Marine ARM GPCI* Investigation of Clouds (MAGIC)

Overview of MAGIC Radiosondes to Date

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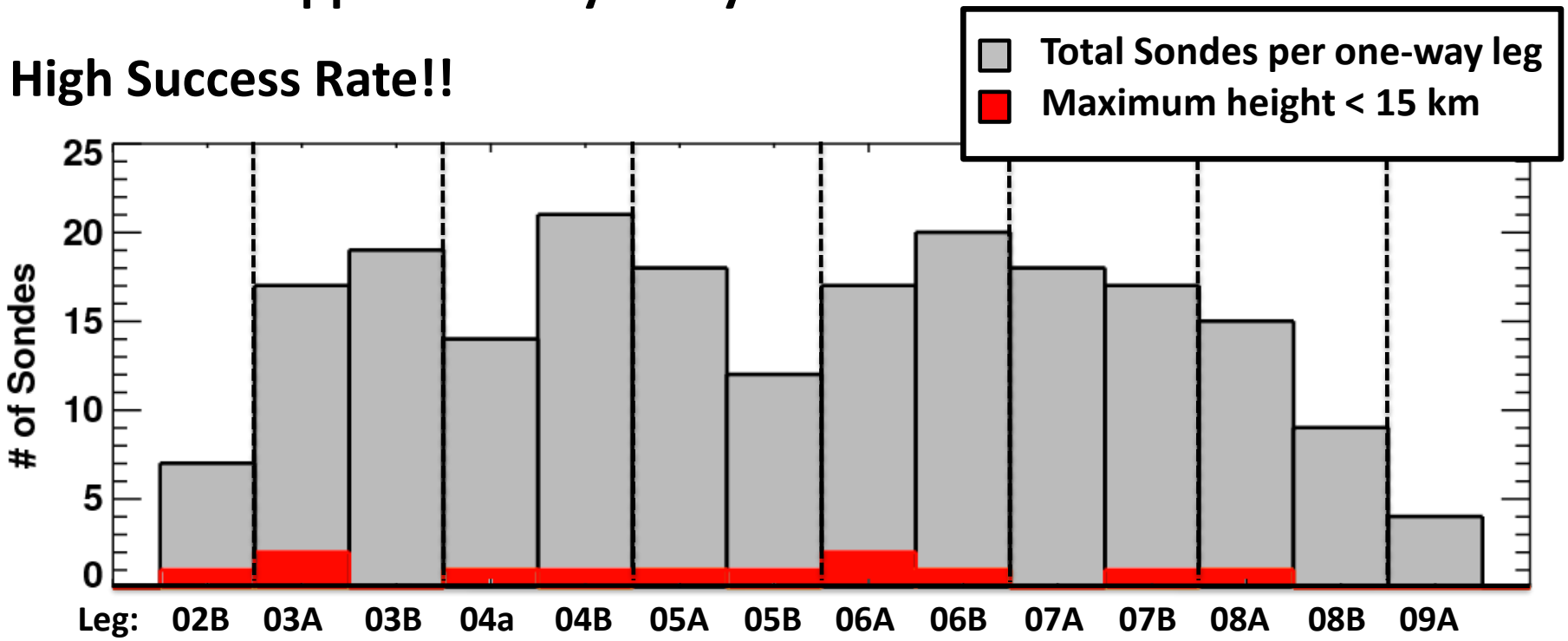
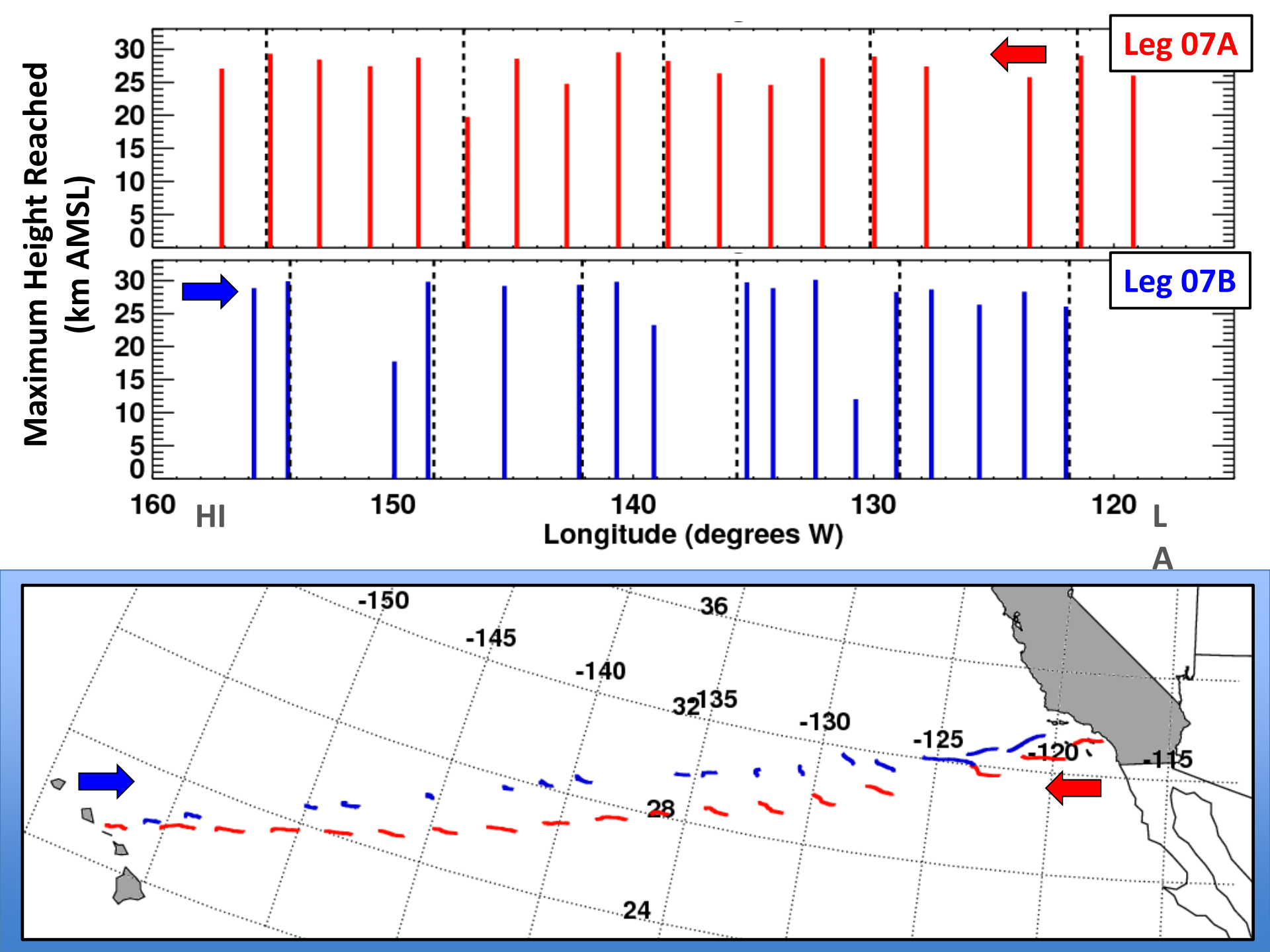
ASR Meeting: March 20, 2013

