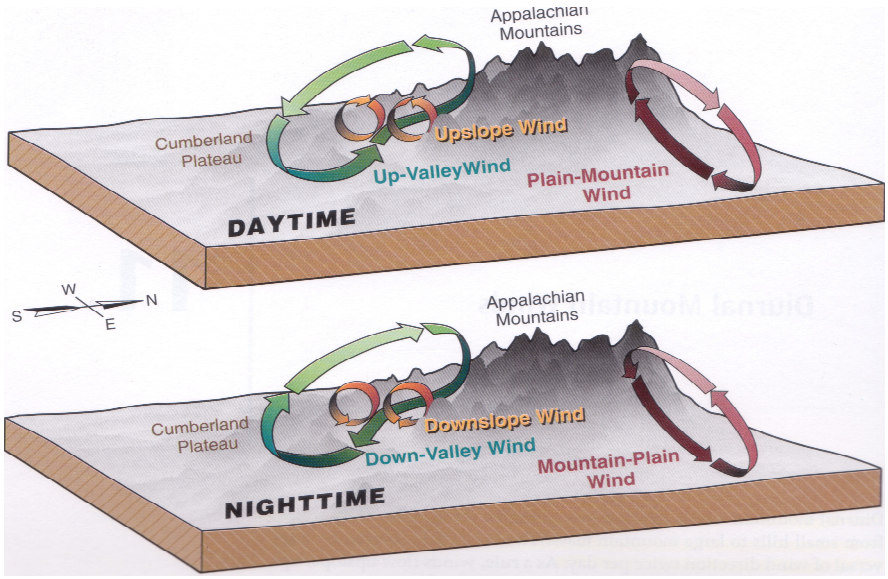
Scientific Computing within the ORNL Modeling and Simulation Group: EM Expertise - Meteorological Modeling Within the Great Valley Of Eastern Tennessee

The ORNL Modeling and Simulation Group (MSG) develops sophisticated numerical solutions for a wide range of scientific, engineering, and operational applications. MSG's core competency is computational physics and engineering, and within our environmental modeling (EM) focus area we maintain considerable expertise for predicting plume dispersal and mountain meteorology in the Great Valley of Eastern Tennessee. During any accidental release on the Oak Ridge Reservation (ORR), the ORNL Emergency Response Meteorologist (ERM's) must assess and forecast meteorological conditions to predict the human and environmental consequences of the release. Winds aloft, atmospheric stability, cloud cover, precipitation, temperature, humidity, pressure, solar angle, and land cover throughout the Great Valley all combine to affect the dispersion of accidental releases on the reservation. MSG staff model these widely-disbursed terrain-specific physical mechanisms to support the ERM's as he generates protective action guidelines during the release. The primary model used by MSG to predict plume dispersal within the Valley is Computer Assisted Protective Action Recommendation Systems (***CAPARS***). ***CAPARS*** is a commercial software suite produced by AlphaTRAC, Inc. that predicts the time-dependant path and chemical nature of hazardous material plumes. Together with real-time and historical meteorological data, the code is able to quickly and accurately predict plume dispersal as functions of the thermal- and terrain-forced wind systems and localized meteorological effects unique to ridge-and-valley terrain. MSG's expertise with meteorological modeling represents an extremely versatile resource for a broad range of R&D, industrial, homeland defense, and military applications. We welcome the opportunity to discuss your potential applications and ways MSG can contribute to a solution.



CAPERS prediction of upslope and downslope winds resulting from two major types of thermally-driven Great Valley wind systems; Along Valley Flow & Mountain Breeze.

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