Diagnosing cloud radar miscalibration during CAP-MBL using higher order moments of the Doppler spectrum

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Radar Doppler Spectrum Skewness

Radar Doppler spectrum skewness is very sensitive to the drizzle formation process. It's relationship with reflectivity has a characteristic shape. The stability of this relationship can be exploited to use warm stratiform clouds as a natural target for radar calibration.
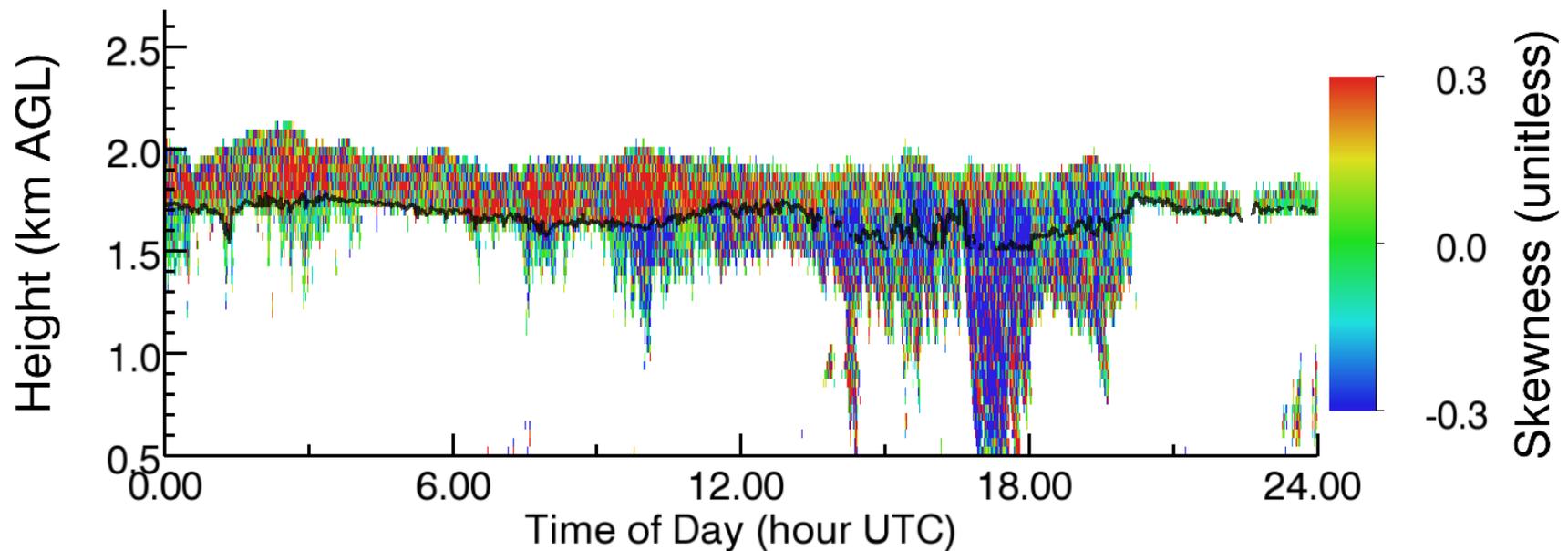