- ~210 Radiosondes, during 2012, over 14 one-way legs
- Launched approximately every 6 hours

High Success Rate!!



*GPCI = GCSS Pacific Cross-section Intercomparison, a working group of GCSS


Leg 07A
Leg 07B
Maximum Height Reached (km AMSL)
30
25
20
15
10
5
0
160
HI
150
140
130
120
L
A
Longitude (degrees W)
-150
-145
-140
-135
-130
-125
-120
-115
36
32
28
24

Convective Available Potential Energy (CAPE) and Convective Inhibition (CIN)

CAPE: positive buoyancy of an air parcel. It is an indicator of atmospheric instability

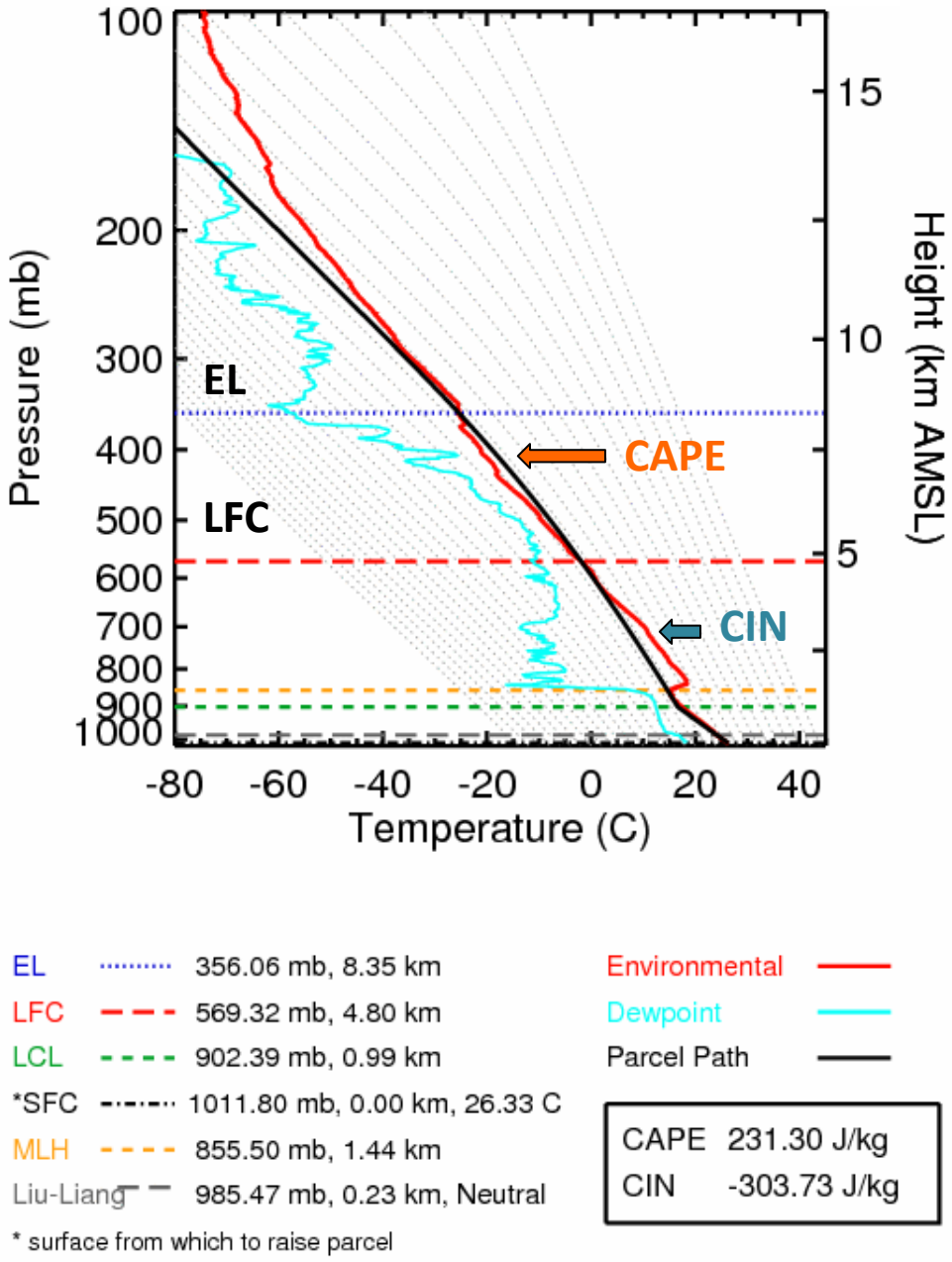
$$\text{CAPE} = \left(\sum_{\text{LFC}}^{\text{EL}} \left[\frac{(\Theta_p - \Theta_v)}{(\Theta_v)} \right] g \right) \Delta Z$$

CIN: negative buoyancy of an air parcel

$$\text{CIN} = \left(\sum_{\text{Sfc}}^{\text{LFC}} \left[\frac{(\Theta_p - \Theta_v)}{(\Theta_v)} \right] g \right) \Delta Z$$

Ours is a surface-based CAPE: the surface is defined as the maximum virtual temperature within the first km.

