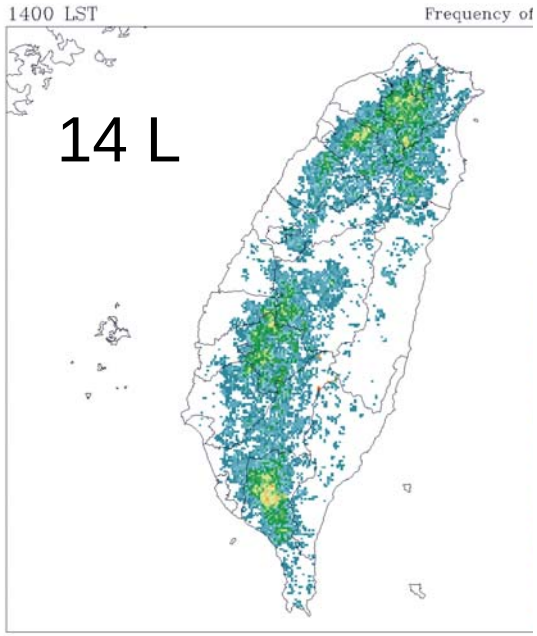
Storm Initiation Locations during TiMREX for Weakly Forced Synoptic Situations

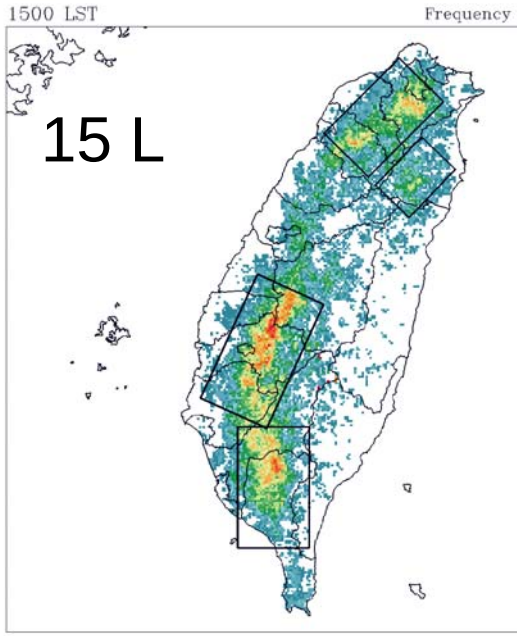
James Wilson and Tracy Emerson
NCAR

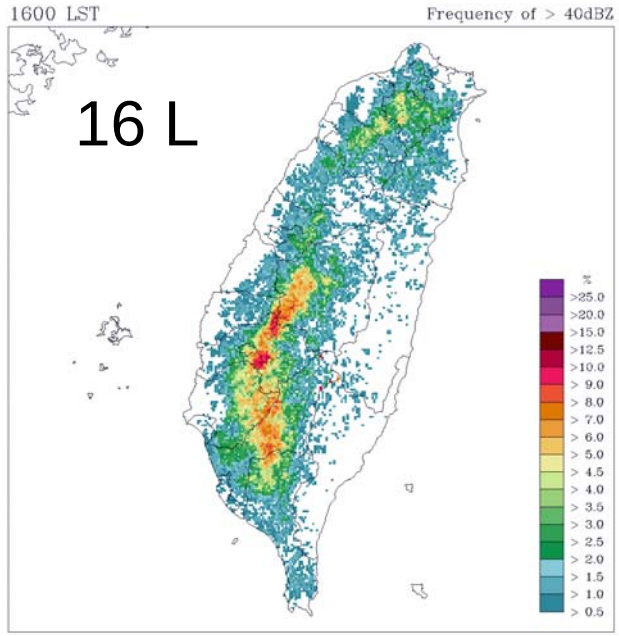
Overall Arching Goal

Collaboratively Develop with CWB a Heavy Rain Nowcasting System For Taiwan

