

2004 Satellite Direct Readout Conference: A Decade in Transition

Miami, Florida, December 6-10, 2004

The automatic generation of synthetic IR
images.

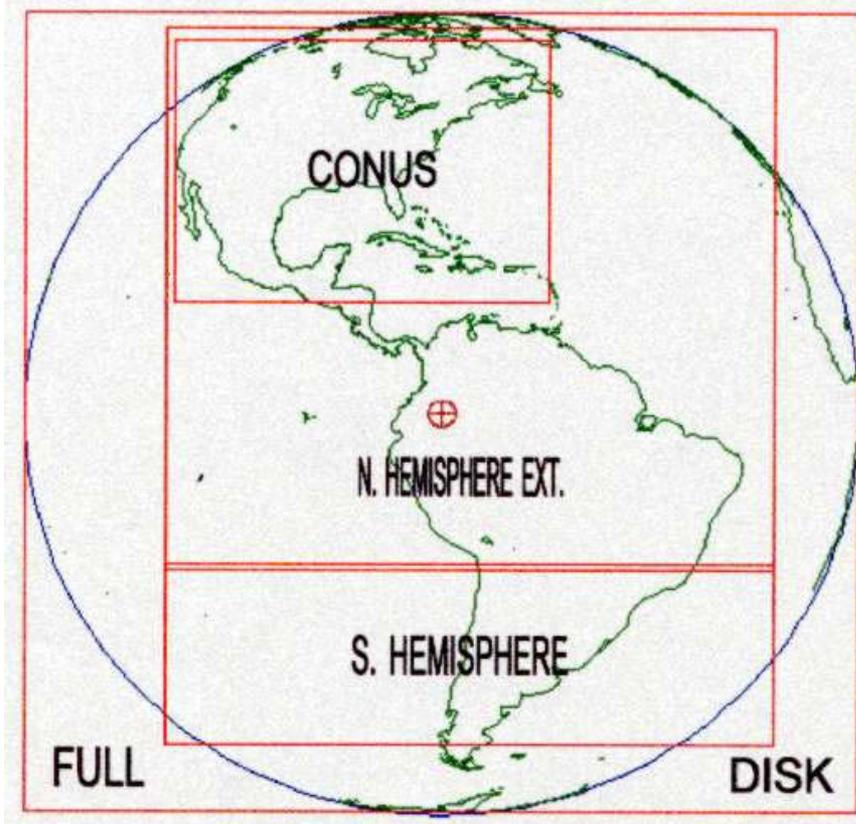
An application to the operational
hydroestimator technique

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Satellite GOES East: 4 sectors of image generation



Scanning frequency

CONUS:

1 image every 15 minutes

SOUTHERN HEMISPHERE:

1 image every 30 minutes
during 70% of the day.

1 image every 90 minutes
during remaining 30% of the
day.

It was proposed the generation of synthetic brightness temperature images interpolated between two consecutive observed images.

