NCAR | RESEARCH APPLICATIONS LABORATORY

HYDROMETEOROLOGY APPLICATIONS

WATER RESOURCE RESEARCH

Water Cycle Support

The Hydrometeorology Applications Program (HAP) focuses on performing research and development to tackle the challenges associate with understanding climate change impacts on the water cycle, high impact weather, winter weather, user needs for water resources and flood warning and control. The research and development efforts in HAP are designed to advance our understating of the water cycle under current and future climate conditions and to meet the hydrometeorological needs of national, local, and international organizations in the public and private sectors.

CLIMATE AND MANAGED WATER SYSTEMS

A number of projects conducted within HAP focus on assisting decision and policy-makers to better understand the impact of climate change and extreme weather events on water resources. Using the Water Evaluation and Planning (WEAP) model we are helping to address the growing need around the globe for new tools and methods to assess the impact of future climate-predicted precipitation on water availability and quality.

HYDROMETEOROLOGY COMMUNITY MODELS

HAP scientists have developed and support a number of hydrometeorology related models that are available to the community. These models include land surface models (NOAH-MP, HRLDAS), hydrological models (WRF-Hydro, SUMMA), water resources management models (WEAP), downscaling models (ICAR), and

Benefits & Impacts

- Relevant & timely information about the world's complex water system
- Robust decision-support tools assisting water-resource planners & managers
- Understanding water supply, flooding, droughts, & reservoir operations

ral.ucar.edu
@NCAR_RAL
info@ral.ucar.edu

models linking urban and crop characteristics and behaviors to the Weather Research and Forecast model (WRF-Urban and WRF-Crop).

COMPUTATIONAL HYDROLOGY

Scientists and engineers in HAP are collaborating to build new community hydrologic research and applications datasets, models and methods that will advance our nation's capability to monitor, predict and project hydrology and to inform water management and planning.

HDYROMET OBSERVATIONS

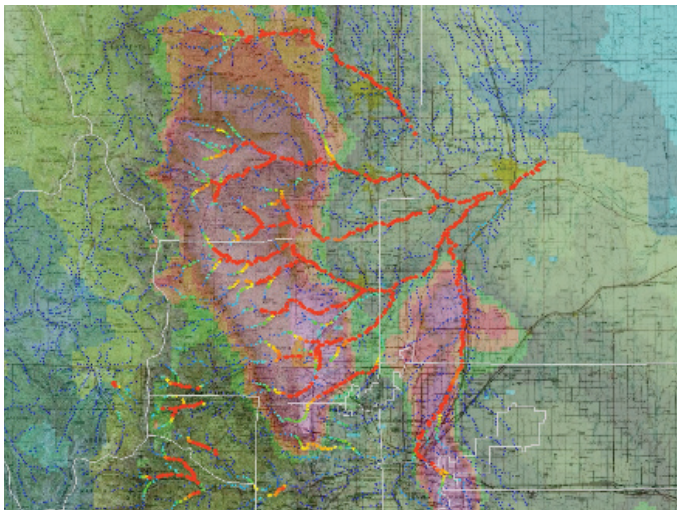
Observations of hydrometeorological processes provide foundational understanding of how weather and hydrologic phenomena combine to create both societal risks and key societal resources. HAP has developed and deployed innovative observations in field programs around the world to create new knowledge.

LAND-ATMOSPHERE INTERACTIONS

The research in this area is designed to help understand, through theoretical and observational studies, the complex interactions (including biophysical, hydrological, and biogeochemical interactions) between the land-surface and the atmosphere at micro- and meso-scales.
The ultimate goal is to integrate such knowledge into numerical mesoscale weather prediction and regional climate models in order to improve prediction of the impacts of land-surface processes on regional weather, climate, and hydrology.

NCAR STEP PROGRAM

The NCAR Short Term Explicit Prediction (STEP) program is tackling the challenging problem of improving the accuracy of high impact weather at short time scales (less than a day) via a collaborative effort across several NCAR labs.
The main focus of STEP during the past few years has been to improve the prediction of heavy precipitation and flash flood by developing an integrated hydro-meteorological system that includes data assimilation of radar data that is able to produce quantitative streamflow forecasts with improved rainfall and streamflow estimates.



WRF-Hydro Community model

STREAMFLOW PREDICTION

Scientists and engineers in HAP are undertaking research to facilitate the transition of streamflow prediction advances into operational streamflow forecasting practice in the US.

NCAR WATER SYSTEM PROGRAM

NCAR Water System Program The NCAR Water System Program (WSP) is a cross-Laboratory program that aims to improve understanding of the current water cycle and its likely evolution in a future climate.

WEATHER OBS AND IMPROVEMENTS

HAP scientists have conducted a wide variety of observations at locations around the world. This naturally has entailed the development of a local observational field site to test and evaluate new and existing instruments. The test site was developed at the NCAR Marshall field site starting in 1991 to fulfil this need.

WINTER WEATHER

It is not surprising that many western states have sought to augment water using operational cloud seeding programs. These programs are based on glaciogenic cloud seeding with either silver iodide (AgI) or liquid propane. HAP scientists have been involved with conducting research and development related to weather modification in Wyoming and Idaho and more recently in the United Arab Emirates.

This material is based upon work supported by the National Center for Atmospheric Research, a major facility sponsored by the National Science Foundation and managed by the University Corporation for Atmospheric Research. Any opinions, findings and conclusions or recommendations expressed in this material do not necessarily reflect the views of the National Science Foundation.