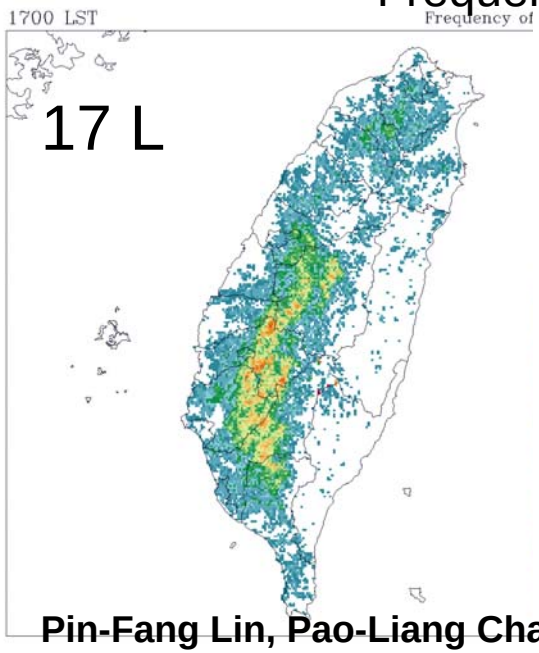
Climatology

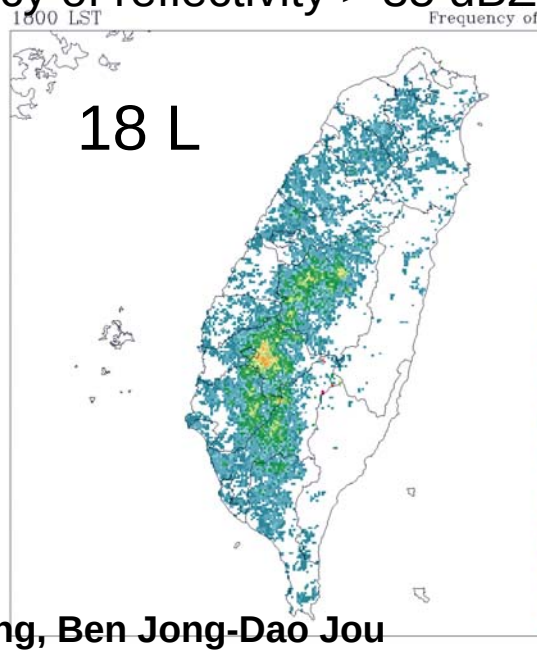


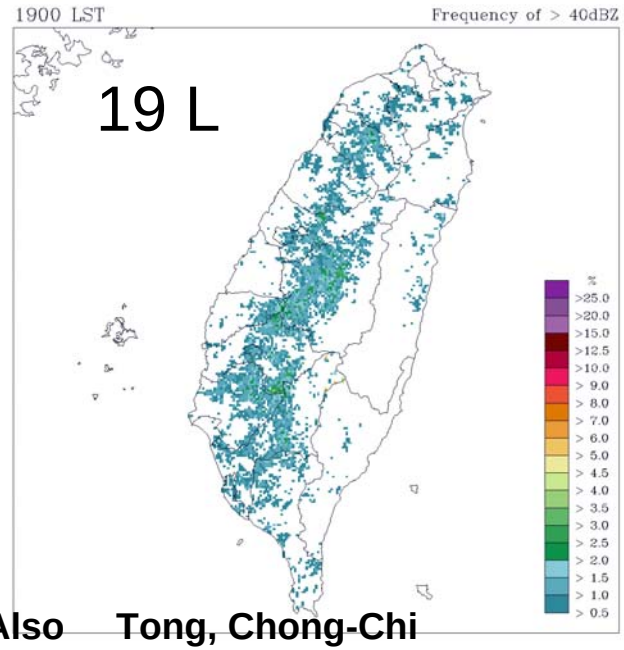




Frequency of reflectivity > 35 dBZ



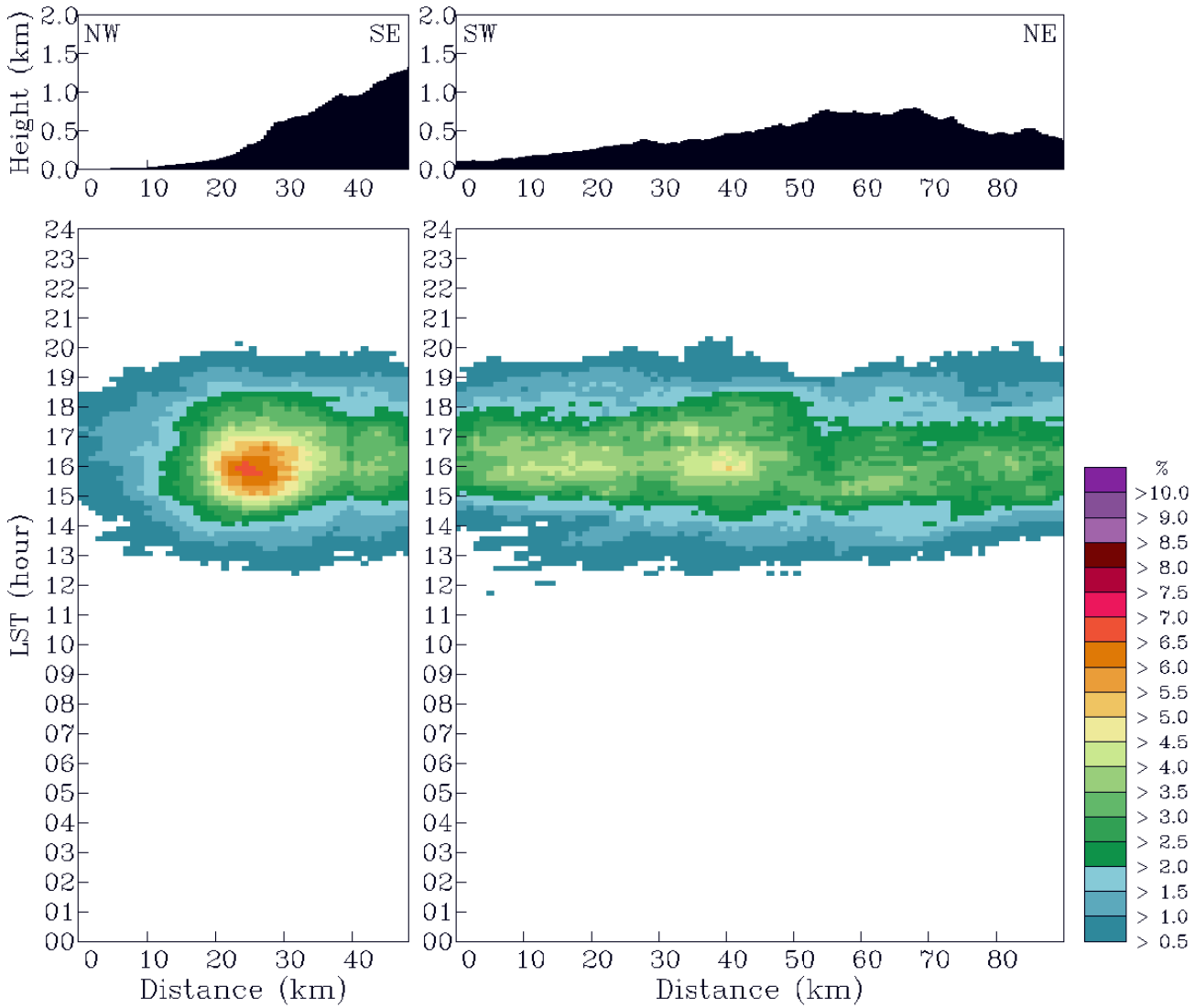




Pin-Fang Lin, Pao-Liang Chang, Ben Jong-Dao Jou **Also Tong, Chong-Chi**