Skew-T Plot From Leg 07B



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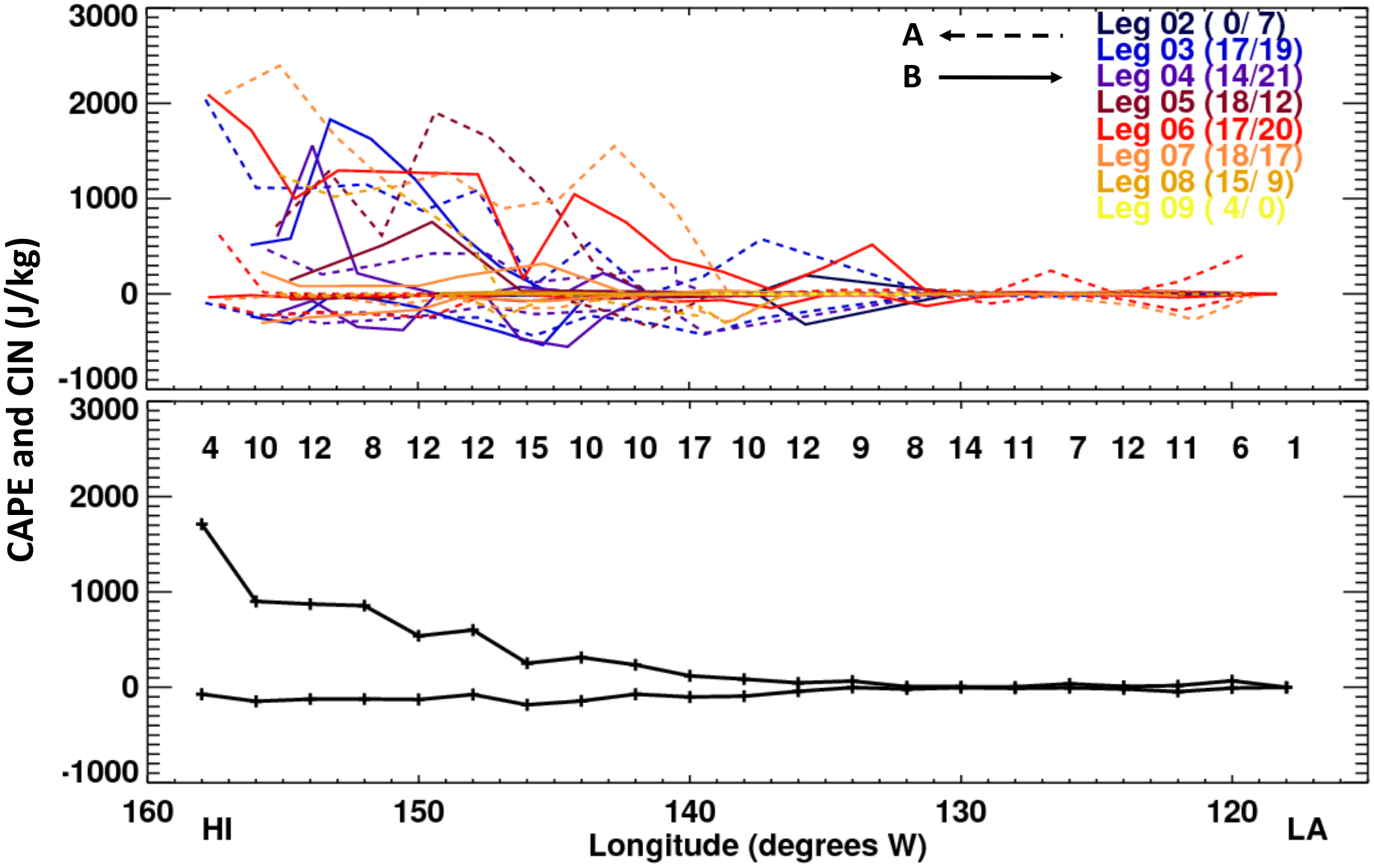
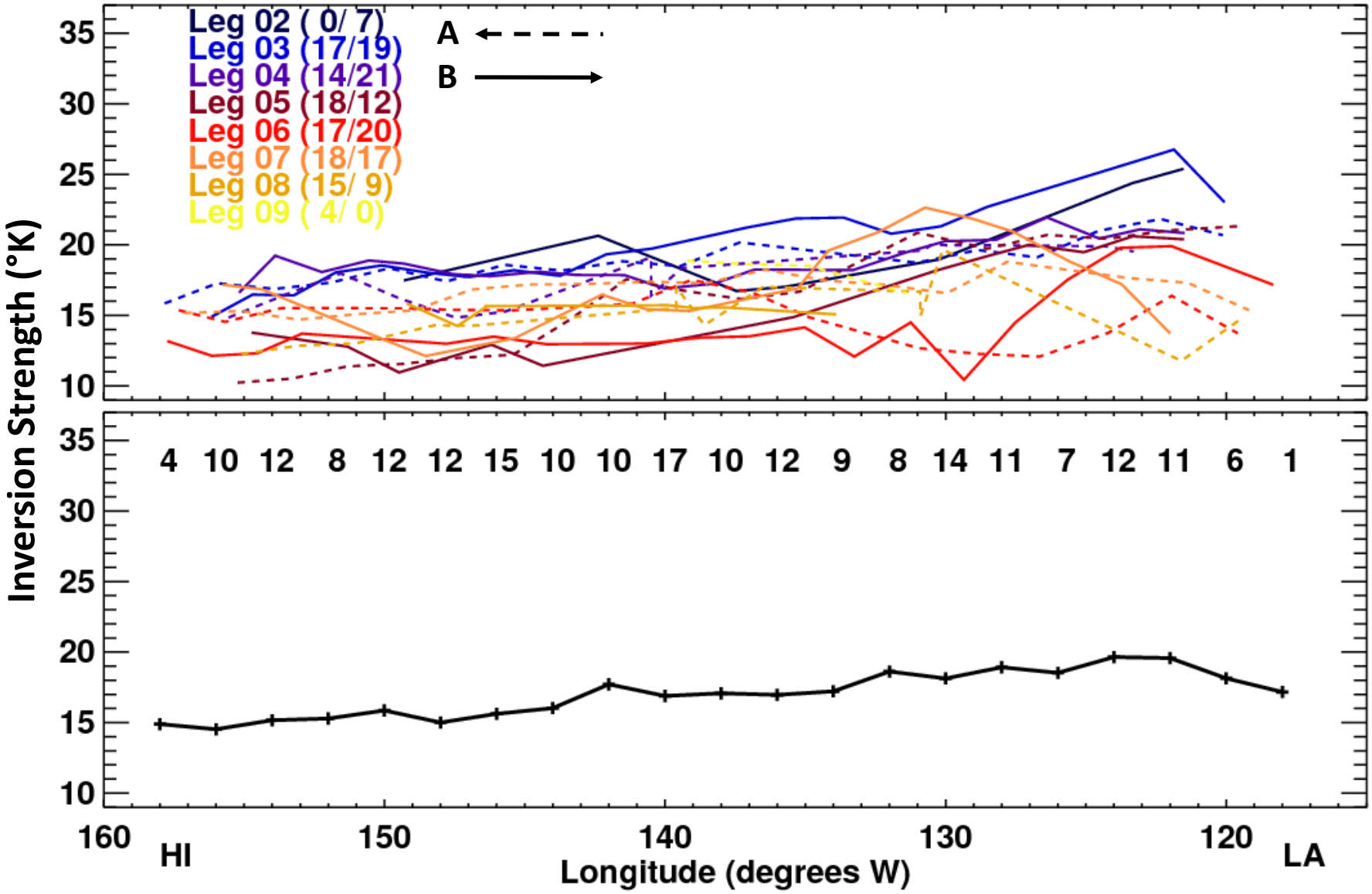