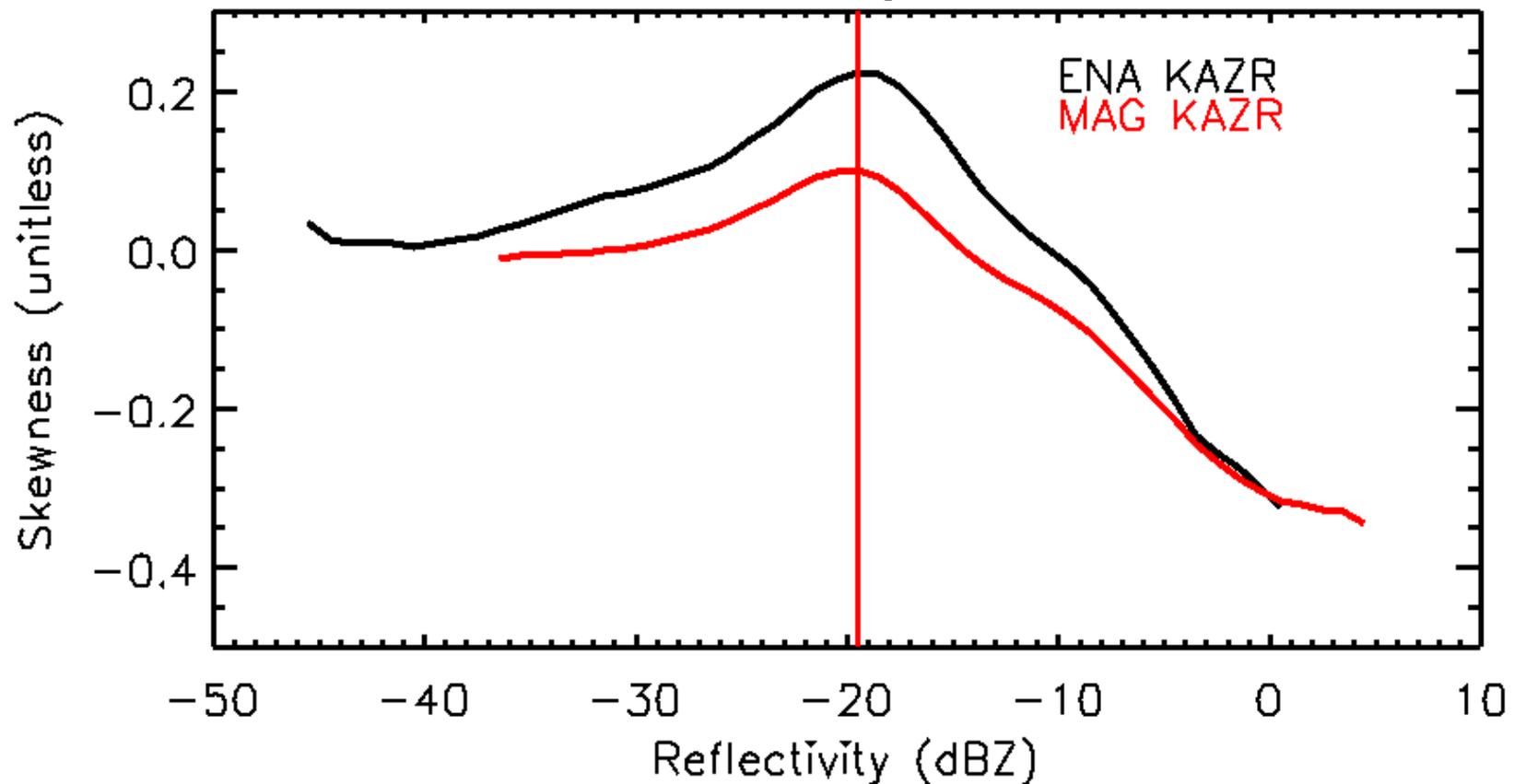# Skewness is an indicator of cloud-drizzle reflectivity balance
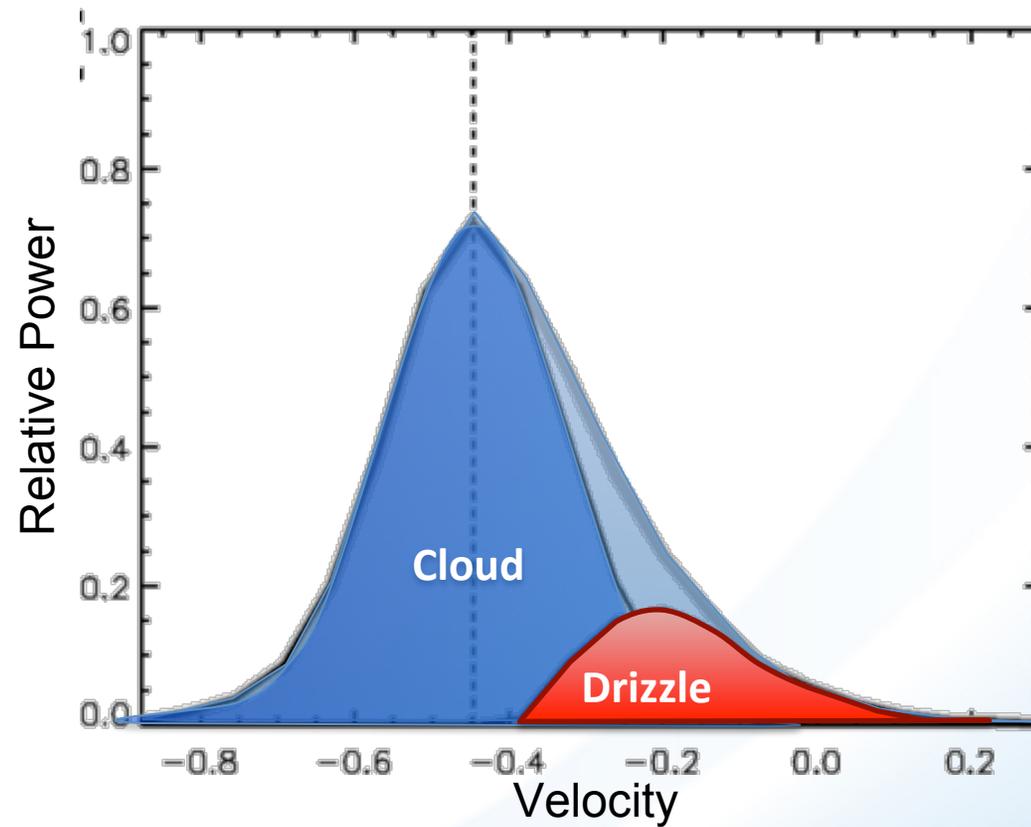
KAZR Skewness vs Reflectivity - ENA