Frequency of reflectivity >35 dBZ

Hovmöller diagram



Pin-Fang Lin, Pao-Liang Chang, Ben Jong-Dao Jou Also Tong, Chong-Chi

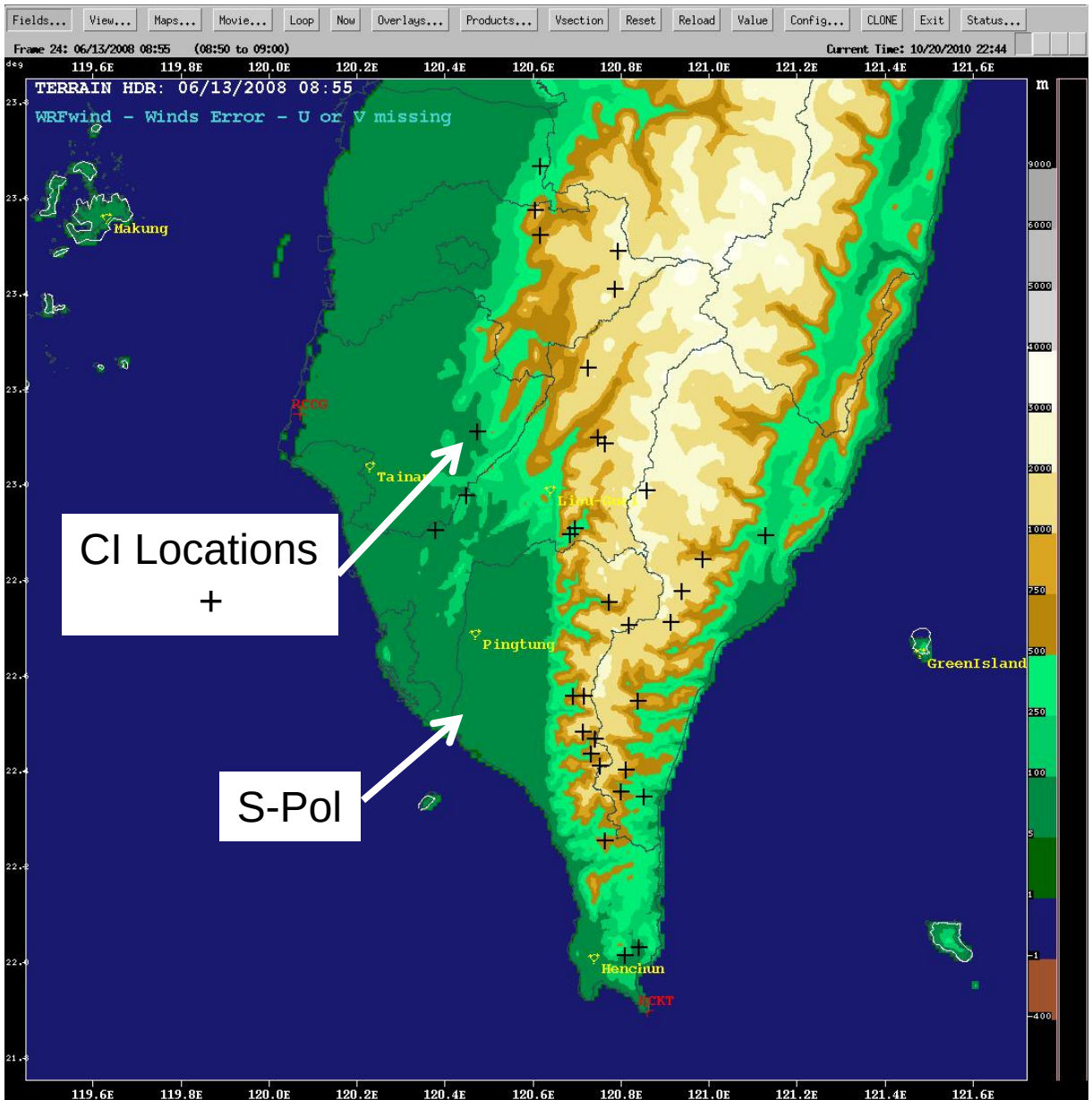
During TiMREX have Identified 22 days with afternoon thunderstorms
With a minimum of synoptic scale forcing.