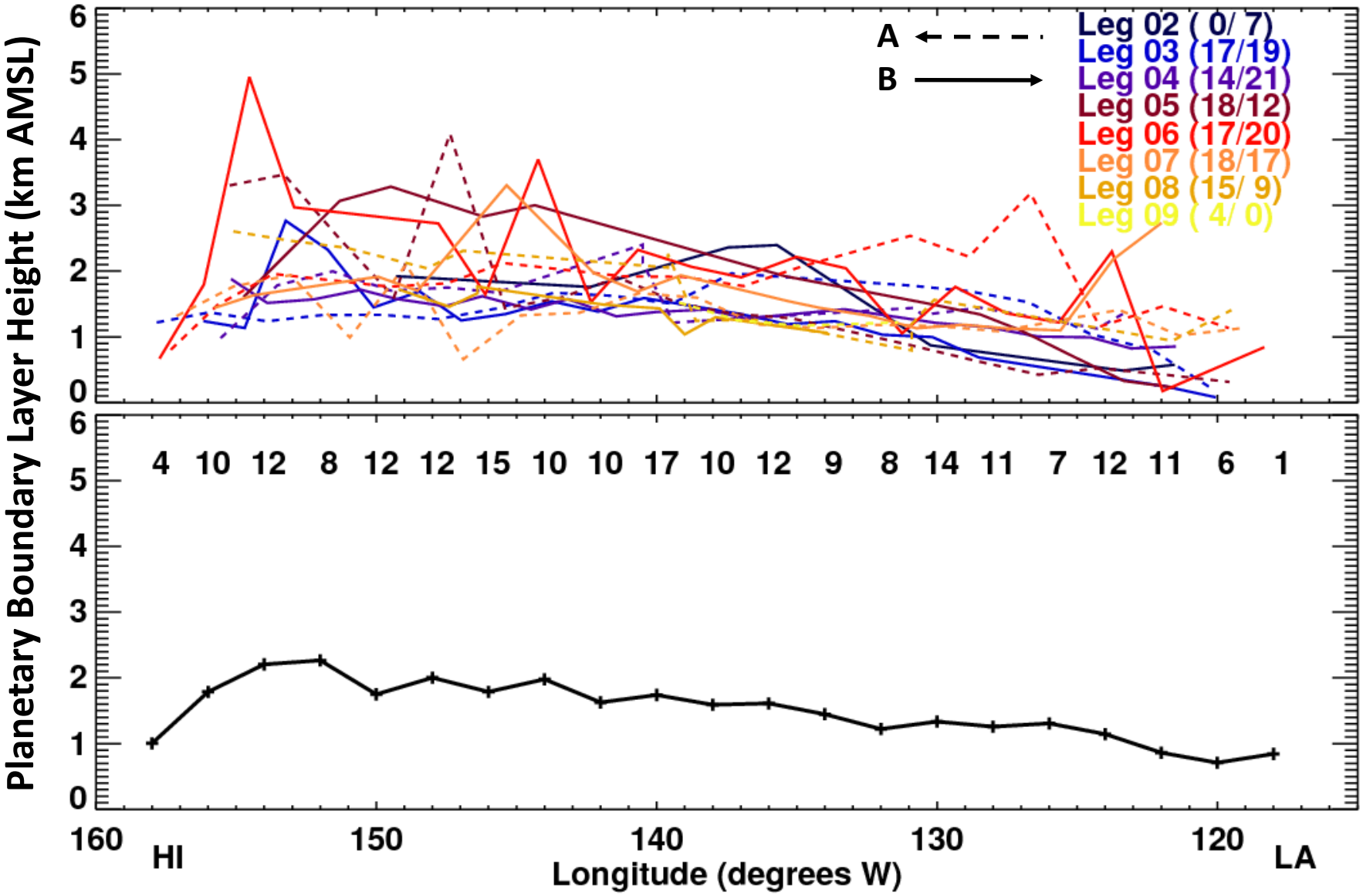
Inversion Strength

For now, using a simple method: $\theta_{700mb} - \theta_{surface}$



Planetary Boundary Layer Height Heffter Method (1980)