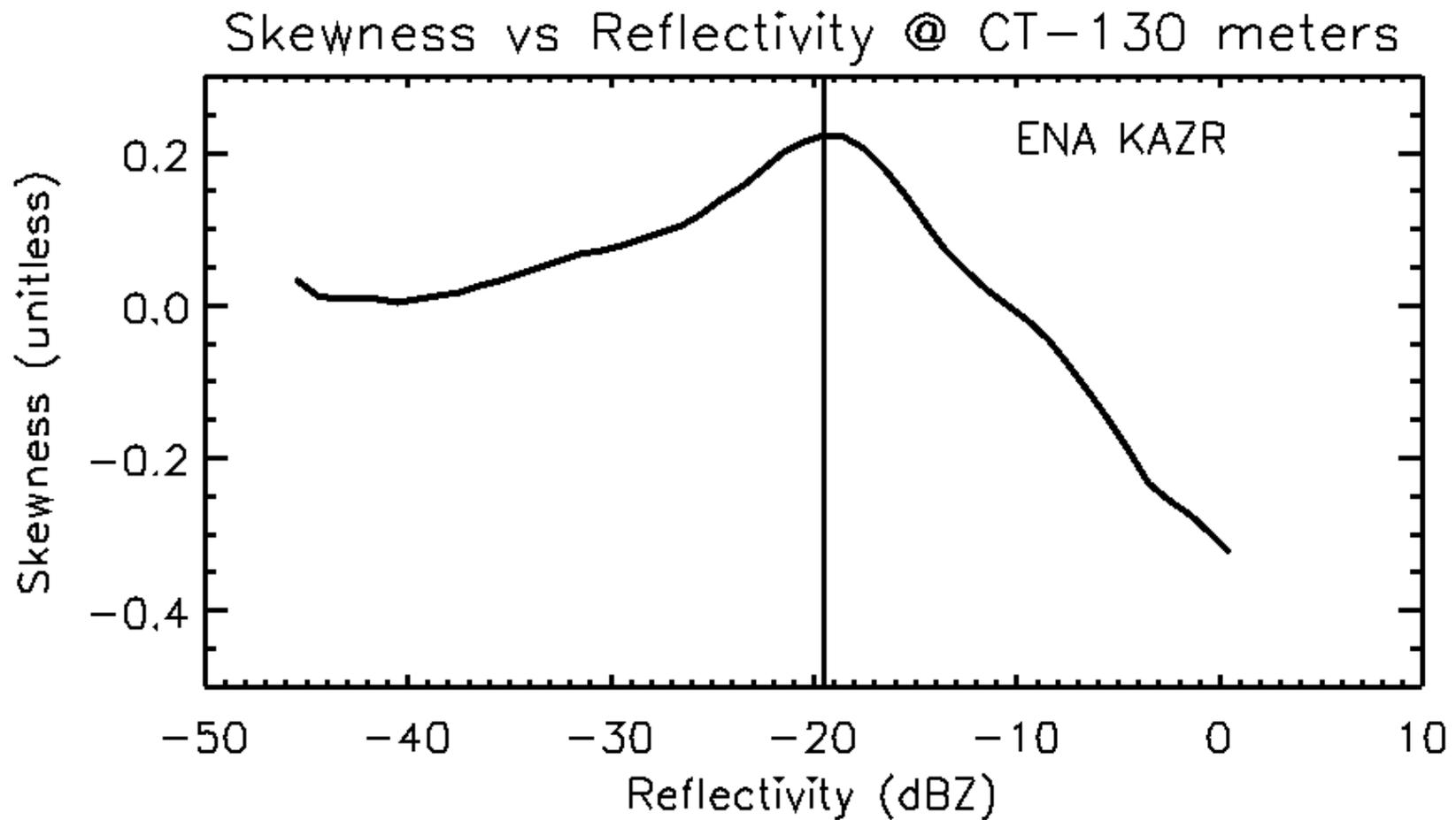
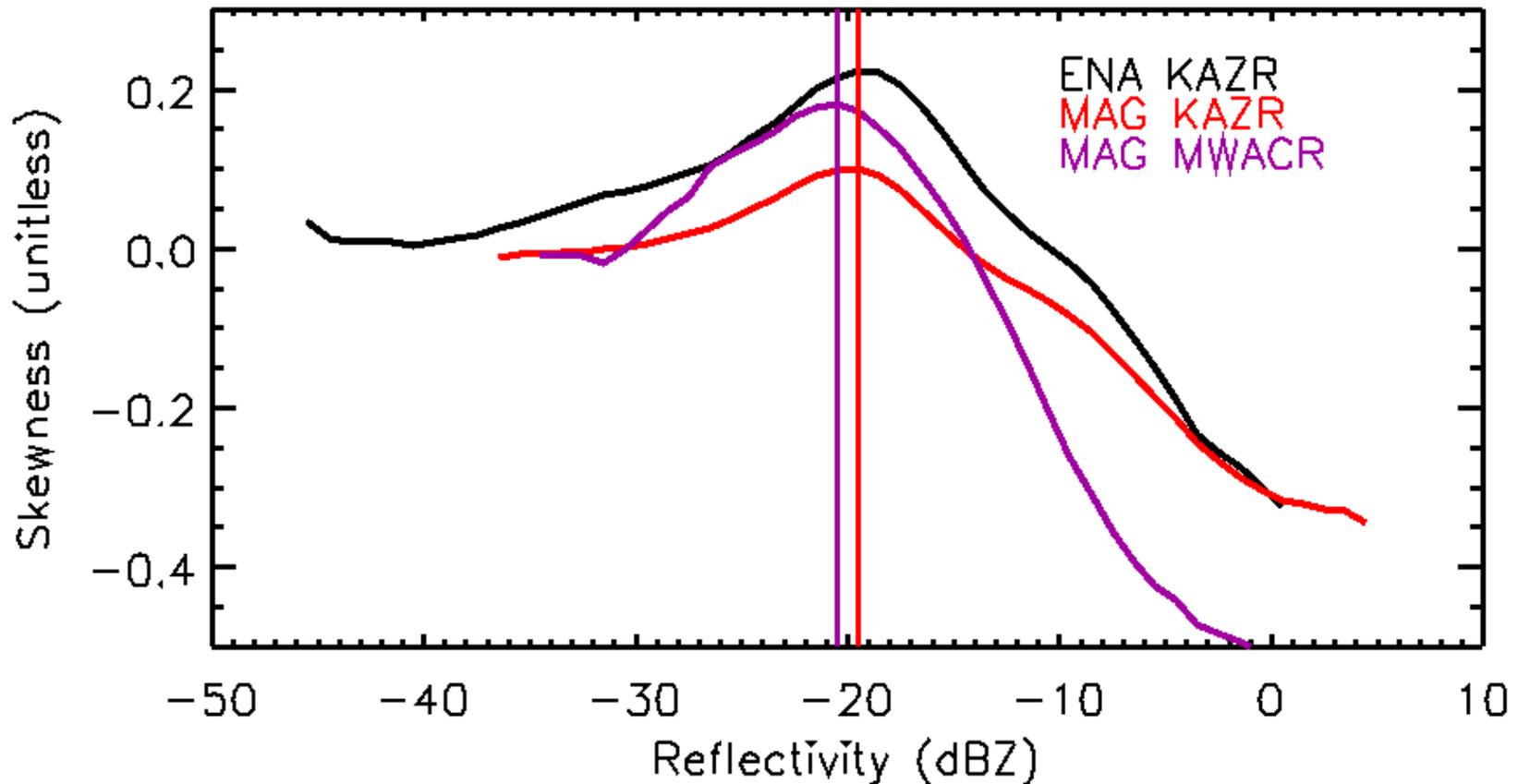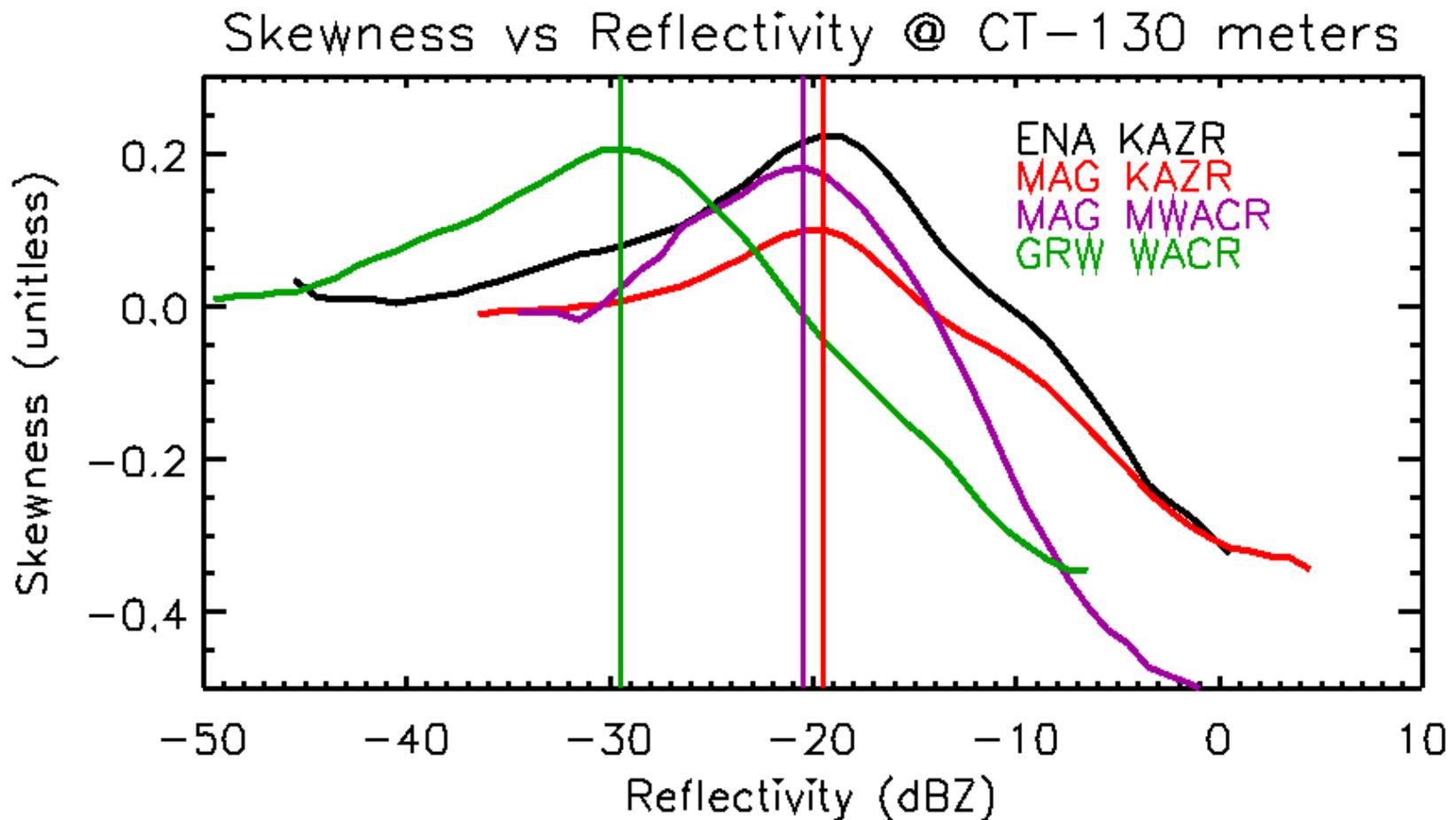Skewness vs Reflectivity @ CT−130 meters