May 17, 18, 22, 23, 24, 25, 26, 28

Work in Progress

- determine boundary layer, mountain top and steering level wind velocity

- determine stability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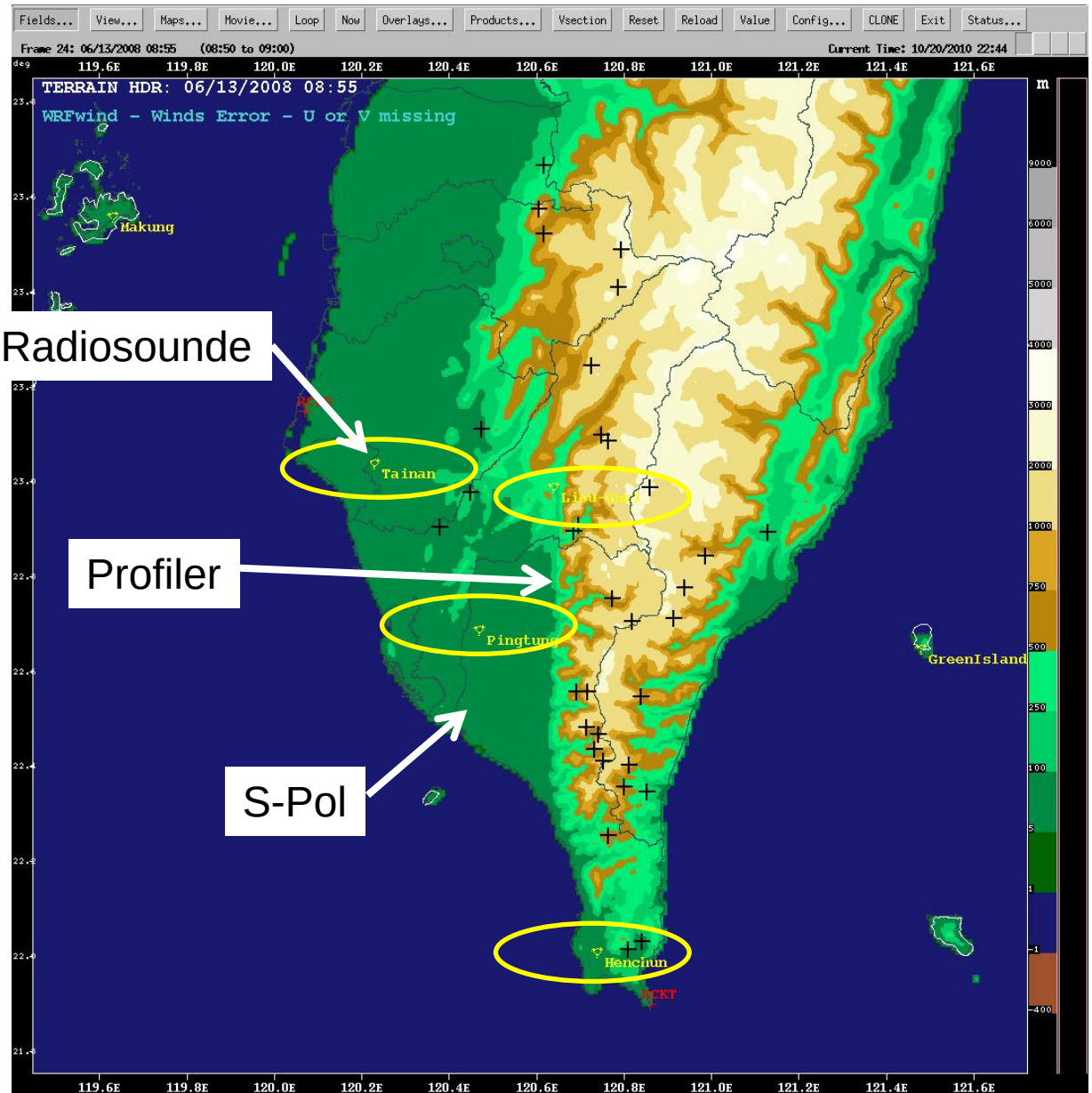
View...
Maps...
Movie...
Loop
Now
Overlays...
Products...
Vsection
Reset
Reload
Value
Config...
CLONE
Exit
Status...
Frame 24: 06/13/2008 08:55 (08:50 to 09:00)
Current Time: 10/20/2010 22:44
TERRAIN HDR: 06/13/2008 08:55
WRFwind - Winds Error - U or V missing
Makung
Tainan
Pingtung
GreenIsland
Henchun
CI Locations
+
S-Pol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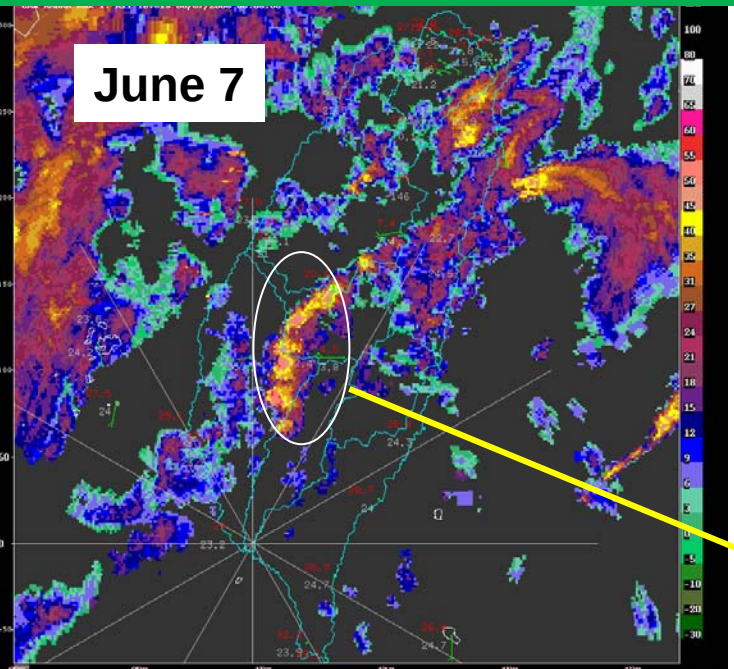
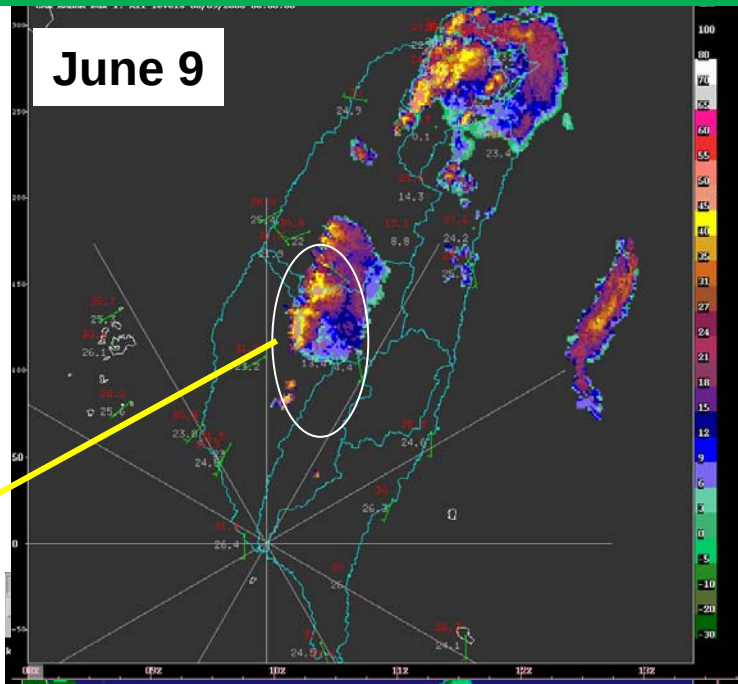
View...
Maps...
Movie...
Loop
Now
Overlays...
Products...
Vsection
Reset
Reload
Value
Config...
CLONE
Exit
Status...
Frame 24: 06/13/2008 08:55 (08:50 to 09:00)
Current Time: 10/20/2010 22:44
TERRAIN HDR: 06/13/2008 08:55
WRFwind - Winds Error - U or V missing
Makung
Tainan
Pingtung
GreenIsland
Henchun
Radiosounde
Profiler
S-Pol

