

Annual Precipitation Pattern over Long Island Based on Radar Data

[Lisha Zhou](#)

Gilbert N. Hanson

Department of Geosciences

Stony Brook University

Stony Brook, NY 11794-2100

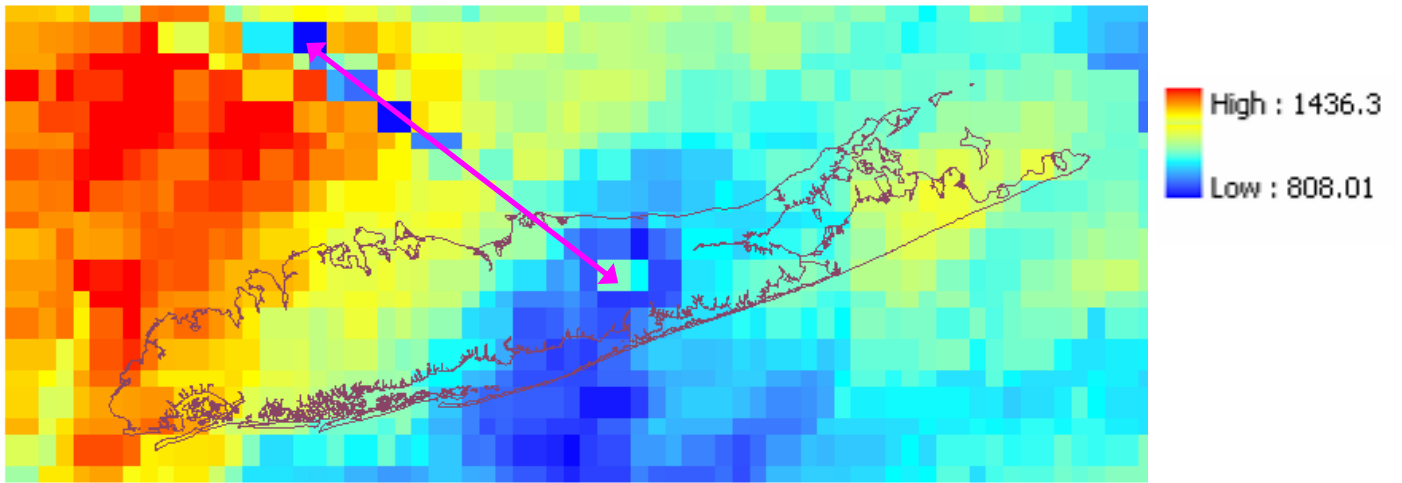
Accurate measurements of precipitation are very important for rainfall-related applications. Rain gauges physically measure rainfall accumulation at a point and provide high quality data for a very small area. But rain gauge networks are usually not dense enough to measure precipitation at the resolution and extent necessary for determining the spatial variability of rain fall over a larger area. In this study we are concerned with the variability of rainfall over Long Island and its relation to the variability in recharge of groundwater across Long Island.

Weather radar measurements of precipitation potentially provide rainfall data with much higher spatial and temporal resolution compared to rain gauges. The radar system (NEXRAD) consists of 159 high resolution Doppler weather radar stations throughout US and selected oversea locations. The radar system generates data every 15 minutes, with spatial resolution of $4*4 \text{ km}^2$. Radar data that can be used for modeling (Stage III and MPE-Multi-sensor Precipitation Estimator) are available beginning in 1996.

We are using the radar MPE data to get the precipitation pattern over Long Island. The automated radar data processing system, which was developed by a research group at the University of Texas at San Antonio, has been implemented using a commercial GIS program and a number of Perl scripts and C/C++ programs.

Results for 2004 show the variability of rainfall over Metropolitan New York including Long Island (Fig. 1). For 2004 rainfall is highest in the west, with the least rainfall over the middle of Long Island.

In order to evaluate the accuracy of the radar results, the results for 2004 were compared with the rain gauge data for the 11 operating stations on Long Island (Fig. 2 and 3). The annual radar rainfall was in good agreement with most of the rain gauge stations except for those at Bridgehampton and Centerport. It is not clear why those two stations give discrepant results.



<i>Statistics for the map</i>	Unit: mm	Unit: inches
Max	1436	56.5
Min	808	31.8
Annual Mean	1142	45.0

Figure 1. Radar Rain Fall Results for 2004. Units on map are in mm. The arrow overlies the area with anomalously low rainfall. Along this line the radar beam from the radar station at Brookhaven National Laboratory is blocked

