

Microwave Profiler Performance during Heavy Rain

Examples:

- Hong Kong (54 mm/hr)
- 2010 Winter Olympics (20 mm/hr)
- Washington, D.C. (50 mm/hr)
- Pearson International Airport (>60 mm/hr)



MP-3000 temperature, humidity and liquid profiles are reasonable during 54 mm/hr rain (Chan, <u>Performance and application of a multi-wavelength, ground-based</u> <u>microwave radiometer in intense convective weather</u>, Met Zeit, 2009)



to 20 mm/hr rain, sleet and snow (Ware et al, Atmos. Res., 2013)



MP-3000A profiles to 7 km height; extreme instability (CAPE=5,000 J/kg) is evident 10 hours in advance; accurate retrievals during rain and hail >50 mm/hr



MP-3000A profiles to 1 km height; forecast index (Windex) shows 100 mph winds eight hours in advance; accurate retrievals during rain and hail >50 mm/hr (<u>Thermodynamic Observations of the June 2012 Derecho</u>, AMS, 2013).



MP-3031A at Pearson International Airport (Toronto, Canada)



Rain rate from gauges <75 m from MP-3031A exceeds 60 mm/hr



MP-3000A retrievals to 9 km height are reasonable during heavy rain



MP-3000A retrievals to 1 km height are reasonable during heavy rain



MP-3000A retrievals are reasonable during peak rain (>60 mm/hr)



Summary

- Reliable MP-3000A performance during heavy precipitation:
 - Hong Kong (54 mm/hr rain)
 - 2010 Winter Olympics (20 mm/hr rain, sleet and snow – good agreement with sondes)
 - Washington, D.C. (50 mm/hr rain)
 - Pearson International Airport (>60 mm/hr rain)