Observations and analysis of an urban boundary layer during extreme heat episodes

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Abstract

1 Introduction

Understanding the planetary boundary layer over urban areas, also called the urban boundary layer (UBL), is critical as the conditions in this layer directly affect human activity.

2 Data collection and analysis

2.1 Study site

The UBL over New York City is observed and analyzed in this study. Observational data was captured at four locations within New York City (Table 1).

Table 1: Locations and details of observations sites.

	Bronx	Manhattan	Queens	Staten Island
Coordinates	40.87248°N, - 73.89352°E	40.82044°N, - 73.94836°E	40.73433°N, - 73.81585°E	40.60401°N, - 74.14850°E
Elevation (m a.g.l.)	57.8	90.6	56.3	32.4

2.2 Observational instruments

Observations of the UBL were made using a synthesis of microwave radiometers, lidars, sonic anemometers, and surface weather stations.
Vertical profiles of temperature and vapor density were captured using microwave radiometers (Radiometrics MP-3000A). Profiles are captured at 58 height levels starting at 50 m and ending at 10 km above ground level, with vertical steps of 50 m from 50 to 500 m, 100 m from 500 m to 2 km, and 250 m steps above 2 km.