Results of Operational Near Real-Time Radiometric Soil Moisture Imaging in CLASIC 2007

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During summer 2007 the CU Center for Environmental Technology operated the PSR/CXI scanning C and X-band radiometer onboard the NASA P-3B aircraft. The observation domain included a large region of central Oklahoma, and three areas over Texas. During the experiment an unusual amount of precipitation was observed over the domain, which resulted in significant flooding of populated areas. The PSR/CXI instrument was used to obtain high resolution microwave thermal emission maps over these areas. These maps were subsequently used to obtain estimated soil moisture maps. Data from sources including the Oklahoma Mesonet (air and soil temperatures), National Weather Service (air temperatures), and the SeaWiFS sensor onboard the SeaStar satellite (NDVI) were used in a soil moisture retrieval algorithm to produce calibrated soil moisture maps within less than 24 hours turnaround time after each flight. The algorithms developed for this data processing were based on the work of Jackson, et al. between 1999 and 2002. As a result of the near-operational processing of the data the experimenter's products were requested and used by emergency management personnel responding to severe flooding over the region of observation. We discuss the electromagnetic theory and method of the operational soil moisture retrieval algorithm and the techniques used to acquire the brightness data and utilize the necessary data elements from a variety of sources to compensate for confounding variables. We compare and validate the results of the soil moisture retrieval algorithm to accumulated precipitation as reported by the NWS Nexrad radar system and *in situ* soil moisture measurements obtained from the Oklahoma Mesonet. Techniques for communicating experimental results using the Google Earth mapping software and KML file formats are discussed.