

**UPPER SAN PEDRO BASIN
SURFACE WATER HYDROLOGY AND SEDIMENT**

- Boughton, W.C., Renard, K.G., Stone, J.J. 1987. Flood frequency estimates in southeastern Arizona. J. Irrig. and Drain. Div. ASCE 113(ID4):469-478.
- Browning-Aiken, A., Richter, H., Goodrich, D., Strain, B., Varady, R. 2004. The Upper San Pedro Basin: Fostering collaborative binational watershed management. J. Water Resour. Dev. 20(3):353-367.
- Chehbouni, A., Goodrich, D.C., Moran, M.S., Watts, C., Kerr, Y.H., Dedieu, G., Kepner, W.G., Shuttleworth, W.J., Sorooshian, S. 2000. A preliminary synthesis of major scientific results during the SALSA program. J. Ag. and For. Meteorol. 105(1-3):311-323.
- Chehbouni, A., Watts, C., Lagouarde, J.-P., Kerr, Y.H., Rodriguez, J.-C., Bonnefond, J.-M., Santiago, F., Dedieu, G., Goodrich, D.C., Unkrich, C. 2000. Estimation of heat and momentum fluxes over complex terrain using a large aperture scintillometer. J. Ag. and For. Meteorol. 105(1-3):215-226.
- Emmerich, W.E., Cox, J.R. 1994. Changes in surface runoff and sediment production after repeated rangeland burns. Soil Sci. Soc. Am. J. 58(1):199-203.
- Goodrich, D.C., Scott, R., Qi, J., Goff, B., Unkrich, C.L., Moran, M.S., Williams D., Schaeffer, S., Snyder, K., Mac Nish, R., Maddock III, T., Pool, D., Chehbouni, A., Cooper, D.I., Eichinger, W.E., Shuttleworth, W.J., Kerr, Y., Marsett, R., Ni, W. 2000. Seasonal estimates of riparian evapotranspiration using remote and in situ measurements. J. Ag. and For. Meteorol. 105(1-3):281-309.
- Goodrich, D.C., Chehbouni, A., Goff, B., Mac Nish, R., Maddock, T., Moran, M.S., Shuttleworth, J., Williams, D.G., Watts, C., Hipps, L.H., Cooper, D.I., Schieldge, J., Kerr, Y.H., Arias, H., Kirkland, M., Carlos, R., Cayrol, P., Kepner, W., Jones, B., Avissar, R., Begue, A., Bonnefond, J.-M., Boulet, G., Branan, B., Brunel, J.P., Chen, L.C., Clarke, T., Davis, M.R., DeBruin, H., Dedieu, G., Elguero, E., Eichinger, W.E., Everitt, J., Garatuza-Payan, J., Gempko, V.L., Gupta, H., Harlow, C., Hartogensis, O., Helfert, M., Holifield, C., Hymer, D., Kahle, A., Keefer, T., Krishnamoorthy, S., Lhomme, J.-P., Lagouarde, J.-P., Lo Seen, D., Luquet, D., Marsett, R., Monteny, B., Ni, W., Nouvellon, Y., Pinker, R., Peters, C., Pool, D., Qi, J., Rambal, S., Rodriguez, J., Santiago, F., Sano, E., Schaeffer, S.M., Schulte, M., Scott, R., Shao, X., Snyder, K.A., Sorooshian, S., Unkrich, C.L., Whitaker, M., Yucel, I. 2000. Preface paper to the Semi-Arid Land-Surface-Atmosphere (SALSA) program special issue. J. Ag. and For. Meteorol. 105(1-3):3-20.
- Goodrich, D.C., Lane, L.J., Shillito, R.M., Miller, S.N., Syed, K.H., Woolhiser, D.A. 1997. Linearity of basin response as a function of scale in a semiarid watershed. Water Resour. Res. 33(12):2951-2965.
- Goodrich, D.C., Faures, J.-M., Woolhiser, D.A., Lane, L.J., Sorooshian, S. 1995. Measurement and analysis of small-scale convective storm rainfall variability. J. Hydrology 173:283-308.
- Goodrich, D.C. 1990. Geometric simplification of a distributed rainfall-runoff model over a range of basin scales. PhD Dissertation, Univ. of Arizona, Tucson.
- Hereford, R., 1993. Entrenchment and widening of the Upper San Pedro River, AZ Geological Society of America Special Paper, Vol 282, 46 p.
