1.5: A New Hydrometeorological Testbed in Northern Mexico for Improved Weather Forecasts and Climate Monitoring

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In northern Mexico, climate change may translate into an increase in extreme weather and more prolonged drought. The existing capability to monitor, assess, and predict the weather and climate of this region is hindered by the lack of observations of key aspects of the hydrological cycle. The objective of this project is to create and establish the North American Monsoon GPS Hydromet Network 2017. This was a long-term hydrometeorological observational testbed in Sonora to better understand and predict convective precipitation during the 2017 North American Monsoon. The testbed is a highly instrumented measurement network that will facilitate process studies of the hydrological cycle and improve weather forecast capability through monitoring of surface water balance, land-surface atmosphere exchange, and atmospheric moisture. The scope of work included the creation of this network and demonstration of its utility to constrain numerical models, validating and improving their capability, and testing hypotheses with regards to monsoon moisture sources and ecosystem responses. This is a joint research project between the University of Arizona (UA), Arizona State University (ASU), and several Mexican institutions, including the Universidad de Sonora (UNISON), Universidad Nacional Autónoma de México (UNAM) and the Instituto Tecnológico de Sonora (ITSON). Bi-national capacity building and technology transfer occurred between the participating institutions. Involved student research and training activities in regional atmospheric modeling and data assimilation took place within the UA Department of Hydrology and Atmospheric Sciences, and resulted in transfer of these technical capabilities to the Centro de Ciencias de la Atmósfera within UNAM. Specific opportunities to continue this research and transition these capabilities for operational forecasting were scoped at the conclusion in the project, in consultation with several local agencies in Sonora involved in agriculture, water resources, civil protection, and ecological management.

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