

OPE³ Progress

(December 31, 2001)

I. Publications

Dulaney, W. P., T. J. Gish, C. S. T. Daughtry, J.A. Doolittle, P. T. Miller, and K.-J. S. Kung.

1998. Determination of subsurface flow characteristics for the installation of groundwater samples. **Proc. 4th International Precision Ag. Conf.** St. Paul, MN. 1:383-394.

Walthall, C. L., Loechel, S. E., Daughtry, C. S. T., Dulaney, W. P., and Watson, L. J. 1998.

Spatial variability of parameters determining corn canopy reflectance. **Proc. 1st Int. Conf. on Geospatial Information in Agriculture and Forestry.** Lake Buena Vista, FL. 1-3 June 1998. Vol. II, pp. 569-576.

Walthall, C. L., Loechel, S. E., Dulaney, W. P., Daughtry, C. S. T., and Watson, L. J. 1999.

Assessing sources of corn field variability using airborne imagery coincident with surface measurements. **Proc. 4th Int. Airborne Remote Sensing Conference.** Ottawa, Ontario, Canada. June 21-24, 1999. Vol. II, pp 367-374.

Daughtry, C. S. T., Walthall, C. L., Kim, M. S., Brown de Colstoun, E., and McMurtrey, J. E.

2000. Estimating corn leaf chlorophyll status from leaf and canopy reflectance. **Remote Sensing of Environment.** **74:229-239.**

Dulaney, W. P., C. S. T. Daughtry, C.L. Walthall, D. J. Timlin, T. J. Gish, and K.-J. S. Kung.

2000. Use of Ground Penetrating Radar and Remotely Sensed Data to Understand Yield Variability Under Drought Conditions. **Proc. 5th International Conference on Precision Agriculture. CD-ROM.** Bloomington, MN July 16-19, 2000.

McCarty, G. W., and J. C. Ritchie. 2000. Influence of sedimentation on carbon storage in agricultural wetlands. **Workshop on Wetlands Carbon Cycling, and Future Climate Change.** Organized by The Institute for Wetland Science and Public Policy of the Association of State Wetland Managers Laurel, Maryland.

Daughtry, C. S. T., W. P. Dulaney, C. L. Walthall, A. L. Russ, T. J. Gish, and S. E. Loechel.

2000. Spatial variability of leaf chlorophyll derived from hyperspectral images. **Proc. 5th International Conference on Precision Agriculture. CD-ROM.** Bloomington, MN July 16-19, 2000.

Mookherji, S. and G.W. McCarty. 2000. Dissolved Gas Analysis for Assessing Nitrate Fate in Riparian Wetland. **Proceedings of International Conference on Riparian Ecology and Management in Multi-Land Use Watersheds.** pp. 125-130.

Ritchie, J. C., and G.W. McCarty. 2000. Sediment deposition in an agricultural wetland. **ASB Bulletin** 47(2):106.

Gish, T. J., W. P. Dulaney, C. S. T. Daughtry, and K.-J. S. Kung. 2001. Influence of Preferential Flow on Surface Runoff Fluxes. **Proc. 2nd International Preferential Flow Symposium**, Am. Soc. Agric. Eng. (and on **CD-ROM**), Hawaii, Jan 3-5, 2001, pp205-209.

Dulaney, W. P., C. S. T. Daughtry, C.L. Walthall, and T. J. Gish. 2001. The use of remote sensing techniques to determine the impact of preferential flow on corn yields. **Proc. 2nd International Preferential Flow Symposium**, Am. Soc. Agric. Eng. (and on **CD-ROM**), Hawaii, Jan 3-5, 2001, pp. 209-212..

McCarty, G. W. and J. Angier. 2001. Impact of Preferential Flow Pathways on Ability of Riparian Wetlands to Mitigate Agricultural Pollution. **Proc. 2nd International Preferential Flow Symposium**. Am. Soc. Ag. Eng. (and on **CD-ROM**), Honolulu, HI, Jan 3-5, pp53-56.