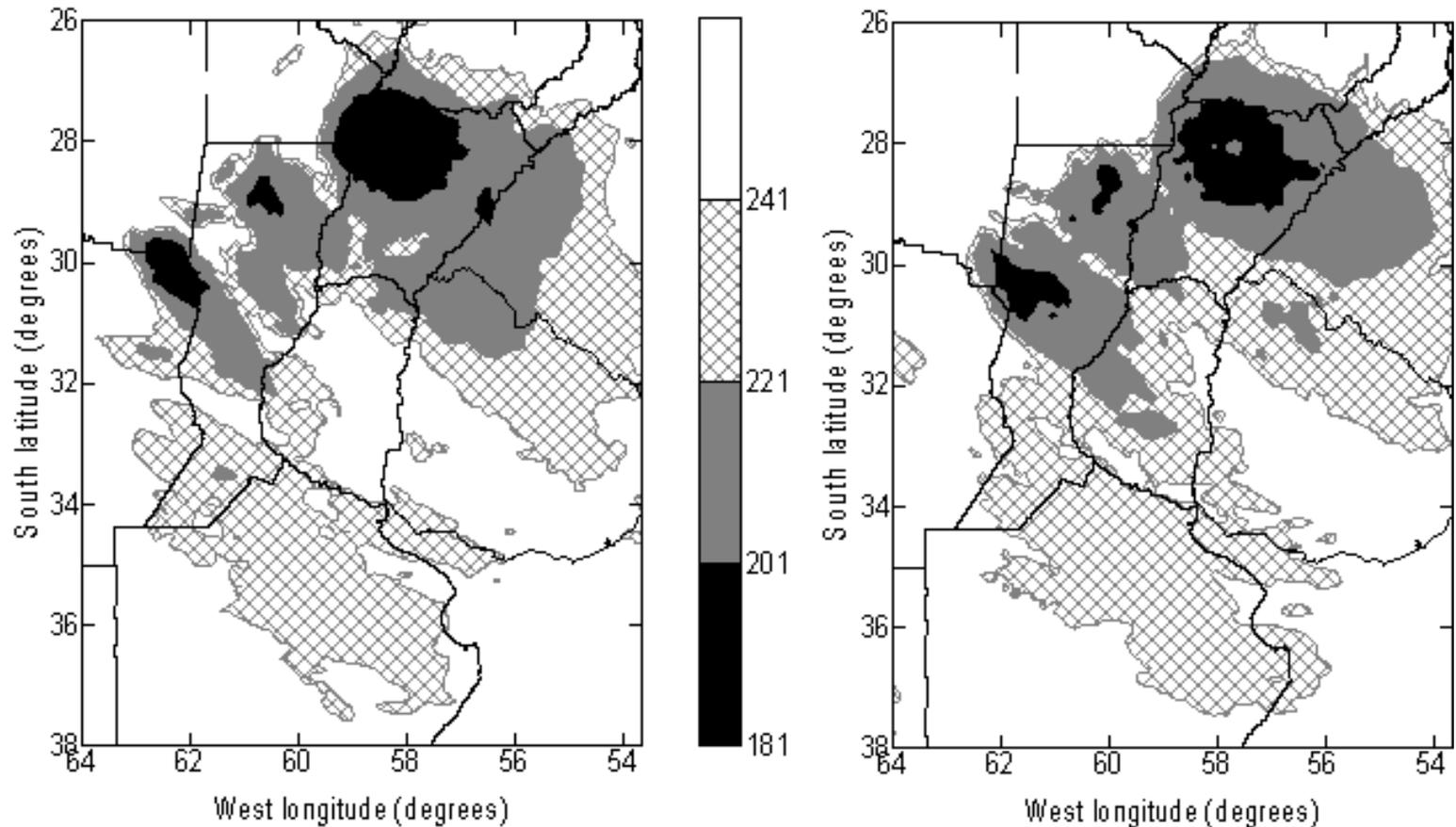
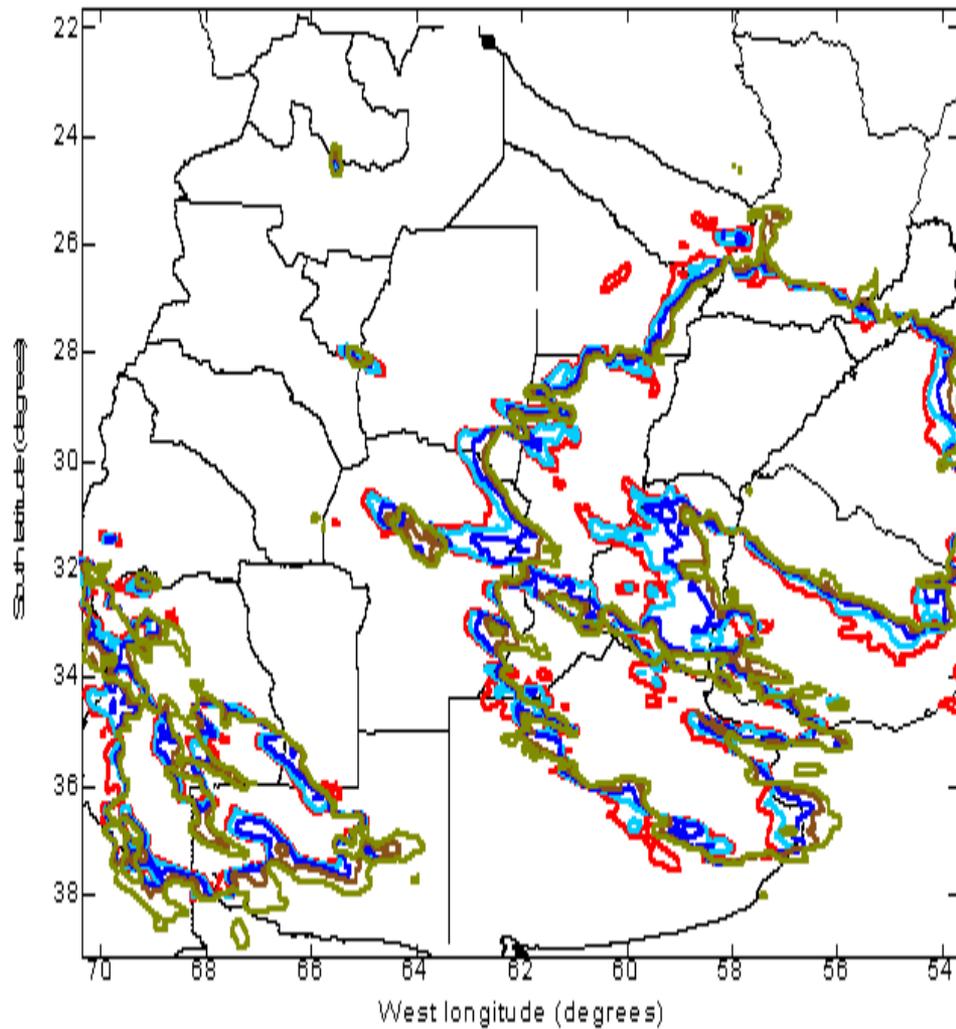


