SYNTOR : God of Weather

Generation of Weather Data for Agricultural, Environmental and Hydrologic Applications

A. What is this research project?

This research develops and implements methodologies for the generation of synthetic weather data. Studies of watershed processes such as watershed runoff, soil erosion, sediment transport, conservation impacts, streamflow frequency, crop production, and pollutant loading often rely on computer simulations that require long weather records that reflect historical and forecast climate characteristics. This research meets these needs.

B. What problem does it address?

Historical weather records frequently are serially incomplete and often too short for investigation of typical agricultural, environmental, water resources, and soil conservation problems. Weather of forecasted climate conditions represent future realizations for which observations do not exist. Only synthetic weather data from a weather generator would be able to meet the needs for long and uninterrupted weather records. Also, a weather generator is able to generate many alternative weather realizations that have similar statistical properties as the observed or forecasted climate at the location of interest.

C. How is the project different from or how does it enhance other projects?

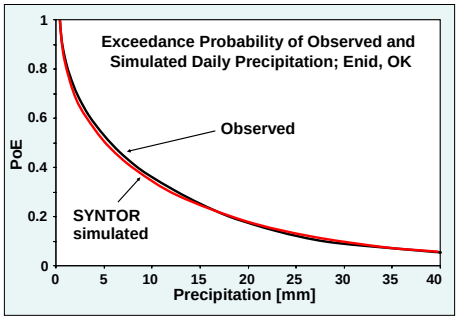
Traditional weather generators produce weather that approximates historical weather characteristics. SYNTOR goes a step beyond by including the generation of weather for forecast climate conditions. Such capabilities enable determination of weather related risk and opportunities in agricultural enterprises.

D. What are the potential benefits of partnering with ARS on this research?

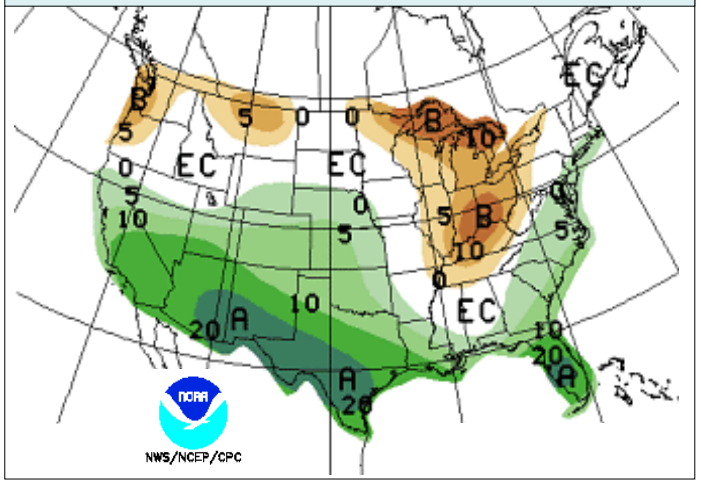
The SYNTOR development team has scientific expertise in stochastic weather generation, in-depth knowledge of capabilities and limitations of the weather generation methodology, and experience in quality control, interpretation, and practical application of generated weather.

E. Who are the potential customers?

Government agencies, universities, and private consulting firms involved in computer simulation studies of agricultural, environmental, water resources, and soil conservation problems.



Example of a NOAA-CPC Seasonal Precipitation Outlook for Feb-Mar-Apr 2003



Stage of Development

The software implementation is in its final stages; testing and refinements are ongoing; a User Manual is in preparation; and development of a graphical user interface in under consideration.

Moving Forward

A preliminary release of weather generator SYNTOR for user testing and feedback is imminent. Partnerships for testing of SYNTOR and development of a graphical user interface are being sought. Research and development will be needed for inclusion of additional weather variables into SYNTOR and for software development of a weather data analysis package.

Researchers

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USDA ARS Water Quality

High Quality Water Benefits Everyone

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