McConnell, L.L., K. Hyunock, N. Cristina, T. J. Gish, and J. Prueger. 2001. Determination of metolachlor volatile flux from soil using solid phase microextraction. **Am. Chem. Soc. Extended Abstract Vol 41(1):307-311.**

Angier, J. T., G. W. McCarty, T. J. Gish, and C. S. T. Daughtry. 2001. Impact of a First-Order Riparian Zone on Nitrogen Removal and Export From an Agricultural Ecosystem. Proceedings of the 2nd International Nitrogen Conference on Science and Policy. **TheScientificWorld** (on-line journal) (<http://www.thescientificworld.com/publications/NitrogenToC.asp>)

Ritchie, J. C., and G.W. McCarty 2001. Sediment deposition rates and carbon content in the soils of an agricultural riparian ecosystem. **Seventh Federal Interagency Sedimentation Conference Proceedings Vol 2 IX41-IX46.**

Daughtry, C. S. T., T. J. Gish, W. P. Dulaney. C. L. Walthall, K.-J. S. Kung, G. W. McCarty, J. T. Angier, and P. Buss. 2001. Surface and subsurface nitrate flow pathways on a watershed scale. Proceedings of the 2nd International Nitrogen Conference on Science and Policy. **TheScientificWorld** (on line journal) <http://www.thescientificworld.com/publications/NitrogenToC.asp>

Walthall, C.L., T.J. Gish, C.S.T. Daughtry, W.P. Dulaney, K-J.S. Kung, G. McCarty, D. Timlin, J.T. Angier, P. Buss and P.R.Houser, 2001. An innovative approach for locating and evaluating subsurface pathways for nitrogen loss. Proceedings of the 2nd International Nitrogen Conference on Science and Policy. **TheScientificWorld** (on-line journal). <http://www.thescientificworld.com/publications/NitrogenToC.asp>

II. Manuscripts Submitted or In-Press:

Daughtry, C. S. T., E. R. Hunt, Jr., C. L. Walthall, T. J. Gish, Shunlin Liang, and E. J. Kramer.

2001. Assessing the spatial distribution of plant litter. AVIRIS Earth Science and Applications Workshop. Pasadena, CA. Feb. 27- Mar. 2, 2001. (**In Press**)

Gish, T. J. , Dulaney, W. P., C. S. T. Daughtry, J. A. Doolittle, P. T. Miller, and K.-J. S. Kung. Use of ground-penetrating radar to identify subsurface flow pathways. **Soil Sci. Soc. Am. J.** (**In Press**).

Liang, S., H. Fang, M. Kaul, T. Van Niel, T. McVicar, S. Campbell, C. Walthall, C. Daughtry and J. Pearlman, 2001. Land surface geo/biophysical variable estimation from EO-1 data and validation. Proc. IEEE IGARSS'2001. (**In Press**).

McCarty G.W. and J.C. Ritchie. Impact of soil movement on carbon sequestration in agricultural ecosystems. **Journal of Environmental Pollution**. (**In Press**)

Timlin, D.J., C.L. Walthall, Ya. Pachepsky, W.P. Dulaney and C.S.T. Daughtry, 2001. Spatial regression of crop parameters with airborne spectral imagery. Proc. of Third International Conference on Geospatial Information in Agriculture and Forestry, Denver, CO, 5-7 November, 2001. (**In Press**)

Walthall, C.L., M. Kaul, D.J. Timlin and C.S.T. Daughtry, 2001. Linking within-field crop response with soil characteristics to define crop response zones for management zone delineation. Proc. of Third International Conference on Geospatial Information in Agriculture and Forestry, Denver, CO, 5-7 November, 2001. (**In Press**)