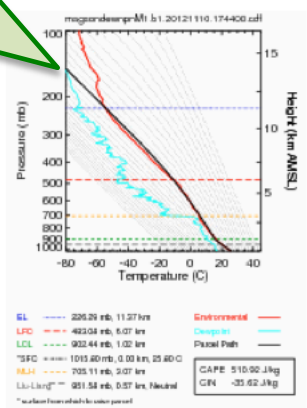
Method is based on potential temperature lapse rate.



Thank you!!

Soundings: MAG 2012 Leg 05B

Generated: Fri Feb 8 20:01:47 2013



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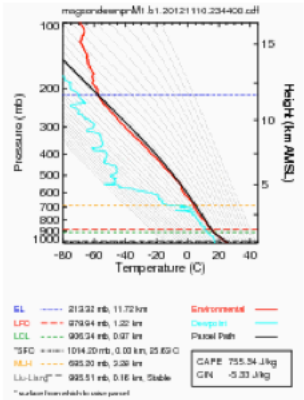

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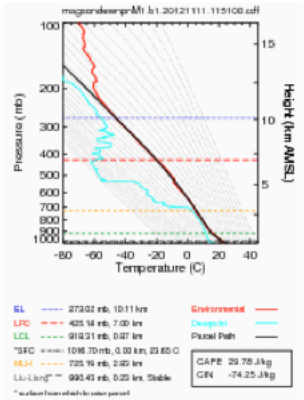

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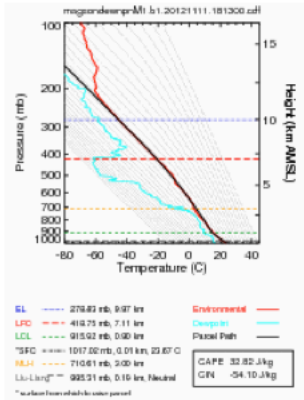

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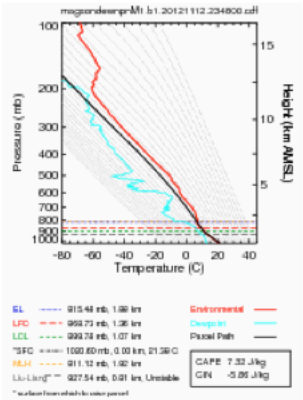

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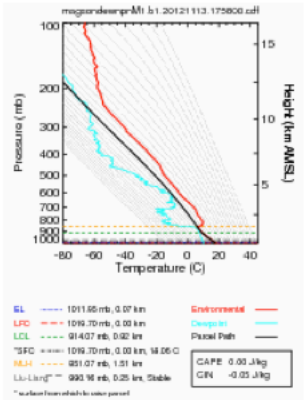

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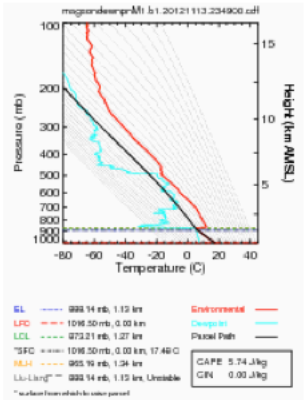

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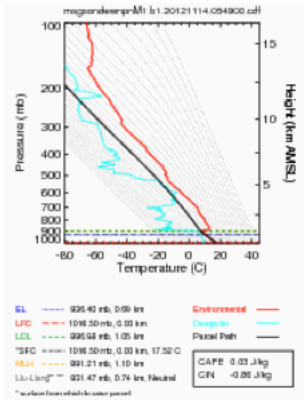

2012/11/14 05:49 UTC

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