- Hsieh, H., Stone, J.J., Guertin, D.P., Slack, D. 2002. Stochastic daily rainfall generation in southeast Arizona. Proc. 13th. Conf. on Applied Climatology, Am. Meteorol. Soc., May 13-16, Portland, OR, pp. 139-141.

- Lane, L.J., Hernandez, M., Nichols, M.H. 1997. Processes controlling sediment yield from watersheds as functions of spatial scale. Environ. Modeling and Software 12(4):355-369.
- Lane, L.J., Nichols, M.H., Hernandez, M., Manetsch, C., Osterkamp, W.R. 1994. Variability in discharge, stream power, and particle-size distributions in ephemeral-stream channel systems. Proc. IAHS Internat' l. Sym. on Variability in Stream Erosion and Sediment Transport, Dec. 12-16, Canberra, Australia, IAHS Pub. No.224, pp. 335-342.
- Lane, L.J., Nichols, M.H., Levick, L.R., Kidwell, M.R. 2001. A simulation model for erosion and sediment yield at the hillslope scale. Chpt. 8 In: Landscape Erosion and Evolution Modeling, R.S. Harmon, W.W. Doe, III (eds.), Kluwer Academic/Plenum Publishers, New York, pp. 201-237.
- Lane, L.J., Nichols, M.H., Simanton, J.R. 1995. Spatial variability of cover affecting erosion and sediment yield in overland flow. Proc. Effects of Scale on Interpretation and Manage. of Sediment and Water Quality IAHS, July, Boulder, CO, IAHS Pub. No. 226, pp. 147-152.
- Lane, L.J., Shirley, E.D., Singh, V.P. 1988. Modelling erosion on hillslopes. Chpt 10 In: Modelling Geomorphological Systems, M.G. Anderson (ed.), John Wiley and Sons Ltd., pp. 287-308.
- Lane, L.J. 1985. Estimating transmission losses. Proc. ASCE Specialty Conf., Development and Manage. Aspects of Irrig. and Drain. Systems, Irrig. and Drain. Engr. Div., San Antonio, TX, pp. 106-113.
- Lane, L.J. 1983. Transmission losses. Chpt. 19 In: SCS National Engr. Handbook, pp. 19-1 - 9-21. (Order from: U. S. Government Printing Office, Washington, DC 20402).
- Lane, L.J. 1982. A distributed model for small semiarid watersheds. J. Hydraul. Div., ASCE 108(HY10):1114-1131.
- Lane, L.J., Diskin, M.H., Wallace, D.E, Dixon, R.M. 1978. Partial area response on small semiarid watersheds. AWRA, Water Resour. Bull. 14(5):1143-1158.
- Lane, L.J., Renard, K.G. 1972. Evaluation of a basin wide stochastic model for ephemeral runoff from semiarid watersheds. Trans. ASAE 15(1):280-283.
- Lane, L.J., Diskin, M.H., Renard, K.G. 1971. Input-output relationships for an ephemeral stream channel system. J. Hydrology 13:22-40.
- Moran, M.S., Clarke, T.R., Kustas, W.P., Weltz, M.A., Amer, S.A. 1994. Evaluation of hydrologic parameters in semiarid rangeland using remotely sensed spectral data. Water Resour. Res. 30(5):1287-1297.
- Moran, M.S., Hymer, D.C., Qi, J., Sano, E.E. 2000. Soil moisture evaluation using multi-temporal synthetic aperture radar (SAR) in semiarid rangeland, J. Agric. and For. Meteorol. 105:69-80.
- Moran, M.S., Rahman, A.F., Washburne, J.C., Goodrich, D.C., Weltz, M.A., Kustas, W.P. 1996. Combining the Penman-Monteith equation with measurements of surface temperature and reflectance to estimate evaporation rates of semiarid grassland. J. Ag. and For. Meteorol. 80:87-109.
- Nearing, M.A., Nichols, M.H., Kimoto, A., Ritchie, J.C. 2005. Spatial patterns of soil erosion and deposition in two small, semiarid watersheds. J. Geophys. Res., 110, F04020, doi:10.1029/2005JF000290.
- Nearing, M.A., Jetten, V., Baffaut, C., Cerdan, O., Couturier, A., Hernandez, M., Le Bissonnais, Y., Nichols, M.H., Nunes, J.P., Renschler, C.S., Souchere, V., van Oost, K. 2005. Modeling response of soil erosion and runoff to changes in precipitation and cover. Catena 61(2-3):131-134.