3 Consective Days During TiMREX

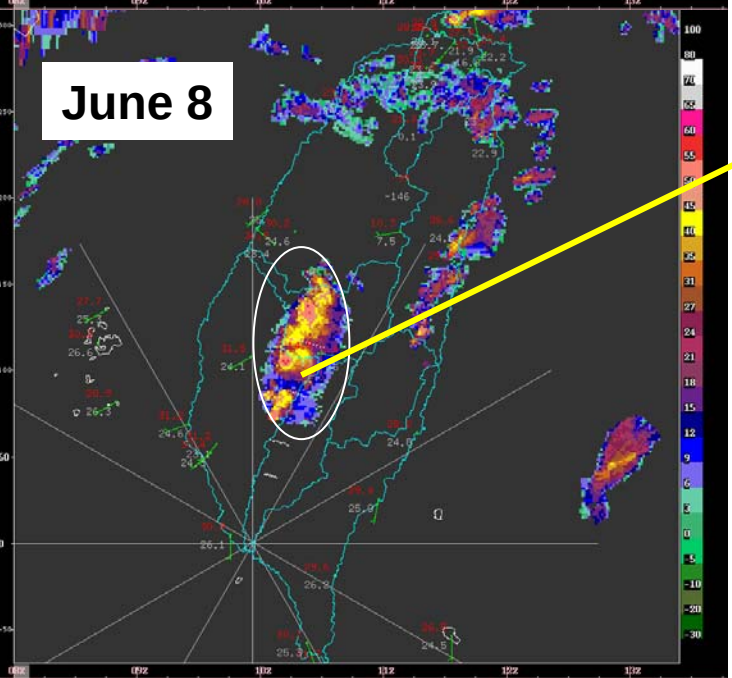


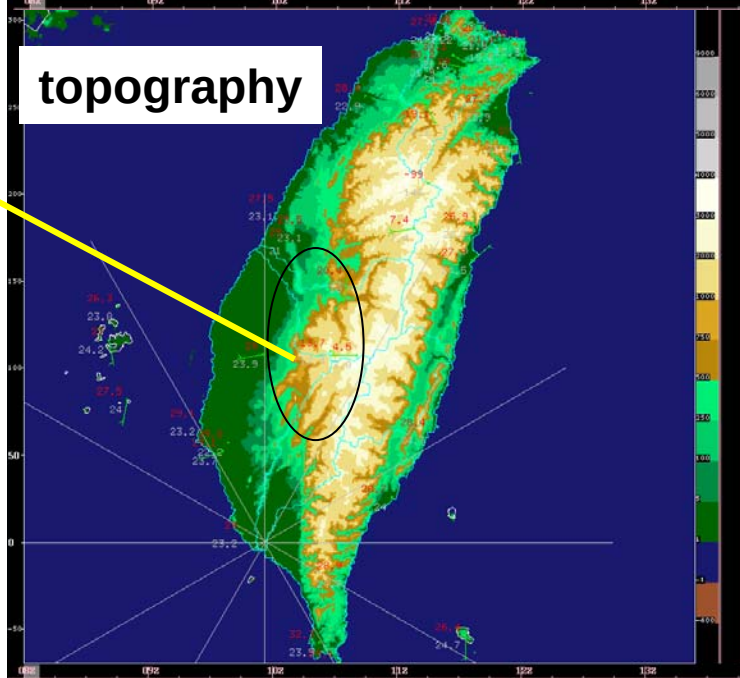


S-Pol
Radar
Reflectivity

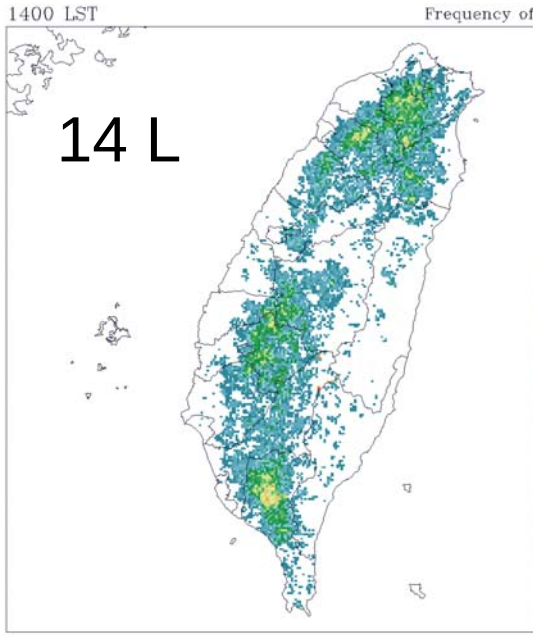
1600 Local

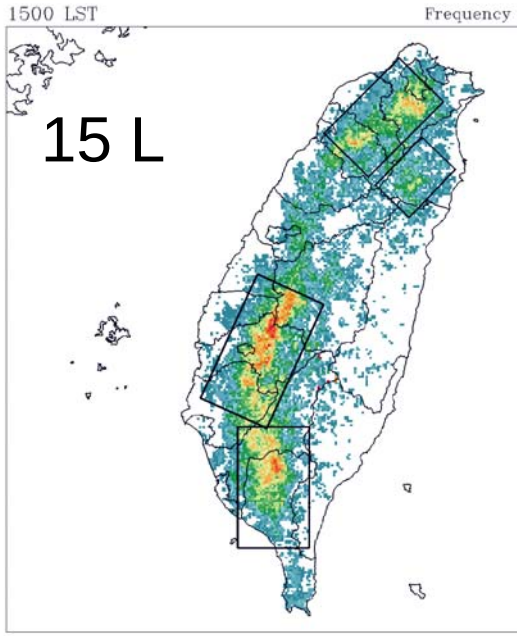
