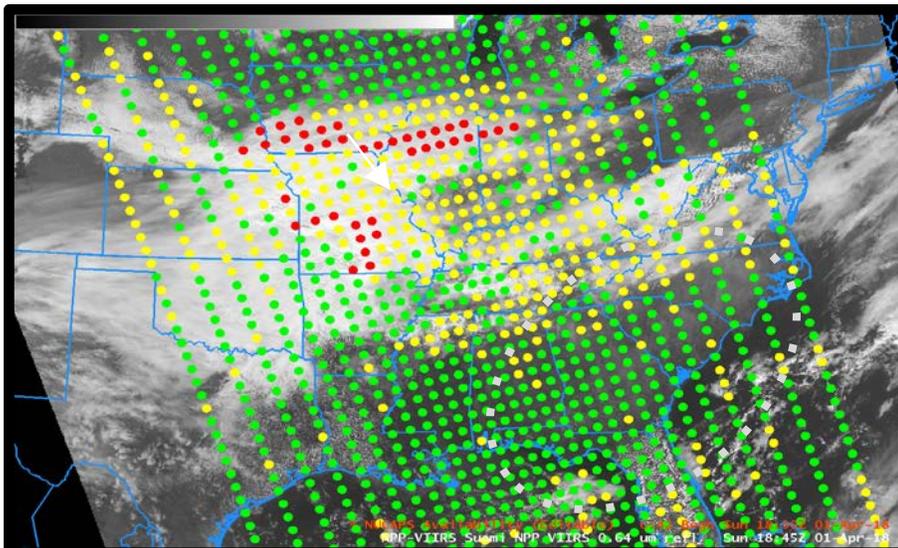


Why are NUCAPS Soundings Important?

Vertical profiles of temperature and moisture are produced by the **NOAA-Unique Combined Atmospheric Processing System**. Over the Continental United States, the timely sounding observations are taken just as afternoon convection is starting. Data from Infrared and Microwave sounders are used (CrIS and ATMS on NPP and NOAA-20 ; IASI and AMSU/MHS on Metop-A and Metop-B). The soundings are driven by satellite observations and are independent of any model. Hundreds of satellite soundings are available day and night.



Suomi NPP NUCAPS Sounding Points overlain over a VIIRS 0.64 μm Visible Image, 1845 UTC on 1 April 2018

Dot Color Meaning

Green	Yellow	Red
Successful infrared (IR) + microwave (MW) NUCAPS retrieval under clear or partly cloudy conditions	Failed IR + MW NUCAPS retrieval. Successful MW-only NUCAPS retrieval under cloudy conditions	Failed IR + MW NUCAPS retrieval. Failed MW-only NUCAPS retrieval under precipitating cloudy conditions

Impact on Operations

Primary Application: Afternoon NUCAPS soundings provide information that diagnoses the pre-convective environment, verifies model fields, characterizes the mesoscale thermodynamic state and improves situational awareness.

Application: NUCAPS moisture observations provide high-quality mid-level information to help analyze severe weather events such as hurricanes.

Application: NUCAPS Soundings over Alaska (and elsewhere) can identify regions of very cold air aloft for aviation guidance.