- Nichols, M.H., Lane, L.J., Gibbons, R. 1995. Time series analysis of data for raingauge networks in the Southwest. Proc. Shrubland Ecosystem Dynamics in a Changing Environment, May 23-25, Las Cruces, NM, USDA-FS Intermountain Res. Station, pp. 43-47.
- Nichols, M.H. 2006. Measured sediment yield rates from semiarid rangeland watersheds. Rangeland Ecol. and Manage. 59:55-62.
- Nichols, M.H., Renard, K.G. 2003. Sediment yield from semiarid watersheds. Proc. 1st Interagency Conf. on Research in the Watersheds, K.G. Renard, S. McElroy, W. Gburek, E. Canfield, and R.L. Scott (eds.), Oct. 27-30, Benson, AZ, pp. 161-166.
- Nichols, M.H., Renard, K.G., Osborn, H.B. 2002. Precipitation changes from 1956-1996 on the Walnut Gulch Experimental Watershed. J. Am. Water Resources Assoc. 38(1):161-172.
- Mac Nish, R.D., Unkrich, C.L., Smythe, E., Goodrich, D.C., Maddock, T., III. 2000. Comparison of riparian evapotranspiration estimates based on water balance approach and sap flow measurements. J. Ag. and For. Meteorol. 105(1-3):271-279.
- Mendez, A., Goodrich, D.C., Osborn, H.B. 2003. Rainfall point intensities in an air mass thunderstorm environment: Walnut Gulch, Arizona. J. Am. Water Resour. Assoc. 39(3):611-621.
- Miller, S.N., Kepner, W.G., Mehaffey, M.H., Hernandez, M., Miller, R.C., Goodrich, D.C., Devonald, K.K., Heggem, D.T., Miller, W.P. 2002. Integrating landscape assessment and hydrologic modeling for land cover change analysis. J. Am. Water Resources Assoc. 38(4):915-929.
- Moran, M.S., Rahman, A.F., Washburne, J.C., Goodrich, D.C., Weltz, M.A., Kustas, W.P. 1996. Combining the Penman-Monteith equation with measurements of surface temperature and reflectance to estimate evaporation rates of semiarid grassland. J. Ag. and For. Meteorol. 80:87-109.
- Morin, E., Krajewski, W.F., Goodrich, D.C., Gao, X., Sorooshian, S. 2003. Estimating rainfall intensities from weather radar data: The scale-dependency problem. J. Hydrometeorology 4:782-797.
- Osborn, H.B., Simanton, J.R. 1990. Hydrologic modeling of a treated rangeland watershed. J. Range Manage. 43(6):474-481.
- Osborn, H.B., Simanton, J.R. 1989. Gullies and sediment yield. Rangelands 11(2):51-56.
- Osborn, H.B., Renard, K.G. 1988. Rainfall intensities for southeastern Arizona. J. Irrig. and Drain. Div., ASCE 114(ID1):195-199.
- Osborn, H.B., Simanton, J.R. 1986. Gully migration on a Southwest rangeland watershed. J. Range Manage. 39(6):558-561.
- Osborn, H.B. 1983. Timing and duration of high rainfall rates in the southwestern United States. Water Resour. Res., AGU 19(4):1036-1042.
- Osborn, H.B., Lane, L.J., Richardson, C.W., Molenau, M. 1982. Precipitation. Chpt. 3 In: Hydrologic Modeling of Small Watersheds, ASAE Monograph No. 5, pp. 81-118.
- Osborn, H.B., Lane, L.J., Myers, V.A. 1980. Rainfall/watershed relationships for southwestern thunderstorms. Trans. ASAE 23(1):82-87, 91.
- Osborn, H.B., Renard, K.G., Simanton, J.R. 1979. Dense networks to measure convective rainfall in the southwestern United States. Water Resour. Res. AGU 15(6):1701-1711.
- Osborn, H.B. 1977. Point to area convective rainfall simulation. Proc. 13th Agric. and For. Meteorol. Conf., Weather-Climatology Modeling for Real-Time Applications in Agriculture, Am. Meteorol. Soc., pp. 51-52.

- Osborn, H.B., Renard, K.G. 1973. Management of ephemeral stream channels. J. Irrig. and Drain. Div., ASCE 99(IR3):207-214.