Same Place
Same Time

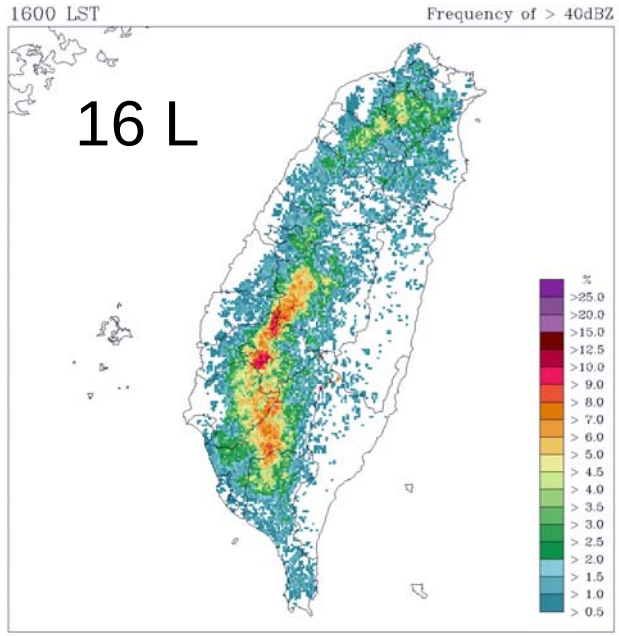




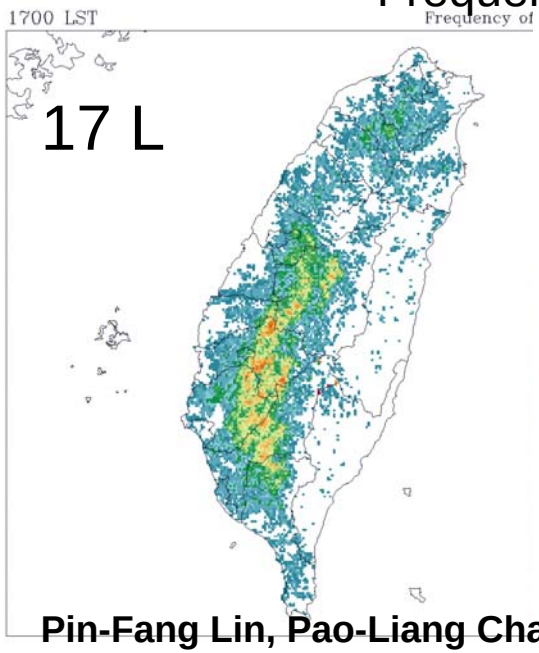
Climatology

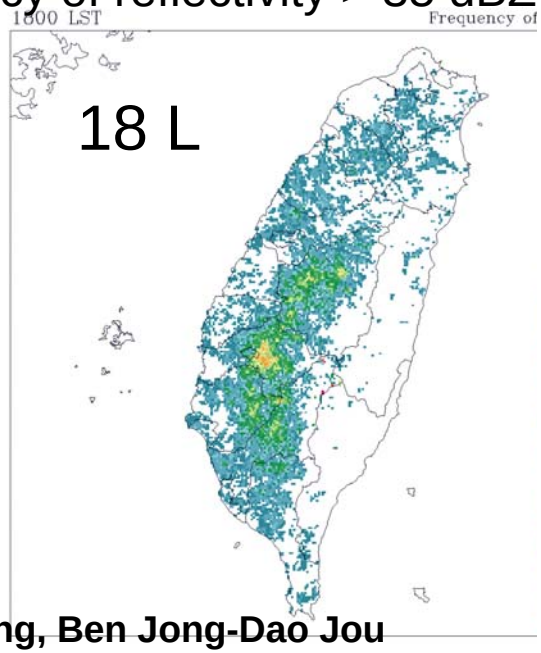


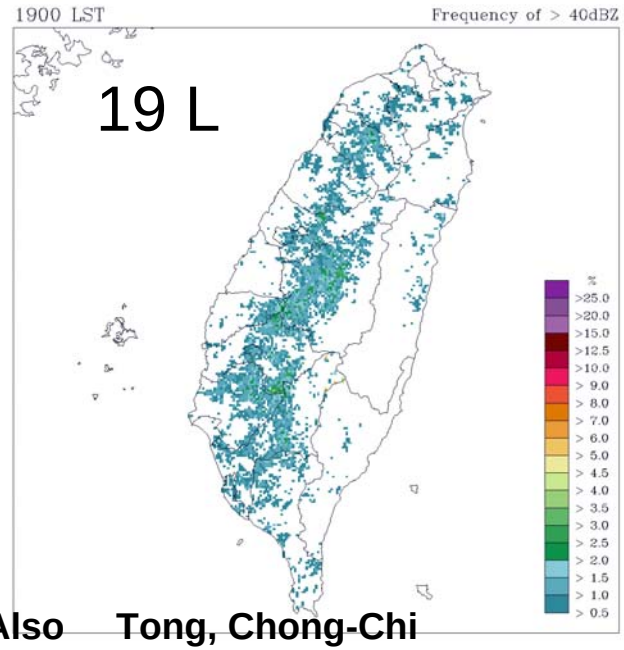




