SuomiNet Efforts in the U.S. Southern Great Plains (paper, year?)

596 Beth Bartel December 30, 2009 SuomiNet 2630

SUOMINET EFFORTS IN THE U.S. SOUTHERN GREAT PLAINS

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1. INTRODUCTION

SuomiNet (Ware et al. 2000) is a university-based, real-time, national network of Global Positioning System (GPS) installations established in 2000 for geosciences research and education, with funding from the National Science Foundation and cost sharing from collaborating universities. The network exploits the ability of groundbased GPS receivers to make atmospheric measurements, including integrated water vapor. The University of Oklahoma (OU), in partnership with the U.S. DOE Atmospheric Radiation Measurement (ARM) Program, is establishing geodetic quality SuomiNet receivers over the next year at 15 ARM Southern Great Plains (SGP) extended facilities (EFs) located throughout Oklahoma and Kansas and at one Oklahoma Mesonet (Brock et al. 1995) weather station in central Oklahoma.

The establishment and scientific applicability of the SuomiNet sites within Oklahoma and Kansas will have several unique aspects. SuomiNet water vapor data will augment ARM's suite of water vapor measurements, which includes a GPS micronet centered on the site's central facility in northern Oklahoma, a number of microwave radiometers, a microwave profiler, a Raman lidar, an atmospheric emitted radiance interferometer, radiosondes, and various standard relative humidity devices located at ground level and on a 60-m tower. The ability to perform water vapor measurement intercomparison studies, conduct instrument development, and operate enhanced, short-term water vapor experiments over the region will be greatly enhanced by SuomiNet's dual-frequency GPS receivers. These high quality receivers, along with co-located surface meteorological data, will allow direct measurement of wet delay and, therefore, total slantpath water vapor. The average station spacing is 50-60 km, thus providing a meso-beta scale horizontal distribution of integrated precipitable water.

Other unique aspects of the SGP deployment will be the use of ruggedized laptop computers to collect the GPS data and push them to SuomiNet computers using local Internet Service Providers (ISPs). The OU's School of Meteorology and Center for the Analysis and Prediction of Storms (CAPS) will evaluate the potential of using the suite of water vapor measurements to improve the skill of numerical weather forecast models. OU scientists in the School of Geology and Geophysics will use the data to conduct plate tectonics studies.

[See attached .pdf file for more.]

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