The Caribbean Low-Level Atmospheric Circulation and Regional Hydrometeorology: Resolved by the COCONet GPS Network?

Sumant Nigam and Alfredo Ruiz-Barradas
Department of Atmospheric & Oceanic Science, University of Maryland, College Park, MD20742
(Email: nigam@umd.edu)

The key features of the Caribbean low-level atmospheric circulation, which includes the well known low-level easterly jet (Munoz et al. 2008), and related hydrometeorology are reviewed and juxtaposed on the GPS station siting plan to assess if they will be suitably resolved. The features include

- Caribbean Low-Level Jet (CALLJ): An easterly (from the east) jet with a core at 925 hPa, and located between 12-14N and 70-75W. The speed of zonal wind (along latitude circle) in the jet-core exceeds 13 m/s. The jet appears both in February and July and transports vast amounts of moisture toward Central and North America.
- Relative vorticity and divergence at 925 hPa: The rotational and divergent components of the circulation are dynamically important in development of organized convection.
- Planetary Boundary Layer (PBL) Static Stability: Is estimated from vertical gradient of potential temperature; it influences exchange of heat and momentum with the free troposphere. A strong thermodynamic influence on the development of convection.
- CALLJ shear: The vertical shear of the zonal wind in the lower troposphere (e.g., 800-925 hPa) and across the troposphere (200-925 hPa) are again dynamically important for the generation and maintenance of organized, deep convection.
- Precipitation over the Caribbean rim: Central America, including the very narrow land bridge, is the locus of intense precipitation and deep atmospheric diabatic heating during boreal spring and summer. The deep heating and its interannual variations have far-reaching circulation and hydroclimate impacts. Improved monitoring of moisture and precipitation over this region would be very beneficial.

The review will help evaluate the GPS station siting plan from a meteorological perspective.

References: Munoz, E., A. J. Busalacchi, S. Nigam, and A. Ruiz-Barradas, 2008: Winter and summer structure of the Caribbean Low-Level Jet. *J. Climate*, 21, 1260-1276.