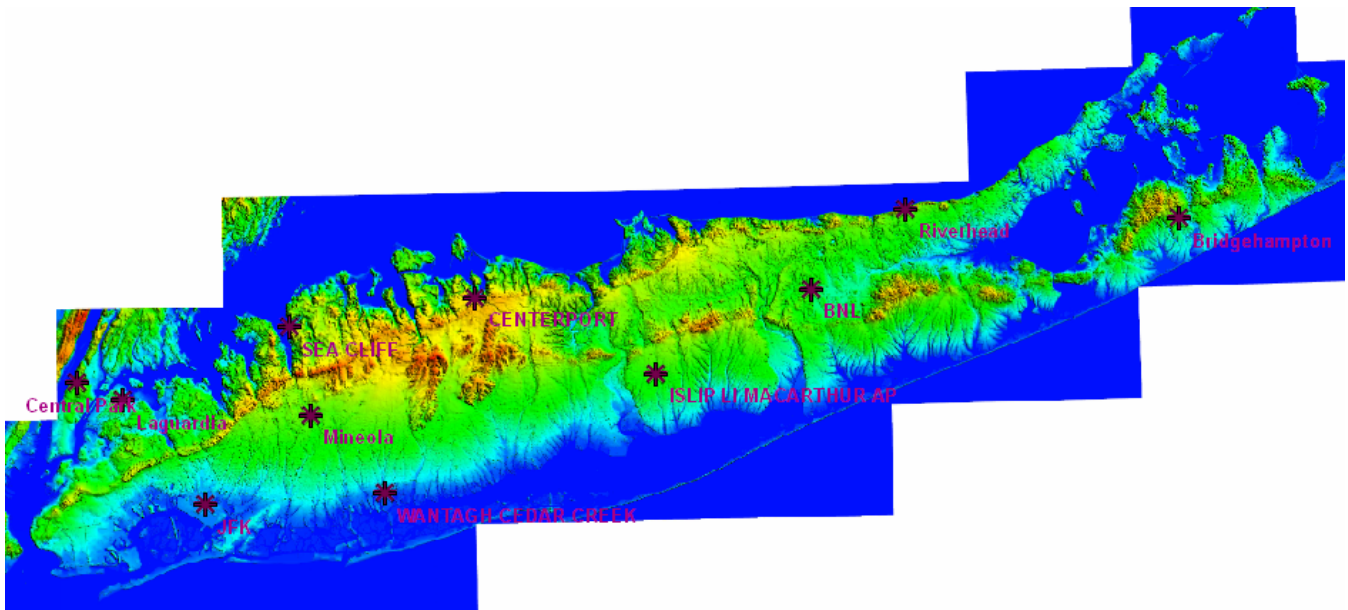


Fig. 2. Operating Rain Gauge Stations on Long Island in 2004

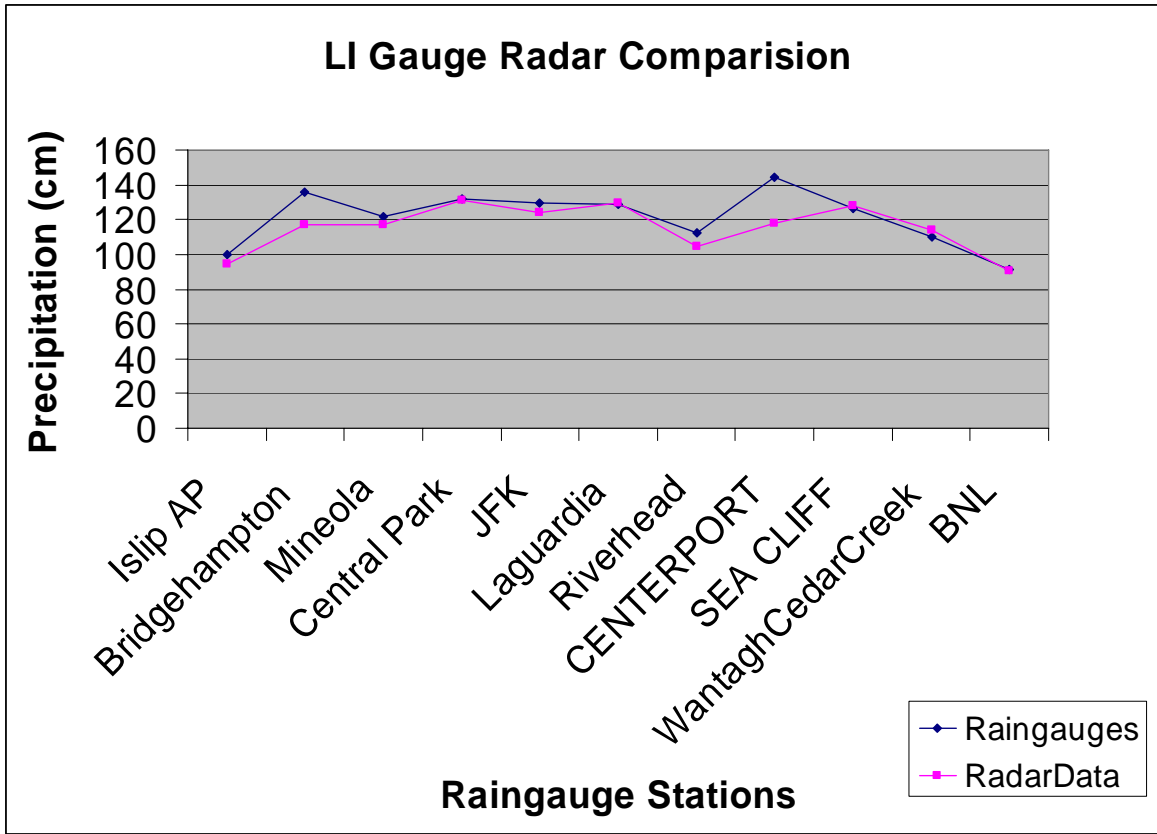


Fig. 3. Comparison of annual rain gauge precipitation for 2004 to the calculated precipitation at the same site based on NEXRAD radar.