Frequency of reflectivity > 35 dBZ

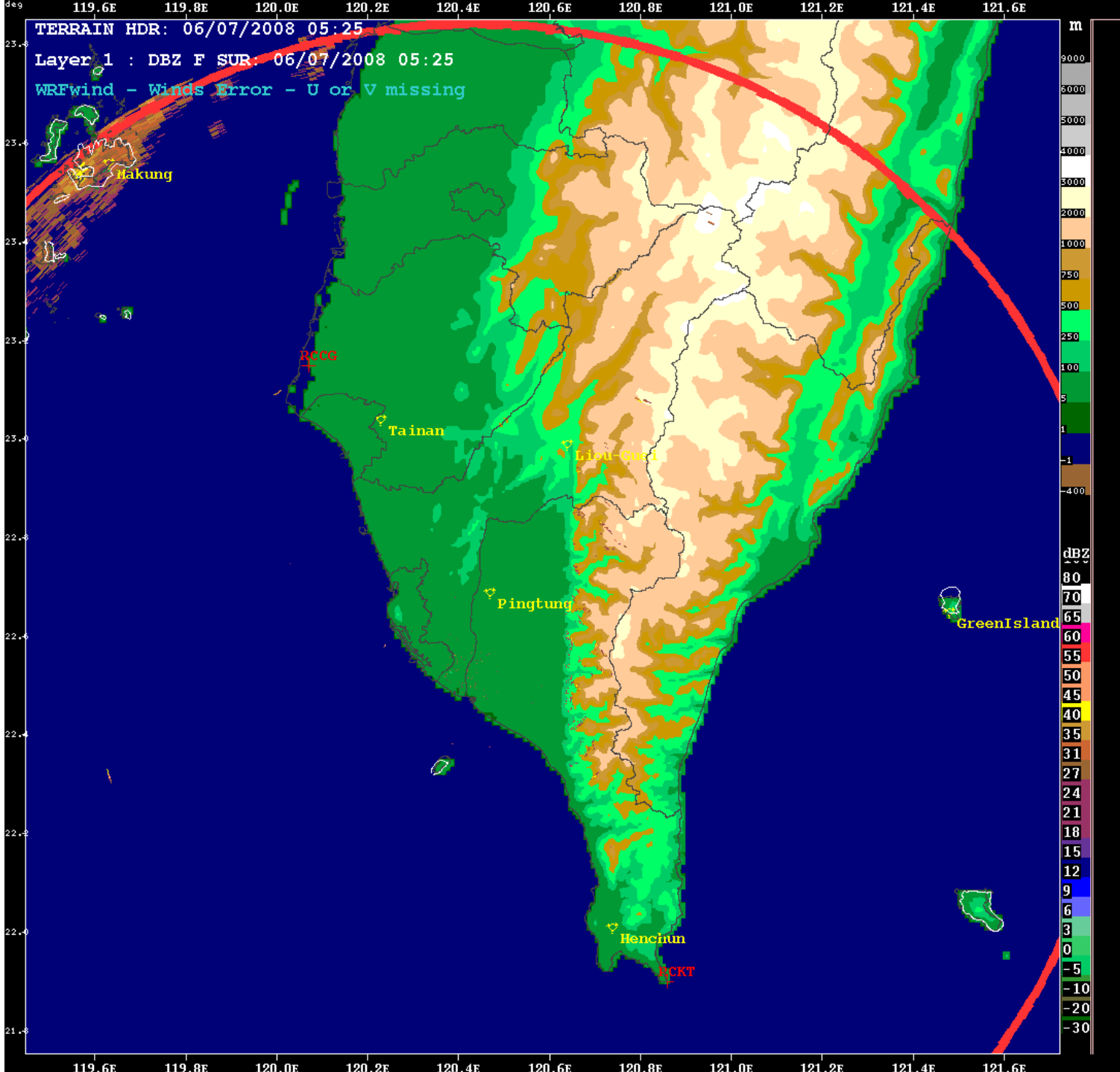






Pin-Fang Lin, Pao-Liang Chang, Ben Jong-Dao Jou **Also Tong, Chong-Chi**

June 7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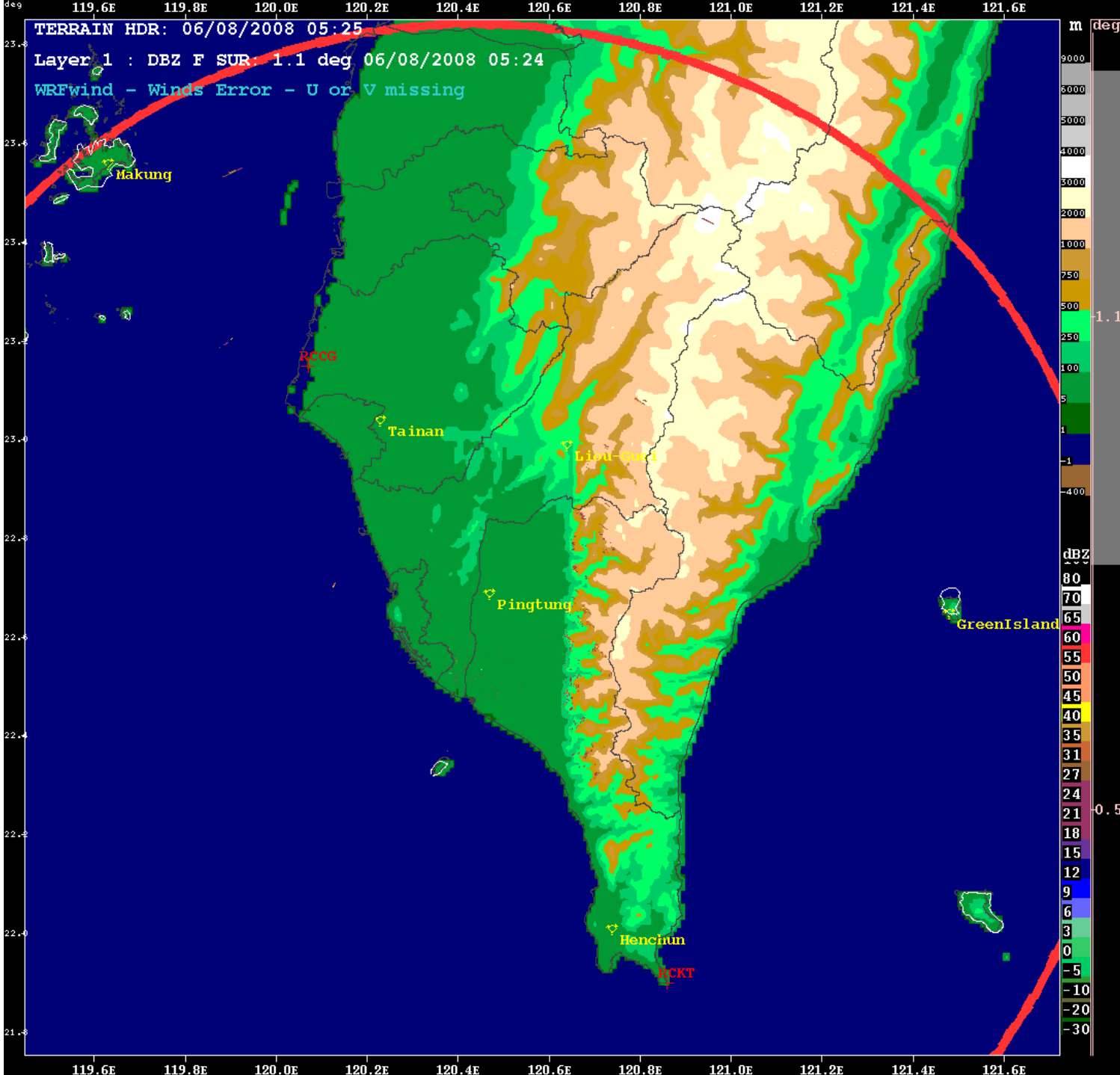