- Osborn, H.B., Laursen, E.M. 1973. Thunderstorm runoff in southeastern Arizona. J. Hydraul. Div., ASCE 99(HY7):129-1145.
- Osborn, H.B., Lane, L.J., Hundley, J.F. 1972. Optimum gaging of thunderstorm rainfall in southeastern Arizona. Water Resour. Res., AGU 8(1):259-265.
- Osborn, H.B., Lane, L.J. 1972. Depth-area relationships for thunderstorm rainfall in southeastern Arizona. Trans. ASAE 15(4):670-673, 680.
- Osborn, H.B., Lane, L.J., Kagan, R.S. 1971. Determining significance and precision of estimated parameters for runoff from semiarid watersheds. AWWA, Water Resour. Bull. 7(3):484-494.
- Osborn, H.B., Renard, K.G. 1969. Analysis of two major runoff producing Southwest thunderstorms. J. Hydrology 8(3):282-302.
- Osborn, H.B., Lane, L.J. 1969. Prediction-runoff relation for very small semiarid rangeland watersheds. Water Resour. Res. 5(2):419-425.
- Osborn, H.B., Hickok, R.B. 1968. Variability of rainfall affecting runoff from a semiarid rangeland watershed. Water Resour. Res., AGU 4(1):199-203.
- Osborn, H.B. 1968. Persistence of summer rainy and drought periods on a semiarid rangeland watershed. Bull. IASH 13(1):14-19.
- Osborn, H.B. 1964. Effect of storm duration on runoff from rangeland watersheds in the semiarid southwestern United States. Bull. IASH 9(4):40-47.
- Osborn, H.B., Reynolds, W.N. 1963. Convective storm patterns in the southwestern United States. Bull. IASH 8(3):71-83.
- Parsons, A.J., Wainwright, J., Abrahams, A.D., Simanton, J.R. 1997. Distributed dynamic modelling of interrill overland flow. *Hydrological Processes* 11:1833-1859.
- Parsons, A.J., Abrahams, A.D., Simanton, J.R. 1992. Microtopography and soil-surface materials on semi-arid piedmont hillslopes, southern Arizona. *J. Arid Environ.* 22:107- 115.
- Pinker, R.T., Laszlo, I., Goodrich, D., Pandithurai, G. 2000. Satellite estimates of surface radiative fluxes for the extended San Pedro basin: Sensitivity to aerosols. J. Ag. and For. Meteorol. 105(1-3):43-54.
- Renard, K.G. 1969. Sediment rating curves in ephemeral streams. Trans. ASAE 12(1):80-85.
- Renard, K.G., Laursen, E.M. 1975. Dynamic behavior model of ephemeral stream. J. Hydraul. Div., ASCE 101(HY5):511-528.
- Renard, K.G., Goodrich, D.C. 1995. Predicting sediment yield in storm-water runoff from urban areas. J. Water Resour. Planning and Manage., ASCE, pp. 510-511.
- Renard, K.G., Lane, L.J., Simanton, J.R., Emmerich, W.E., Stone, J.J., Weltz, M.A., Goodrich, D.C., Yakowitz, D.S. 1993. Agricultural impacts in an arid environment: Walnut Gulch studies. Am. Institute of Hydrology, Hydrological Sci. and Tech. 9(1-4):145-190.
- Renard, K.G., Lopez, F.A., Simanton, J.R. 1991. Brush control and sediment yield. Proc. 5th Fed. Interagency Sedimentation Conf., Federal Energy Reg. Comm., March 18-21, Las Vegas, NV, pp. 12-38 to 12-45.
- Renard, K.G. 1972. Dynamic structure of ephemeral streams. PhD Dissertation, Dept. of Civil Engr. and Engr. Mechanics, Univ. of Arizona, Tucson, 183 p. (Order from: Univ. Microfilms, Ann Arbor, MI 48109).
- Renard, K.G., Keppel, R.V. 1966. Hydrographs of ephemeral streams in the Southwest. J. Hydraul. Div., ASCE 92(HY2):33-52.

- Renard, K.G., Osborn, H.B. 1966. Rainfall intensity comparisons from adjacent 6-hour and 24-hour recording rain gages. Water Resour. Res 2(1):145-146.
- Renard, K.G., Keppel, R.V., Hickey, J.J., Wallace, D.E. 1964. Performance of local aquifers as influenced by stream transmission losses and riparian vegetation. Trans. ASAE 7(4):471-474.