Skewness vs Reflectivity – ENA,MAG

Skewness vs Reflectivity @ CT−130 meters

Skewness vs Reflectivity – ENA,MAG
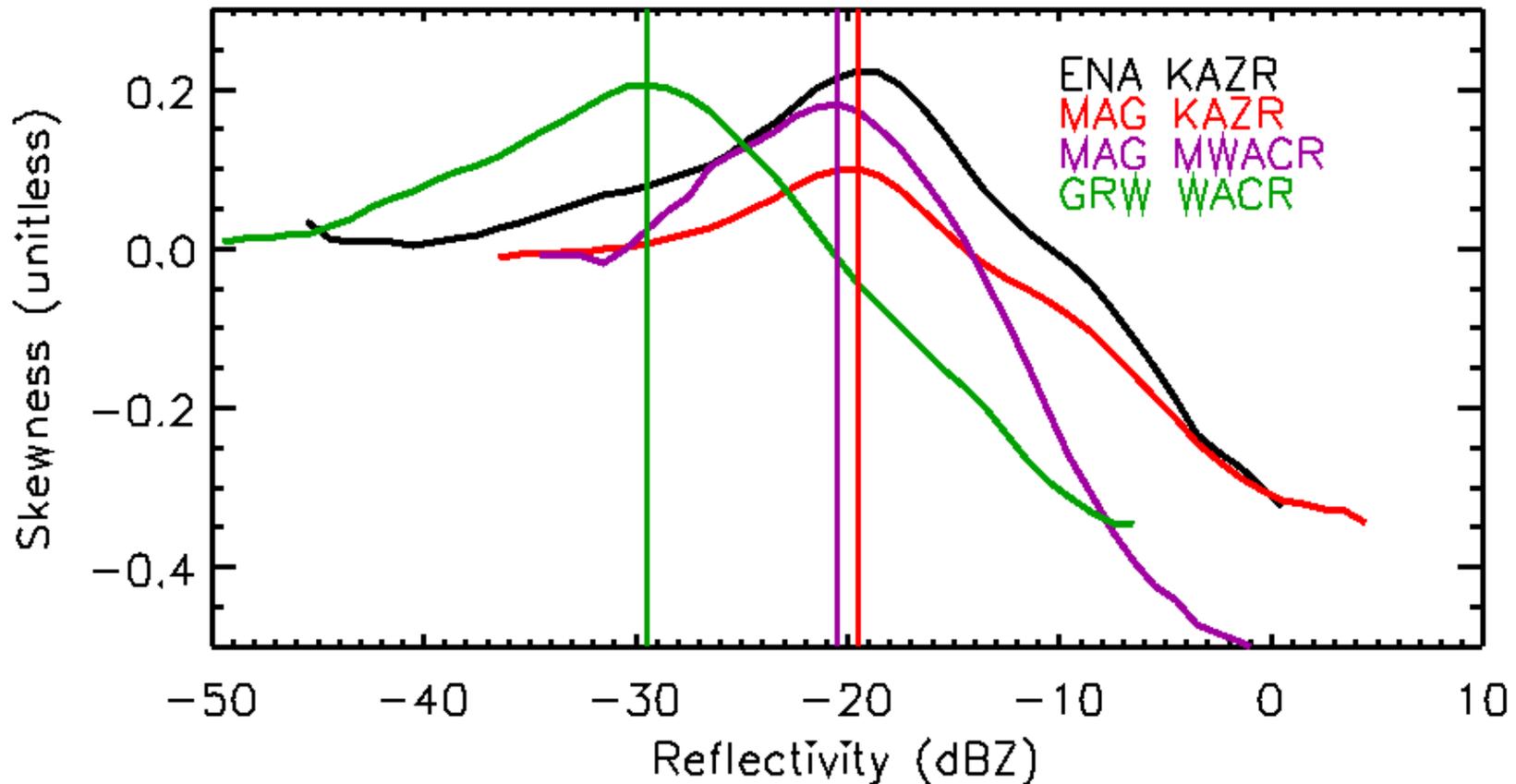

Skewness vs Reflectivity @ CT-130 meters

ENA KAZR
MAG KAZR
MAG MWACR

Skewness vs Reflectivity – ENA,MAG,GRW

Skewness vs Reflectivity @ CT-130 meters

ENA KAZR
MAG KAZR
MAG MWACR
GRW WACR

Skewness vs Reflectivity – ENA,MAG,GRW

"Graciosa…we have a problem…"

