The Kentucky Mesonet: Past, Present, and Future

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Interim Joint Committee on Local Government Legislative Research Commission Frankfort, Kentucky

June 27, 2018

Kentucky's Weather and Climate Monitoring Infrastructure





Getting Off the Ground



WESTERN KENTUCKY UNIVERSIT

News 8

Media News

Photo Echo

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Events	Kentucky Mesonet Recognized As official
Relations	Data Source
Archives	
Gallery	April 06, 2006
Magazine	Rowling Green, Ky Gov. Ernie Fletcher has signed a resolution recognizing the Kenteen, re-
alendars	as the official source of climatological observations for the com-

- Approval of federal funding via National Weather Service
- State recognition via SJR 228
- 3. Kickoff meetings at ADDs across the state



Kentucky Mesonet Infrastructure across the Commonwealth





Vertical Integration of the Kentucky Mesonet

Archive data and system metadata

Quality assure

data

and disseminate

Install and maintain instruments

Test and calibrate instruments



Station Instrumentation

Standard Instrumentation

- Air temperature
- Precipitation
- Leaf Wetness
- Solar radiation
- Relative humidity
- Wind speed & direction

Base Infrastructure

- Datalogger controls station operations
- Cellular modem enables 2-way communication via AT&T
- Batteries are trickle-charged via solar or AC power

Supplemental Instrumentation *

- Soil moisture & temperature
- Barometer
- Camera
- Multi-level temperature

* Tier II stations are in the process of being developed. Some sites already have all listed instrumentation.

Station Maintenance



- Spring, summer, and fall site maintenance passes to maintain station network infrastructure
 - Check and clean instrumentation
 - Periodically swap out instruments and replace batteries
 - Cut vegetation
 - Take site photographs
 - Respond to "trouble tickets" when QA reports require unscheduled site maintenance visits

Metadata Database

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- Inventory of all scientific
 instrumentation, including
 serial numbers, deployment
 sites and dates, and
 calibration history
- Record of visits to all sites for both regular maintenance and trouble tickets.

Quality Assurance

Over 200,000,000 data values are collected, processed, and archived each year across the network.



 Automated QA processes run on data every five minutes as they are collected from remote sites

 Manual QA is performed on a daily basis to provide expert assessment of system performance and issue "trouble tickets"



KENTUCKY MESSNET | WKU

The Commonwealth's Official Source for Weather and Climate Data



KENTUCKY MESSNET | WKU.

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The Commonwealth's Official Source for Weather and Climate Data



Precipitation Data Points on Precipitation Contour Map

1 2 3 4 5

Leaflet

Tiered Funding Model

Leveraging State Investment



Local Partnerships

- Standard Station Installation Agreement
 - Estimated station cost: \$25,000
 - Local sponsor's portion: First \$15,000
 - Mesonet match: Remaining \$10,000
- Sponsorship Agreement
 - Annual contribution up to \$5,000, but currently \$3,000
 - Supports cost of maintaining station
 - Priority site for instrumentation enhancements
- Site License Agreement

Kentucky Mesonet Outreach Applications



Temperature Inversion Monitoring System Experimental Project Supported by USDA Midwest Climate Hub



- Multi-level temperature measurements (1.5', 6', and 10') help to determine when the potential for a temperature inversion is high.
- Farmers can determine when conditions are right for applying chemical treatments to crops.
- The monitoring system is being installed at 6 sites.
- Results will be evaluated to determine whether to invest in monitoring at additional sites.

The Kentucky Drought Early Warning System





Proposed scope of work integrates four key themes:



Projected timeline: Two-year project beginning in Summer of 2018.

Vegetation Health Indicator

Experimental Project for Drought Impact Monitoring



Visual imagery to document landscape condition

Infrared imagery to document vegetation health through NDVI

Kentucky Mesonet Stations

0	25	50	100 Miles
	<u> </u>		

Takeaways

- A world-class infrastructure benefitting rural and urban communities across Kentucky
- Enhancing public safety in partnership with the National Weather Service
- Strengthening economic competitiveness and development of weather-sensitive industries
- Leveraging state funding through local partnerships and federal grants
- An opportunity to grow Kentucky's knowledge economy through R&D partnerships

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e-mail

phone

