

A COMPARISON OF THE ARPS MODEL AND RETRIEVALS OF CLOUD PROPERTIES FROM GOES

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LaRC CRYSTAL Satellite Page via: www-pm.larc.nasa.gov/
ARPS CRYSTAL page: asd-www.larc.nasa.gov/model/crystal

4-Hour Time Series from July 29, 2002

GOES-derived Cloud Properties

ARPS Total Cloud Condensate and Winds

GOES Visible Channel w/NEXRAD Overlay

GOES Cloud Properties are using the Visible Infrared Solar-infrared Split-window Technique VISST utilizes the 0.65, 3.9, 10.8, 11.9 μm GOES channels (4-km) Rapid Update Cycle (RUC) model output for profiles CERES-generated clear sky albedo maps and cloud mask

ARPS: Advanced Regional Prediction System
For this study used 3-km domain, hourly forecasts from 1500UTC initialization
Model output provided by Donghai Wang

1900 UTC

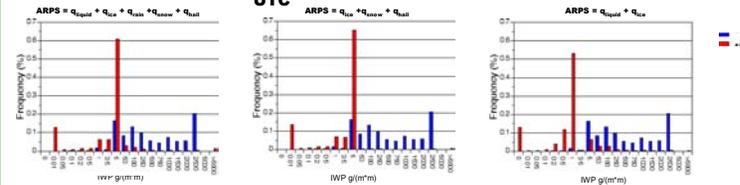
2000 UTC

2100 UTC

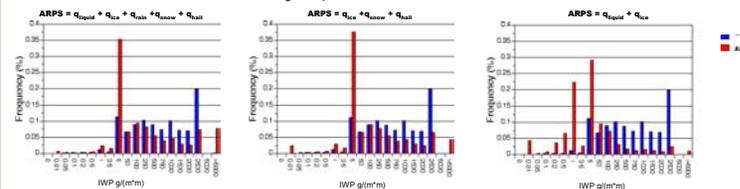
2200 UTC

Ice Water Path Comparison

July 29, 2002 ~1900 UTC



July 29, 2002 ~2200 UTC



At 1900UTC, GOES VISST retrievals exhibit large IWP associated with convective cells near Eastern and Western Florida coasts. ARPS model verifies well at 2200 UTC indicating a time lag in the onset of convection in the model.

SUMMARY

Cloud and precipitation fields from GOES and ARPS compare well for this limited case study of a convective outbreak during CRYSTAL-FACE, but with a time lag.

Comparisons of frequency distributions of IWP yield surprisingly good results once the ARPS convection "catches up".

ARPS IWPs derived with total condensate and frozen condensate then to match GOES IWP slightly better than those using $q_{\text{liquid}} + q_{\text{ice}}$

FUTURE WORK

Many more convective systems during CRYSTAL-FACE will be examined to allow quantification of timing and location differences.

Cloud top heights will be thoroughly compared with GOES, ARPS and validation sources.

Rather than comparing a fixed location as in this study, comparisons will follow systems as they evolve and advect.

TOA fluxes from GOES will be compared to ARPS-derived TOA fluxes.