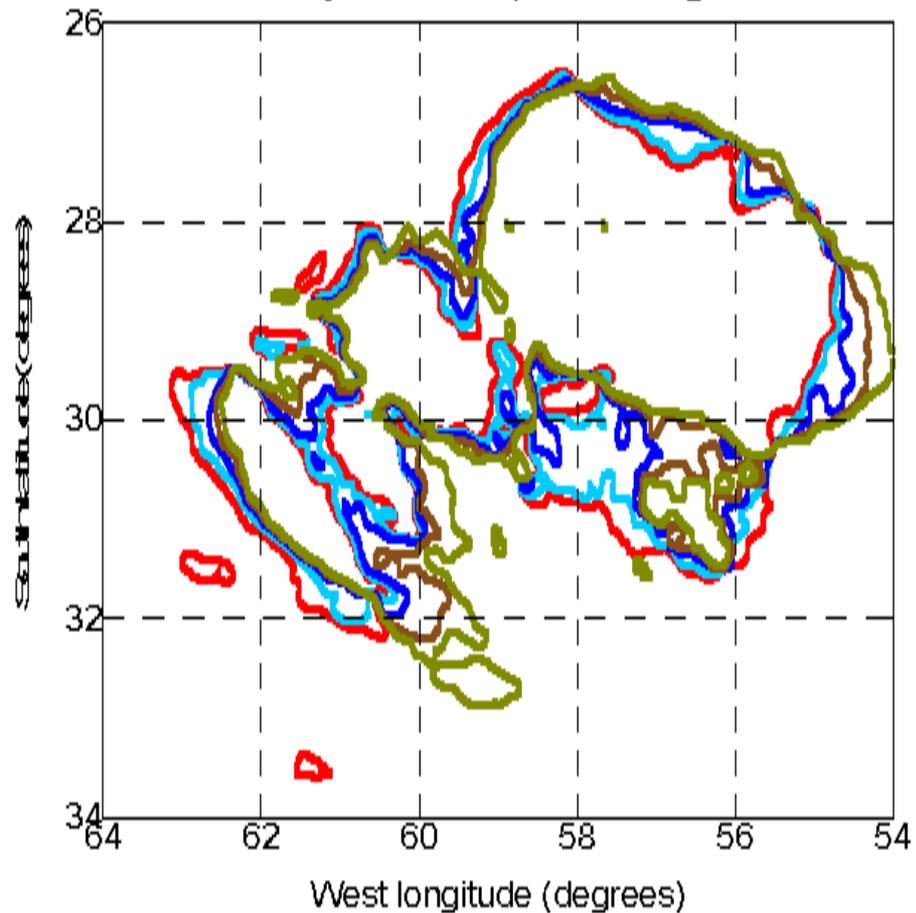
Figure 1. Bright temperature fields from two consecutive GOES IR Images
Class Interval limits are in Kelvin degrees
Date: Apr10/02 Left: 11.45 UTC Right: 13.09 UTC

241K cloud shield evolution from GOES
and synthetic interpolated images



Date: Apr/10/02.
GOES images: Red: 11.45GMT Green: 13.09GMT
Synthetic images: Sky blue: 12.07GMT Blue: 12.28GMT
Brown: 12.48GMT