Walthall , C.L., Y. Pachepsky, W.P. Dulaney, D.J. Timlin and C.S.T. Daughtry, 2001. Using spatial variance information from remotely sensed imagery to map crop foliage density. Proc. of Third International Conference on Geospatial Information in Agriculture and Forestry, Denver, CO, 5-7 November, 2001. (**In Press**)

Angier, J. T., G. W. McCarty, C. P. Rice, and K. Bialek. Impact of a Riparian Wetland on Quality of Water Exported From a Field Applied With Agrochemicals. **Journal of Agricultural and Food Chemistry**. (In review)

Gish, T. J., W. P. Dulaney, C. S. T. Daughtry, C. Walthal, K-J. S. Kung, and P. Houser. Impact of funnel flow on the spatial distribution of corn grain yields. **Soil Sci. Soc. Am. J.** (In review)

Liang, S., H. Fang, J. Morisette, M. Chen, C. Walthall, C. Daughtry and C. Shuey. Atmospheric correction of ETM+ land surface imagery: II. Validation and applications. **IEEE Trans. On Geoscience and Remote Sensing**. .(In review).

- Liang, S., C. Shuey, H. Fang, C. Walthall, C. Daughtry and R. Hunt, 2001. Narrowband to broadband conversions of land surface albedo: II. Validation. **Remote Sensing of Environment.** (In review).
- Liang, Shunlin, H. Fang, J. T. Morisette, M. Chen, C. L. Walthall, C. S. T. Daughtry, C. J. Shuey. Atmospheric correction of Landsat ETM+ land surface imagery: II. Validation and applications. **Trans. Geoscience and Remote Sensing.** (In review)
- Ritchie, J. C., and G.W. McCarty. Using 137-Cesium to understand soil carbon redistribution on agricultural watersheds. **Soil and Tillage Research.** (In review)

III. Published Abstracts

- Gish, T. J., Dulaney, W. P., Daughtry, C. S. T., and Lu, Y. C. 1997. Environmental and economic viability of precision and sustainable farming. Proc. AGU Chapman Conf. on Application of GIS, Remote Sensing, Geostatistics and Solute Transport Modeling to the Assessment of Non-point Source Pollutants in the Vadose Zone. Riverside, CA. 19-24 October 1997.
- Daughtry, C. S. T., Gish, T. J., Dulaney, W. P., and Lu, Y. C. 1998. Optimizing production inputs for environmental and economic enhancement: OPE³ Proc. 28th Crop Simulation Workshop, Beltsville, MD. 5-8 April 1998.
- Dulaney, W P., Gish, T. J., and Daughtry, C. S. T. Use of ground-penetrating radar to determine field-scale subsurface flow characteristics. *Agronomy Abstracts* 90:37. 1998.
- Walthall, C. L., Loechel, S. E., Huemmrich, K. F., Daughtry, C. S. T., Dulaney, W. P., and Watson, L. J. 1998. Variability of parameters affecting corn canopy reflectance and multispectral imagery. *Agronomy Abstracts* 90:16. 1998.
- Dulaney, W. P., Gish, T. J., Daughtry, C. S. T., Kung, K.-J. S., Jones, D., Miller, P., Buss, P., and Doolittle, J. 1999. Determination of funnel flow processes at the watershed scale. *Agronomy Abstr.* 91:181. 1999.
- Gish, T. J., Dulaney, W. P., Daughtry, C. S. T., Kung, K.-J. S., Jones, D., Miller, P., and Doolittle, J. Impact of subsurface stratigraphy on soil moisture and yield. *Agronomy Abstr.* 91:180. 1999.
- Angier, J., and G.W. McCarty 1999. Evidence for Preferential Movement of Groundwater in Wetland Systems. ASA Meeting, Salt lake City, Utah *Agronomy Abstracts* p. 186.

- McCarty, G. W., S. Mookherji and J. Angier. 1999. Stratified Denitrification Potential in Profiles of Riparian Wetland Soil. ASA Meeting, Salt lake City, Utah *Agronomy Abstracts* p. 229.

