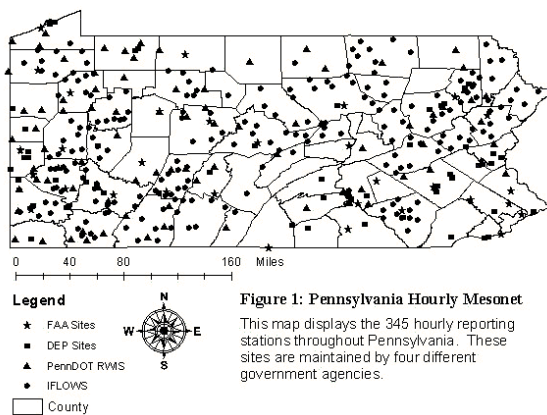


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From highway safety and integrated pest management to air quality issues, the value of smaller scale, frequent weather observations is rapidly increasing. In Pennsylvania, where agriculture and commerce are major industries, the integration of mesoscale reports is the focus of a two-year project sponsored by COMET and the Federal Highway Administration. Using Pennsylvania's Department of Transportation's (PennDOT) Roadway Weather Information System (RWIS) as the base, the state climate office is stitching a new network of hourly observations from several sources. The 84 RWIS sites are being combined with the 33 Federal Aviation airport sites and 50 sensors from the state's Department of Environmental Protection (DEP). Additionally, 178 hourly I-Flow (precipitation gauges along rivers) reports are used to create a mesoscale network of hourly temperature (167), precipitation (211), wind and relative humidity (115) observations (Fig. 1).



The first phase of the project was the acquisition of the individual data streams into a cohesive database. The quality of each observation was examined before inclusion into the database. Issues of site location, frequency of observations, instrument differences and network communications were among the initial challenges of creating the Pennsylvania

mesonet. A series of studies are being conducted to crosscheck observations with the well-established, high quality FAA station network. An analysis of these data has shown instrument errors at several new sites (which are being corrected) and has amplified the inconsistencies in network communications.

The second phase of the project is the assembly and displays of the observation elements in near real-time. Several interfaces have been explored including spatial representation of surface temperature with adjustments due to complex terrain, time series of relative humidity, animations of streamlines representing hourly wind reports as well. Downloadable Adobe portable document formatted (PDF) files of each site's archived reports are being produced. The design of the graphic user interface is being accomplished by collaboration with web masters at the Penn State Environment Institute, the Science Operations Officer at the State College National Weather Service (CTP) and senior management at ZED-X Inc, a private enterprise firm serving agro-meteorological interests in the eastern United States.

The third phase of the project is the development of value-added, user specific products. Additional tools to serve PennDOT's Total Storm Management program are being designed using the mesonet. Application of the finer scale observations into the Advanced Weather Information Processing System (AWIPS) are planned for use by the National Weather Service in Pennsylvania to enhance winter storm watches and warnings based on pavement temperatures. In time, the new network of observations, will be incorporated into regional mesoscale weather models. The development of both a mesoscale and microscale climatology of the state will be part of the project's outcome.

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