

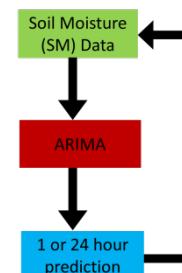
Predicting Observed Soil Moisture Using Statistical Modeling

THE NEED

Soil moisture is important to agriculture, coastal ecosystems, and environmental engineering. The amount of water holding capacity for a particular soil type is essential for irrigation, drought and flooding potential in coastal ecosystems, and waste water applications. As critical a parameter as soil moisture is, few real-time or historical soil moisture data are available. The North Carolina Environment and Climate Observing Network (ECONet) is the only climate observing network that measures volumetric soil moisture at 20 cm depth at 37 locations throughout North Carolina. It is therefore important to ensure high data quality.

SERVING THE NEED

The purpose of this study is to evaluate the accuracy of a soil moisture estimation technique to assist with quality control of ECONet data and prediction of missing data. The Auto-Regressive Iterative Moving Average (ARIMA) is a statistical model which predicts soil moisture with minimal error using only the observed soil moisture values as a predictor. The ARIMA model can be used as a quality control method for soil moisture observations decreasing the amount of erroneous values reaching the public.



How the ARIMA model works

IMPACT

Applying the ARIMA model could reduce the amount of erroneous values reaching the public through the CRONOS database. As a result, good quality data will allow users to get more accurate information and increases trust in the State Climate Office of North Carolina. Also, researchers can use this ARIMA for further research in many different studies. Ameenulla Syed, the ECONet program manager, commented on how this new quality control method is allowing us to have more confidence in the values of soil moisture and detection of erroneous data.

PARTNERS& SUPPORT

The research of predicting observed soil moisture using ARIMA has used data from other climate services. The sources of data are from the NC ECONet and USCRN which are funded by North Carolina Agricultural Research Service and National Oceanic and Atmospheric Administration.