PREFACE

According to the Eagleson et al. (1991), “most of the significant advances [in hydrological sciences] have resulted from new measurements.” The charge of the Journal of Hydrometeorology (JHM) includes publication of research related to observations of processes associated with water and energy fluxes at and near the land surface. Over the last 20 yr, a major evolution in hydrology has been in the research of hydrological processes at large scales. This interest has both been motivated by and lead to large-scale field experiments, including, for instance First International Satellite Land Surface Climatology Project (ISLSCP) Field Experiment (FIFE), Boreal Ecosystem–Atmosphere Study (BOREAS), Hydrological Atmospheric Pilot Experiment (HAPEX), and a number of others. These field experiments have had two major objectives. The first is to provide ground-truth data for (mostly) satellite-based remote sensors. A second, much broader, objective has been to provide observations of processes that control land–atmosphere fluxes of moisture and energy so as to develop, or validate, new parameterizations of these processes in coupled land–atmosphere models. Experiments like FIFE and BOREAS involved literally hundreds of scientists, students, and support personnel, and required budgets in the tens of millions of dollars. Over the last 5–10 yr, a number of more modest, and focused, field campaigns have been held. These include the Southern Great Plains (SGP) experiments in 1997 and 1999, and the Soil Moisture Experiment (SMEX) in 2002, 2003, and 2004. The core objectives of both the SGP and SMEX series of experiments were quite specific, and were intended primarily to provide ground-truth data for the evaluation of airborne versions of planned future passive microwave remote sensors of soil moisture, and to develop and test retrieval algorithms. However, the infrastructure that was provided by these experiments (all of which were of quite limited duration, typically from a few weeks to a month or two) was used synergistically to host a much wider range of observations than those associated directly with the experiments. Special issues of various journals have been published describing most of these experiments.

The papers in this special issue describe observations and related modeling associated with Soil Moisture–Atmosphere Coupling Experiment (SMACEX). SMACEX was conducted in the summer of 2002, in conjunction with SMEX02, in an agricultural area near Ames, Iowa. While the intent of SMEX02 was primarily to provide a validation data for microwave remote sensing algorithms for soil moisture, SMACEX was targeted at understanding the impact of spatial and temporal variability in vegetation and soil moisture on turbulent fluxes of moisture and energy between the land and atmosphere. An overview of the experiment is provided by Kustas et al. (2005). The 13 papers in this issue summarize a range of field data that was collected during the summer 2002 experiment, and its use for the development and testing of parameterizations and models for predicting land–atmosphere fluxes. The papers in this special issue, and the experiment itself, were coordinated by Bill Kustas, the JHM Chief Editor. His efforts on behalf of the experiment and the special issue are to be commended. Bill and I hope that you will enjoy the papers, which we believe will be an important archive of progress on the topic.

Dennis P. Lettenmaier
Guest Editor

REFERENCES