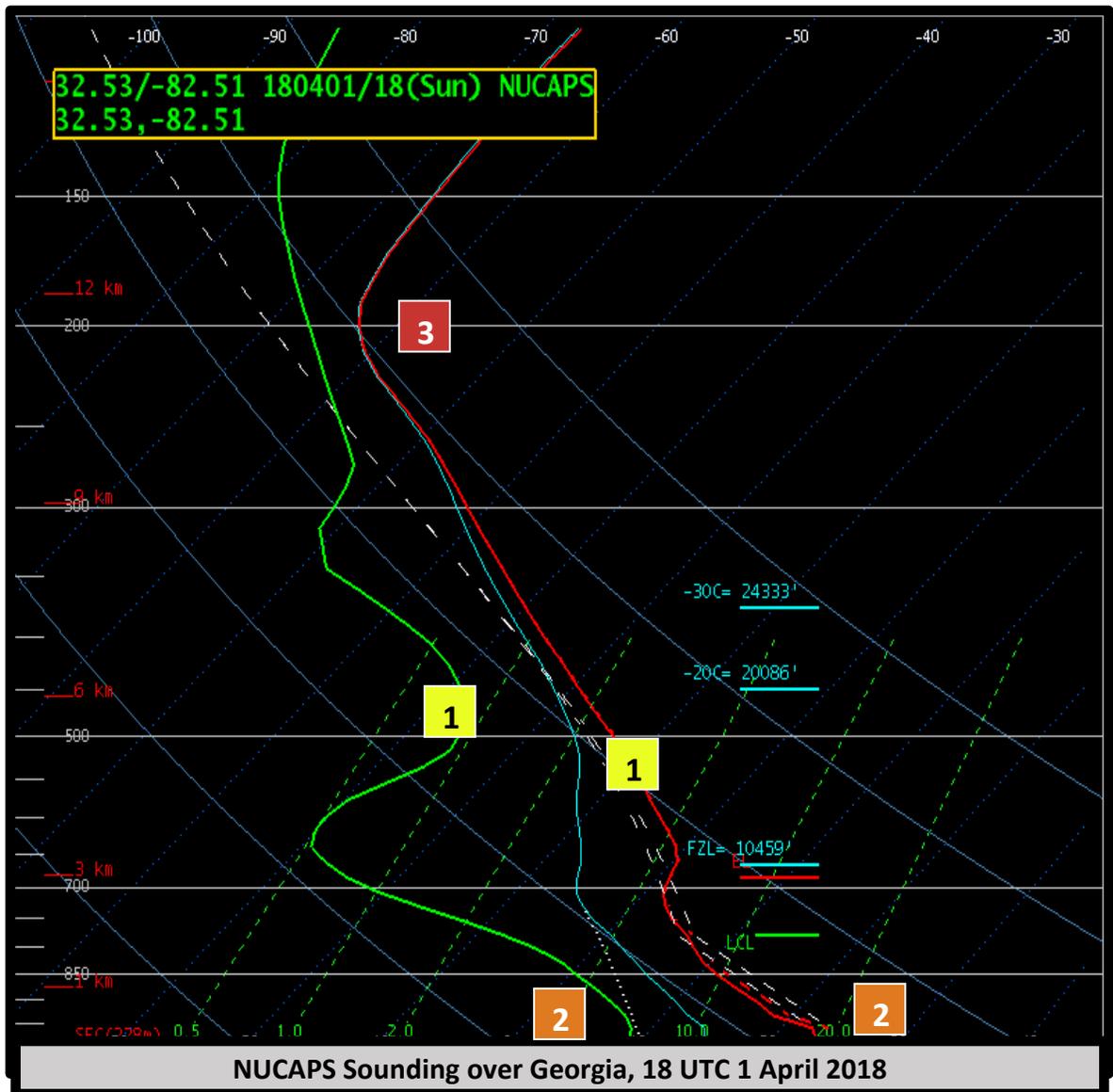
Strengths and Limitations

Uniform Cloud Fields: A NUCAPS footprint over a uniform cloud field means the IR + MW retrieval will fail; a microwave-only sounding with limited vertical resolution is the result.

Limitation: Satellite Observations are from the top of the atmosphere, and views of the boundary layer can be imprecise. AWIPS allows you to modify the sounding to match METARs or RTMA analyses if necessary.

Characterization: NUCAPS soundings – albeit smooth compared to radiosondes – have greater vertical resolution than other satellite-derived soundings.

- 1** Temperature and dewpoint lines plotted with accuracy but very smooth
- 2** Features in the boundary layer may or may not be well-sampled
- 3** Tropopause values (above the cloud) are sampled well



NUCAPS Sounding over Georgia, 18 UTC 1 April 2018

Sum1	CAPE	CINH	LCL	LI	LFC	EL
SB PARCEL	11	-12	1739m	2	2049m	9439'
FCST PARCEL	11	0	2156m	2	2156m	9253'
MU PARCEL	25	0	1926m	2	1926m	9734'
ML PARCEL	0	0	1953m	3	M	6407'
USER PARCEL	0	0	2550m	7	M	8368'
EFF PARCEL	11	-12	1739m	2	2049m	9439'
PW=	0.59 in	3CAPE= 0J/kg	WBZ=	6390'	WINDG=	-0.00
K=	3	DCAPE= 741J/kg	FZL=	10459'	ESP=	0.00
MidRH=	23%	DownT= 50F	ConvT=	78F	MMP=	0.00
LowRH=	45%	MeanW= 6.6g/kg	MaxT=	78F	NCAPE=	0.02
sfc-3km Agl LapseRate=	23C/8.1C/km		SuperCell=	0.0		
3-6km Agl LapseRate=	19C/6.5C/km		STP (CIN)=	0.0		
850-500mb LapseRate=	25C/6.2C/km		STP (fixed)=	0.0		
700-500mb LapseRate=	15C/5.8C/km		SHIP=	0.0		

Resources

[NOAA STAR NUCAPS Soundings](#)

[Blog Posts NUCAPS at HWT](#)

[NUCAPS at CIMSS Satellite Blog](#)

[Skew-Ts Online](#)

Hyperlinks will not work in AWIPS, but they do in VLAB

Thermodynamic variables are output with the NUCAPS Sounding. Modify the sounding to match surface METARs or RTMA analyses, and convective parameters will adjust both in the list of parameters, and next to the sounding