

SIMULATING CLIMATE AND LANDSCAPE EFFECTS ON HYDROLOGY USING THE PRECIPITATION RUNOFF MODELING SYSTEM IN THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN, SOUTHEASTERN USA

Jacob LaFontaine¹, Lauren E. Hay², Roland J. Viger², Steven L. Markstrom², and R Steve Regan²

AUTHORS: ¹US Geological Survey, 3039 Amwiler Road, Atlanta, Georgia 30360; ²US Geological Survey, Denver Federal Center Box 25046 MS 412, Lakewood, Colorado 80225

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Abstract. To help environmental resource managers assess potential effects of climate change on ecosystems, the Southeast Regional Assessment Project (SERAP) began in 2009. One component of the SERAP is development and calibration of a set of multi-resolution hydrologic models of the Apalachicola-Chattahoochee-Flint (ACF) River Basin. The ACF River Basin is home to multiple fish and wildlife species of conservation concern, is regionally important for water supply, and has been a recent focus of environmental and climate-change research. Hydrologic models of varying spatial extents and resolutions are required to address varied local-to-regional water-resource management questions as required by the scope and limits of potential management actions. These models are developed using the U.S. Geological Survey Precipitation Runoff Modeling System (PRMS). A coarse-scale model developed for the ACF River Basin has a contributing area of approximately 50,700 km²; while, six fine-resolution PRMS models ranging in size from 396 km² to 2,690 km² are nested within the coarse-scale model, and have been developed for the following basins: the upper Chattahoochee, Chestatee, and Chipola Rivers, and Ichawaynochaway, Potato, and Spring Creeks. Both coarse- and fine-scale models simulate basin hydrology using daily time-steps, measured climatic data, and basin characteristics such as land cover and topography. Measured streamflow data are used to calibrate and evaluate computed basin hydrology. Land cover projections are used in conjunction with downscaled Global Climate Model results to simulate future hydrologic conditions for this set of models.