McCarty, G. W., and J. Angier 1999. Impact of Preferential Flow Pathways on the Biogeochemical Function of Riparian Systems. ASA Meeting, Salt Lake City, Utah. Agronomy Abstracts p. 186.

Angier, J., Prestegaard, K. L., and McCarty, G. W. 1999. Factors That Limit the Nitrate Reducing Capabilities of a Riparian Buffer Strip. Spring AGU meeting, Boston, MA. AGU Abstracts p.

McCarty, G. W. . 2000. Research on Pollution Control by Riparian Buffers in the Mid-Atlantic Region. ASA Meeting, Minneapolis, Minnesota. Agronomy Abstracts p. 381.

Daughtry , C., Dulaney, W., Walthall, C., Gish, T., Loeschel, S., and Russ, A. 2000. Spatial Variability of Leaf Chlorophyll Derived From Canopy Reflectance. Society of Photo-optical Instrumentation Engineers. Albuquerque, NM. 10-12 April 2000.

Angier, J., K.L. Prestegaard and G.W. McCarty. 2000. Hydrological Processes and Nitrate Delivery Mechanisms in a Riparian Zone. Spring AGU Meeting, Washington, D.C. AGU Abstracts p. S255

McCarty, G. W., J.C. Ritchie and J. Angier. 2000. Riparian Wetland Sedimentation and Carbon Sequestration in Agricultural Ecosystems. Spring AGU Meeting, Washington, D.C. AGU Abstracts p. S255

McCarty, G. W., S. Mookherji, and J. Angier. 2000. Assessing N Gas Production in Riparian Wetlands by Dissolved Gas Analysis. Spring AGU Meeting, Washington, D.C. AGU Abstracts p. S187

Mookherji, S., G. W. McCarty, and J. T. Angier. 2001. Effect of Wetland Vegetation Residues on Denitrification in Riparian Ecosystems. ASA Meeting, Charlotte, N. C. Agronomy Abstracts (CD-ROM).

Gish, T. J. C. S. T. Daughtry, W. P. Dulaney, C. L. Walthall, S.-J. K. Kung, and P. Buss. 2001. Identifying watershed –scale subsurface flow pathways. Invited, Agronomy Abstracts, ASA National Meetings, Charlotte, NC. (CD-ROM)

Daughtry, C. S. T., E. J. Hunt, Jr., C. L. Walthall, T. J. Gish, and S. Liang. 2001. Remote sensing of crop residue cover and conservation tillage. Agronomy Abstracts. ASA National Meetings, Charlotte, NC. (CD-ROM)

Ritchie, J. C. and G. W. McCarty. 2001. Soil carbon and Cesium-137 relationships in a small agricultural watershed. Annual Meeting American Society of Agronomy (CD-ROM)

McCarty, G. W., T. J. Gish, C.S. T. Daughtry. 2001. Landscape parameters influencing availability of soil nitrogen for crop production. Annual Meeting American Society of Agronomy (CD-ROM)

IV. Other Resources

As members of both NASA's EO-1 Science Team and NASA's EOS MODIS/MISR Validation Team, we receive, **at no cost**, numerous multispectral and hyperspectral images over OPE³, BARC, and surrounding areas from a wide array of airborne and satellite sensors.

V. 2001 OPE3 Highlights

- 1) Sampling of carbon fluxes from the watersheds initiated this spring.
- 2) Intensive LAI measurements, leaf optics, with RS and intense soil and plant data
- 3) Received funding (\$240,000 to area through a CSREES-NRI grant) to monitor subsurface water and chemical fluxes (cooperation with Dr. Samuel Kung, Univ. WI, Madison WI).
- 4) Twelve sap flow sensors have been instrumented on 5 trees in a transect across the riparian wetland, with another transect to be added further downstream later this year; this allows direct measurement of ET, and correlation with stream flow, riparian groundwater levels, and nutrient behavior.