Skewness vs Reflectivity – ENA,MAG,GRW

"Graciosa…we have a problem…"
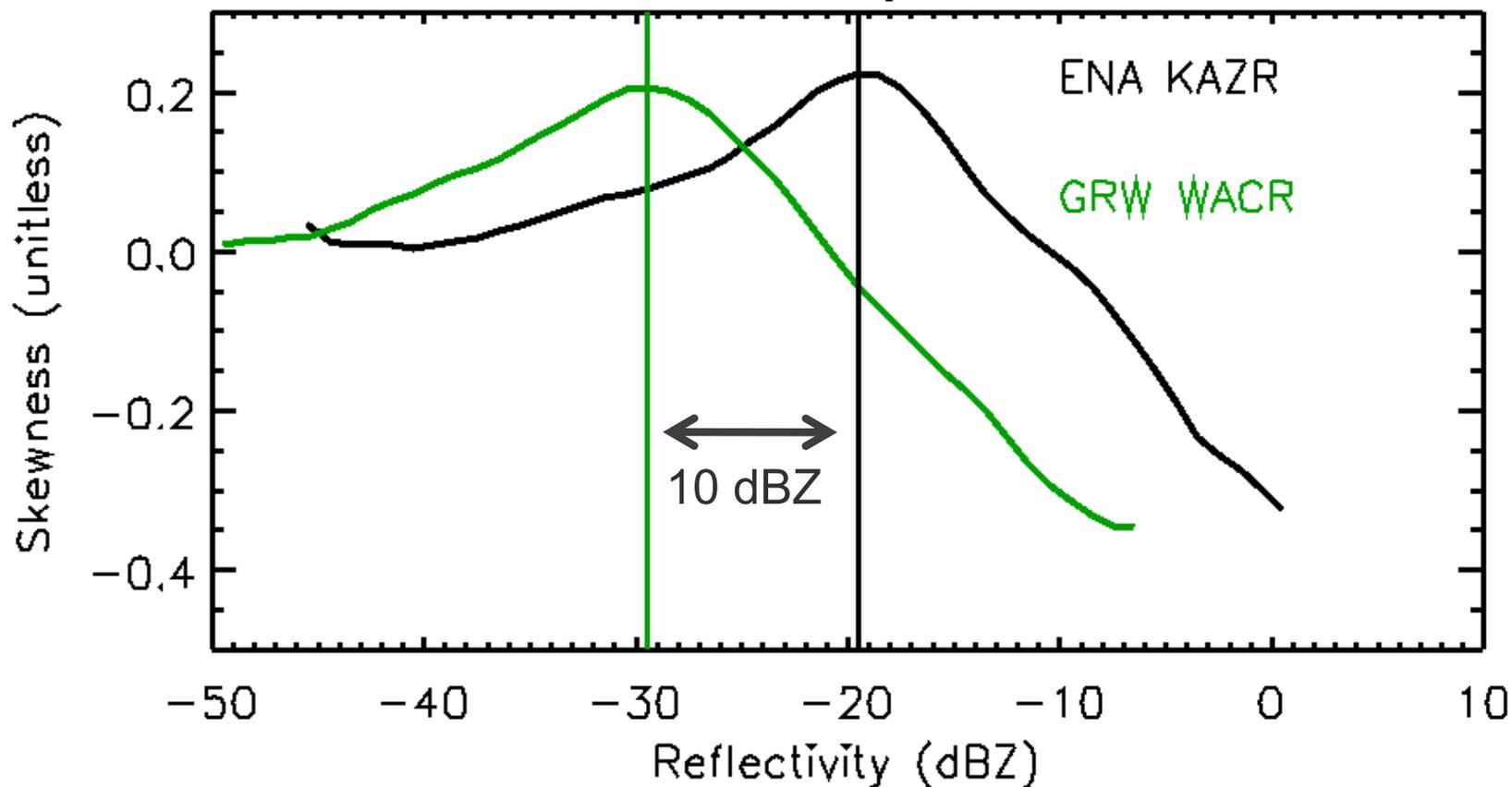
Maximum Column Reflectivity vs LWP
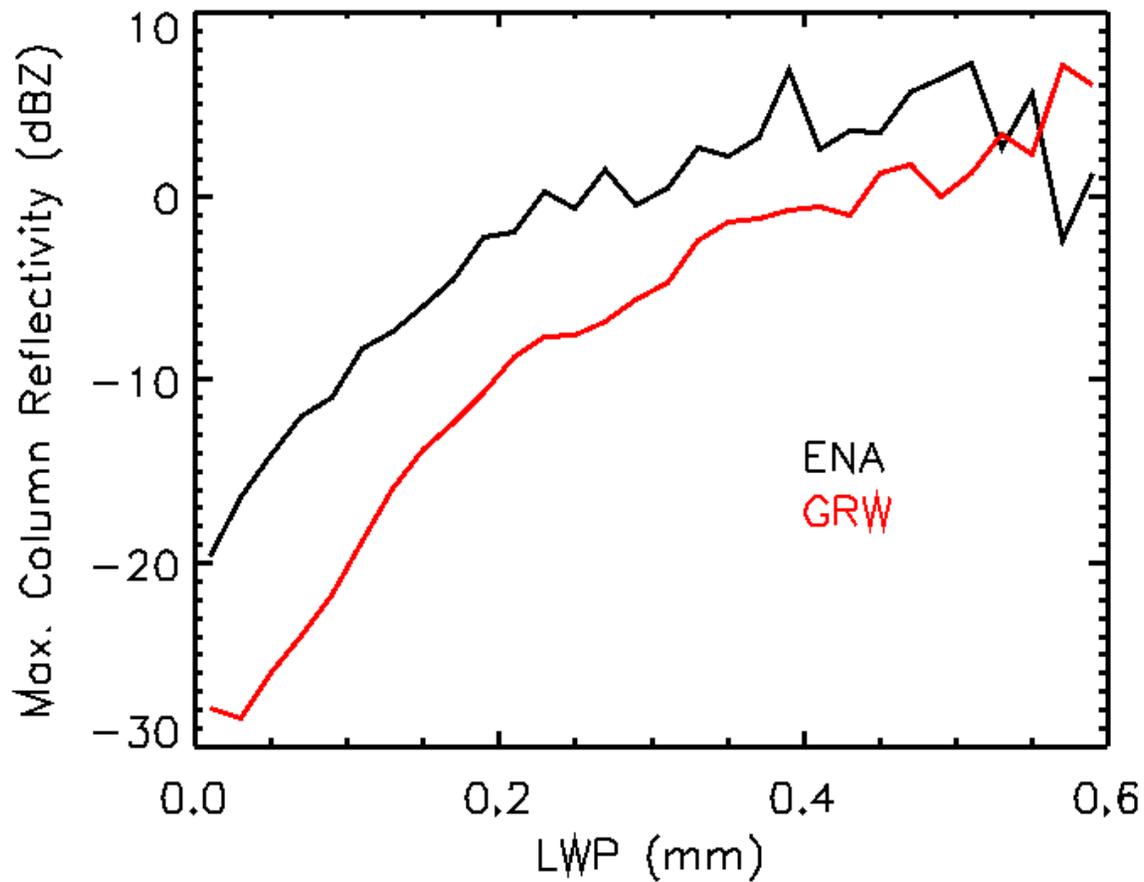
Conclusions

❑ WACR reflectivity during CAP-MBL is biased roughly **10 dBZ too low**.

❑ KAZR reflectivity at ENA and MAGIC are in good agreement

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