- Rhoton, F.E., Emmerich, W.E., Goodrich, D.C., McChesney, D.S., Miller, S. 2003. Soil contributions to sediment properties in Walnut Gulch Experimental Watershed: Influence of slope factors. Proc. 1st Interagency Conf. on Research in the Watersheds, K.G. Renard, S. McElroy, W. Gburek, E. Canfield, and R.L. Scott (eds.), Oct. 27-30, Benson, AZ, pp. 415-421.
- Scott, R.L., Huxman, T.E., Williams, D., Goodrich, D.C. 2006. Ecohydrological impacts of woody plant encroachment: Seasonal patterns of water and carbon dioxide exchange within a semiarid riparian environment. Global Change Biology, 12:311-324.
- Scott, R.L., Goodrich, D.C., Levick, L., McGuire, R., Cable, W.L., Williams, D., Gazal, R., Yezpey, E.A., Elsworth, P., Huxman, T.E. 0. San Pedro Riparian National Conservation Area (SPRNCA) water needs - final study report. J. US Geological Survey Water Supply.
- Scott, R.L., Edwards, E.A., Shuttleworth, W.J., Huxman, T.E., Watts, C., Goodrich, D.C. 2004. Interannual and seasonal variation in fluxes of water and carbon dioxide from a riparian woodland ecosystem. J. Ag. and For. Meteorol. 122(1-2):65-84.
- Scott, R.L., Watts, C., Gratz-Payan, J., Edwards, E., Goodrich, D.C., Williams, D., Shuttleworth, W.J. 2003. The understory and overstory partitioning of energy and water fluxes in an open canopy, semiarid woodland. J. Ag. and For. Meteorol. 114:127-139.
- Scott, R.L., Edwards, E.A., Shuttleworth, W.J., Huxman, T.E., Watts, C., Goodrich, D.C. 2004. Interannual and seasonal variation in fluxes of water and carbon dioxide from a riparian woodland ecosystem. J. Ag. and For. Meteorol. 122(1-2):65-84.
- Scott, R.L., Watts, C., Gratz-Payan, J., Edwards, E., Goodrich, D.C., Williams, D., Shuttleworth, W.J. 2003. The understory and overstory partitioning of energy and water fluxes in an open canopy, semiarid woodland. J. Ag. and For. Meteorol. 114:127-139.
- Scott, R.L., Shuttleworth, W.J., Keefer, T.O., Warrick, A.W. 2000. Modeling multiyear observations of soil moisture recharge in the semiarid American Southwest. Water Resour. Res. 36(8):2233-2247.
- Scott, R.L., Shuttleworth, W.J., Goodrich, D.C., Maddock, T., III 2000. The water use of two dominant vegetation communities in a semiarid riparian ecosystem. J. Ag. and For. Meteorol. 105(1-3):241-256.
- Scott, R.L. 1999. Riparian and rangeland soil-vegetation-atmosphere interactions in southeastern Arizona. PhD Dissertation, Dept. Hydro. And Water Resour., Univ. of Arizona, Tucson, 156 p.
- Simanton, J.R., Renard, K.G., Christiansen, C.M., Lane, L.J. 1994. Spatial distribution of surface rock fragments along catenas in semiarid Arizona and Nevada, USA. Catena 23:29-42.
- Simanton, J.R., Hawkins, R.H., Mohseni-Saravi, M., Renard, K.G. 1996. Runoff curve number variation with drainage area, Walnut Gulch, Arizona. Trans. ASAE 39(4):1391-1394.
- Simanton, J.R., Toy, T.J. 1994. The relation between surface rock-fragment cover and semiarid hillslope profile morphology. Catena 23:213-225.
- Simanton, J.R., Frasier, G.W. 1980. Stockwater development to enhance benefits of brush to grass conversion. Soc. for Range Manage., Rangelands 2(4):146-147.
- Tromble, J.M., Renard, K.G., Thatcher, A.P. 1974. Infiltration on three rangeland soil-vegetation complexes. J. Range Manage. 27(4):318-321.

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Yepez, E.A., Williams, D.G., Scott, R.L., Lin, G. 2003. Partitioning overstory and understory evapotranspiration in a semiarid savanna woodland from the isotopic composition of water vapor. *J. Ag. and For. Meteorol.* 119:53-68.