Functions of Soil Hydraulic Parameters

J. H. M. W"sten, S. Tamari

2:30-3:00 PM

Invited: The Significance of Natural and Tillage-Induced Temporal Variation of Hydraulic Properties to Soil Hydrologic Processes

H. M. van Es*, C. B. Ogden

3:00-3:30 PM BREAK

3:30-4:00 PM

Invited: Parameterizing Flow and Transport Models for Field-Scale Applications in Heterogeneous, Unsaturated Soils

M. L. Rockhold*

4:00-4:15 PM SESSION IV Announcements and Closing Remarks

THURSDAY, OCTOBER 23, 1997

SESSION V: REMOTE SENSING AND NONINVASIVE TECHNIQUES

Presiding Chair: Marion Baumgardner

8:00-8:30 AM

Invited: Remote Sensing in Hydrology

E. T. Engman*

8:30-9:00 AM

Invited: Possibilities for Observing Soil Hydraulic Properties in the Vadose Zone with Remote Sensing

T. Schmugge*

9:00-9:30 AM

Invited: Spatially Delineating Actual and Relative Evapotranspiration From Remote Sensing: The Pre-modeling Phase

W. G. M. Bastiaanseen, R. Sakthivadivel, A. van Dellen

9:30-9:45 AM

Experimental Verification of Inversion of Soil Conductivity Profiles From Electromagnetic Induction Measurements

J. M. H. Hendrickx, B. Borchers, A. Hilgendorf, J. Rhoades, D. Corwin

9:45-10:00 AM

Principal Component Transformation Method to Separate Active Discharge and Recharge Areas Using Remote Sensing Data

C. V. Sundara Rajan, O. Batelaan, F. De Smedt

10:00-10:15 AM

Analysis of Remote Sensing Data for Studying the Influence of Natural and Human Induced Factors on Surface and Ground Water Quality

Y. L. Obyedkov

10:15-10:45 AM BREAK

SESSION V: Continued

Presiding Chair: Ted Engman

10:45-11:30 AM

Keynote: Remote Sensing and Non-invasive Techniques for the Spatio-Temporal Measurement of Surface and Subsurface Hydrologic Parameters

M. F. Baumgardner*

11:30 AM-12:15 PM

Keynote: Geopatial Measurements of Soil Electrical Conductivity to Determine Soil Salinity and Diffuse Salt-Loading From Irrigation

J. D. Rhoades*

12:15-12:30 PM

Detection of Soil Salinity at Different Scales From Field Observations to Satellite Images

J. Beekma, J. Miller, N. Hartog, M. Wierda, C. Mass, C. Groat, B. Penn, B. Harrison, J. M. H. Hendrickx

12:30-12:45 PM

Using Nuclear Magnetic Resonance Imaging for Non-invasive Water Content Measurements in the Deep Vadose Zone

T. Yao, J. M. H. Hendrickx

12:45-2:00 PM LUNCH

SESSION VI: Scale and Scaling Problems

Presiding Chair: John Crawford

2:00-2:45 PM

Keynote: Scaling Spatial Predictability: Can it be Done Without Considering the Natural Scales of Processes?

P. Baveye*

2:45-3:00 PM

Scale Effects on the Simulation of Soil Water and Nitrogen Dynamics in Steep Watersheds

W.-L. Kuo, T. S. Steenhuis*, C. E. McCulloch, D. P. Swaney, D. Weinstein, S. D. DeGloria, C. L. Mohler

3:00-3:15 PM

Stochastic and Fuzzy Methods for Upscaling Under Spatial Variability

A. Bardossy*

3:15-3:45 PM BREAK

SESSION VII: CASE STUDIES

Presiding Chair: Russ Yost

3:45-4:00 PM

Combining Simulation Models and GIS, a Case Study of Resource Management in the Sahelian Region of Niger

H. W. G. Bootink*, M. H. Gandah, P. K. Thornton

4:00-4:15 PM

GIS-Based Quantification of Statewide NPS Nutrient Loads Within Pennsylvania

B. M. Evans*, E. Nizeyimana

4:15-4:30 PM

GIS Data Analysis and Application of a 3-D Variably Saturated Seawater Intrusion Model to the Korba Aquifer (Tunisia)

I. Khlaifi, G. Lecca*, A. Giacomelli, J. Tarhouni, C. Paniconi

4:30-4:45 PM

Spatial and Temporal Variability in Groundwater Nitrate Distribution: A Detailed Field Study and Non-point Source Tracer Test

M. C. Ryan*, J. McLellan, J. Harman, B. Gillham, S. Shiff

4:45-5:00 PM

GIS Based Modeling of Solute Fluxes at the Catchment Scale: A Case Study of the Agricultural Contribution to the Riverine Nitrogen Loading in the Vejle Fjord Watershed, Denmark

E. Skop*

5:00-5:15 PM

Predicting Agricultural Impacts on Ground Water: Testing Combinations of Indices, Models, and GIS in Small Watersheds

R. A. McLaughlin*, K. C. Matson, N. B. Rajbhandari, D. Jennings, J. B. Weber

5:15-5:30 PM SESSION VII Announcements and Closing Remarks

FRIDAY, OCTOBER 24, 1997

SESSION VIII: QUANTIFICATION OF SPATIAL VARIABILITY AND SOIL-LANDSCAPE MODELS

Presiding Chair: John Wilson

8:00-8:30 AM

Invited: Sampling and Spatial Analysis Techniques for Quantifying Soil Map Unit Composition

R. B. Ferguson*, G. W. Hergert

8:30-9:00 AM

Invited: Reducing Uncertainty in Spatial Variability Assessments
A. W. Warrick, S. Mayer, M. Restrepo, T. Ellsworth, J. A. Vargas

9:00-9:30 AM

Invited: Incorporating Spatial Variability Into Existing Soils Databases
R. S. Yost*, X. Wang, C. Smith

9:30-10:00 AM

Invited: The Utility of the Concept of Representative Element Volume to Nonpoint Source Pollutant Modeling in the Vadose Zone
T. R. Ellsworth*, D. L. Corwin, K. Loague

10:00-10:30 AM BREAK

10:30-11:00 AM

Invited: Fuzzy Inference of Soil Patterns: Implications for Distributed Watershed Modeling
A. X. Zhu*, L. E. Band

11:00-11:30 AM

Invited: Application of Fractals to Soil Properties, Landscape Patterns, and Solute Transport in Porous Media
J. W. Crawford, P. Gindrod, P. Baveye

11:30 AM-12:00 PM

Invited: Spatial Relationships Between Topography and Ecosystem Patterns and Processes Associated With Solute Transport

P. Gessler*, L. D. Althouse-Oyler, O. Chadwick, J. Schimel

12:00-1:00 PM LUNCH

EPILOGUE

1:00-1:30 PM

Invited: Modeling: Intrinsic to the Scientific Method, but is it Supplanting Observation Rather Than Complementing it?

J. Letey*, D. L. Corwin

1:30-3:00 PM

PANEL DISCUSSION

Moderator: Timothy Ellsworth; Panel: W. A. Jury, G. E. Fogg, J. P. Wilson, D. E. Myers, A. W. Warrick, J. W. Crawford, E. T. Engman, P. Baveye, J. D. Rhoades, J. L. King, M. F. Baumgardner

3:00-3:15 PM Closing Remarks

3:15 PM CONFERENCE ADJOURNS