221K cloud shield evolution from GOES
and synthetic interpolated images



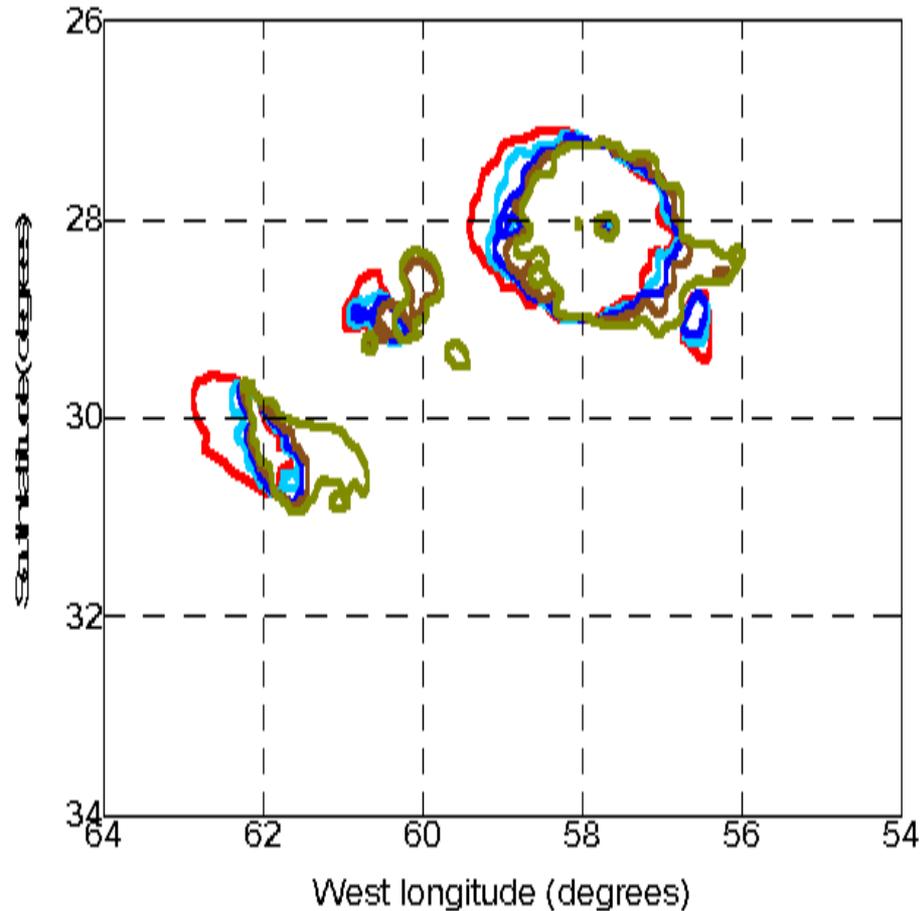
Date: Apr/10/02.

GOES images: Red: 11.45GMT Green: 13.09GMT

Synthetic images: Sky blue: 12.07GMT Blue: 12.28GMT

Brown: 12.48GMT

201K cloud shield evolution from GOES
and synthetic interpolated images



Date: Apr/10/02.

GOES images: Red: 11.45GMT Green: 13.09GMT

Synthetic images: Sky blue: 12.07GMT Blue: 12.28GMT

Brown: 12.48GMT

The *Hydro-estimator* technique: Designed to estimate convective rain in an operational way for periods up to one day. Spatial resolution limited by the pixel size (16 km²).

Monospectral: Uses infrared channel 4 (10.7μm)

Two stages:

1. Estimation of rain rate. Yields an area average value in each pixel.
2. Calculation of accumulated precipitation by integration over a time range assigned to each image.

Life-cycle scheme of a short-lived convective cell

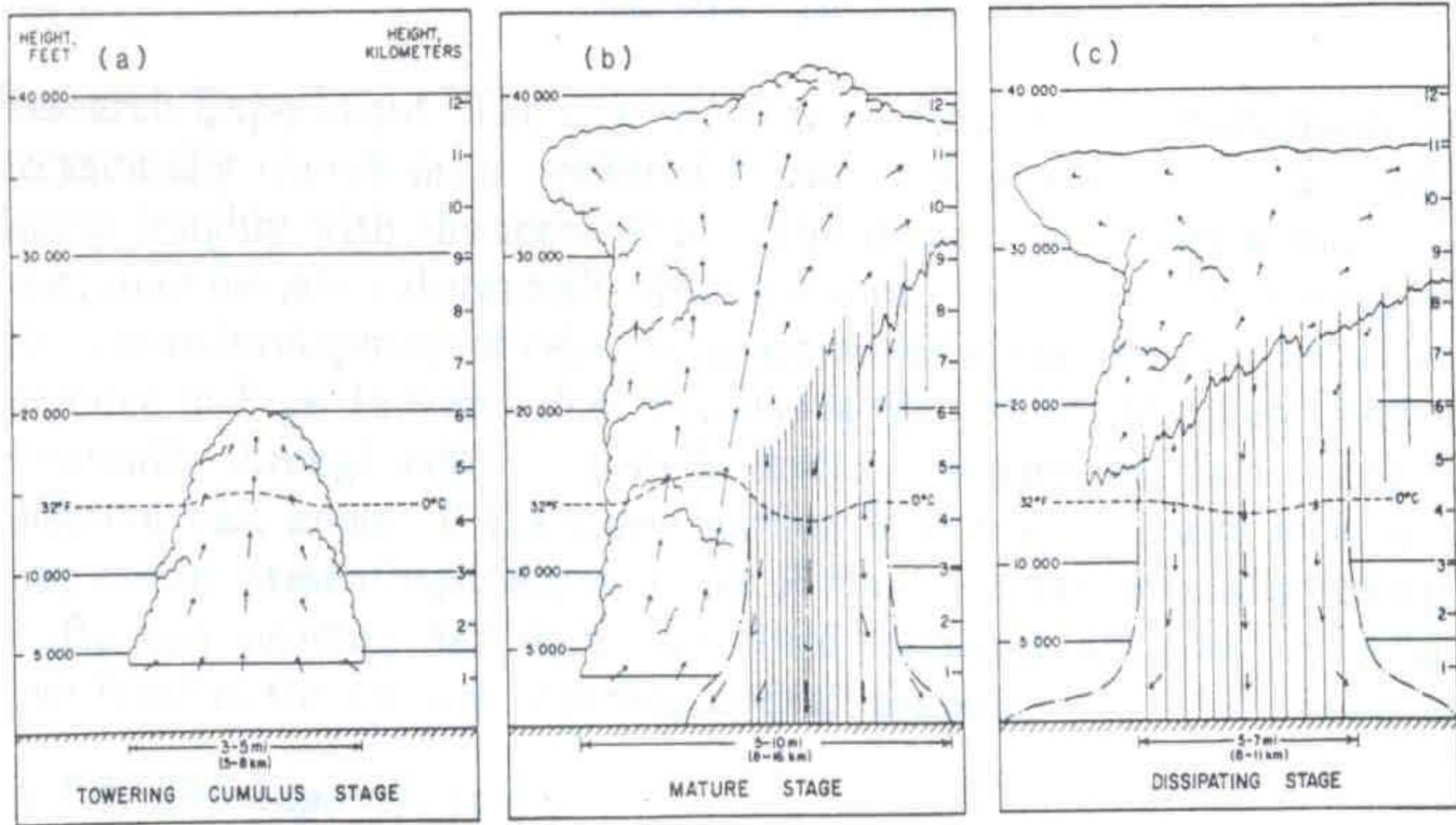
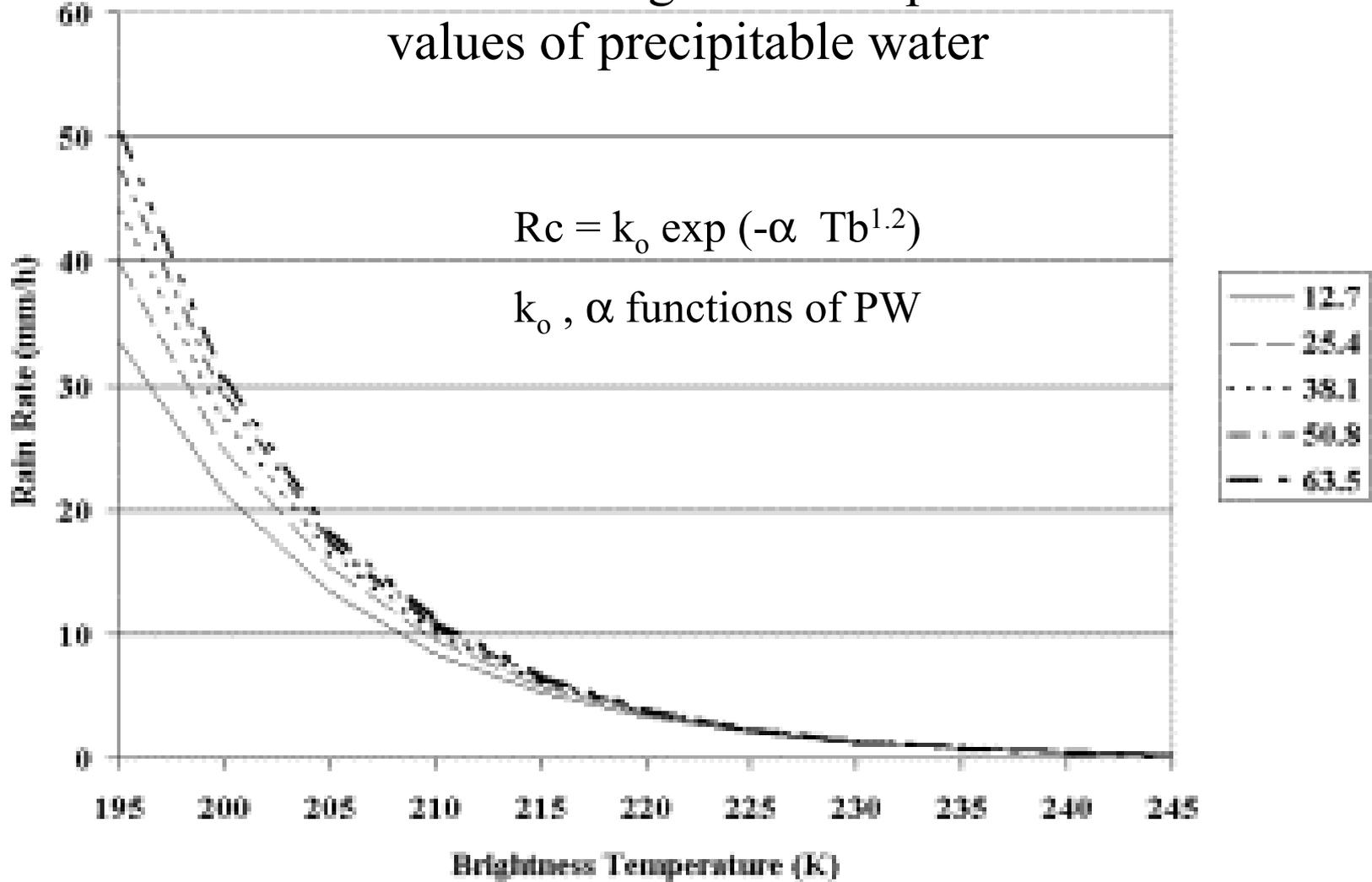


Figure 15.1. (a) The towering cumulus stage, (b) mature stage, and (c) dissipating stage of a short-lived convective cell. (Courtesy of C. A. Doswell, NOAA/ERL/WRP, Boulder, Colo.; adapted from Byers and Braham, 1949.)

Rain rate as a function of brightness temperature for different values of precipitable water



(Kuligowski, Davenport and Scofield, 2003)

Figure a

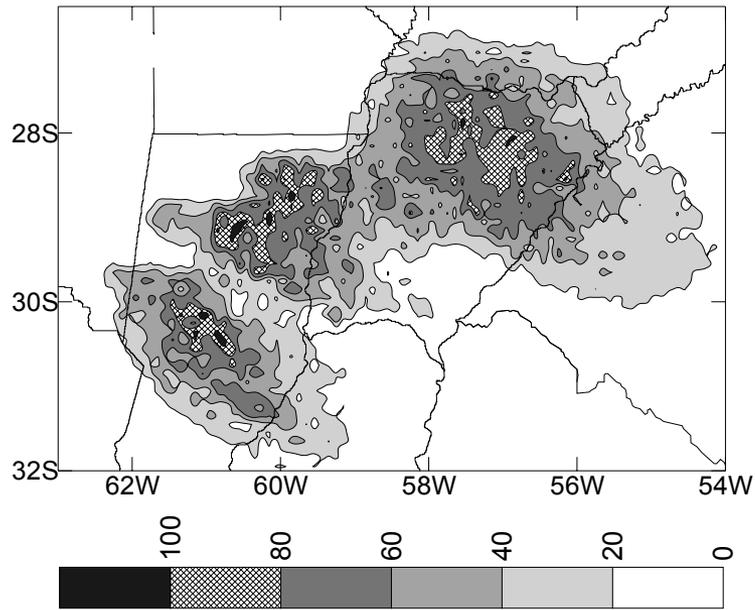


Figure b