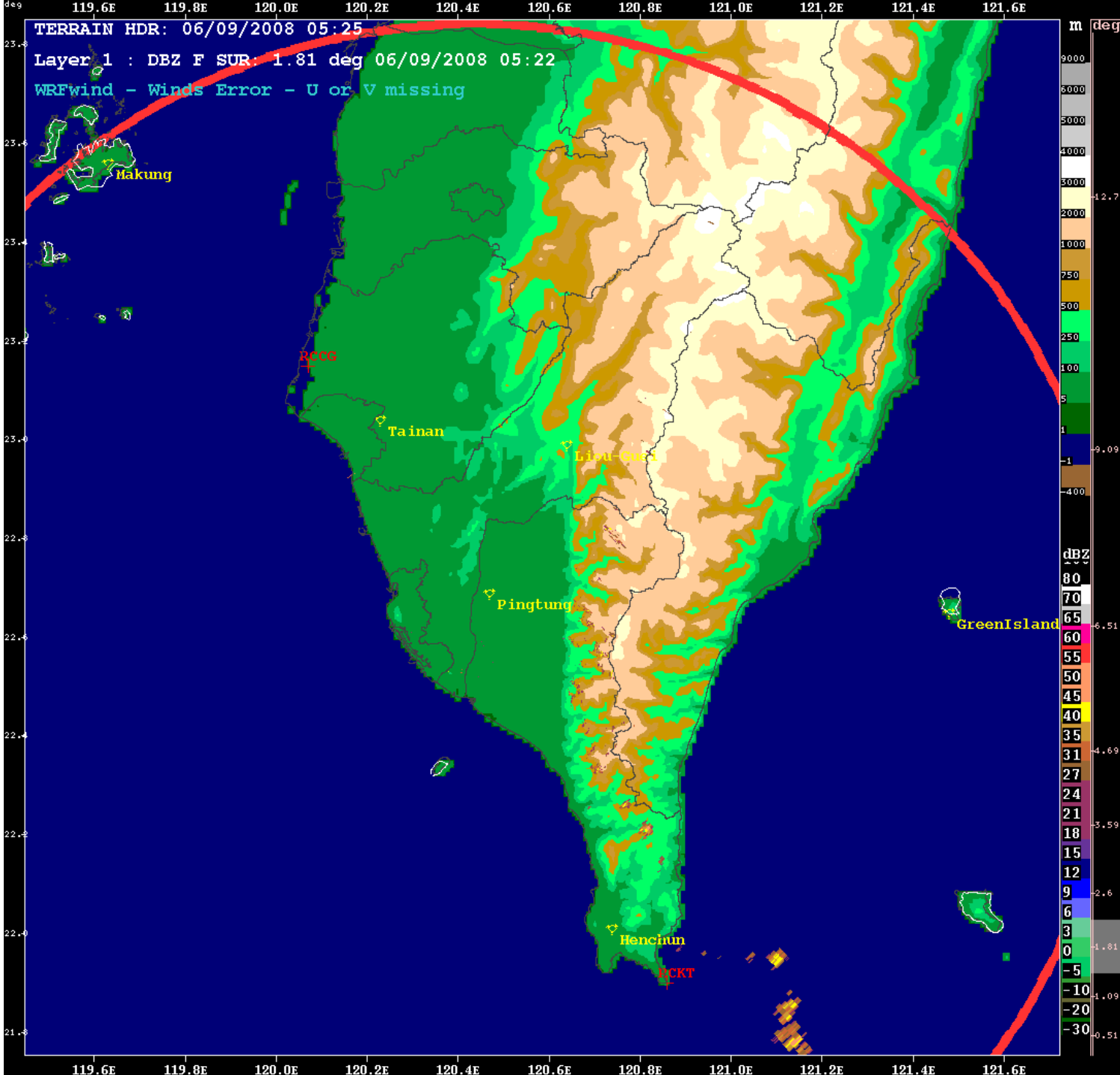
Layer 1 : DBZ F SUB: 06/07/2008 05:25
WRFwind - Winds Error - U or V missing
Makung
RCCG
Tainan
Liuu-Guei
Pingtung
GreenIsland
Henchun
RCKT
119.6E
119.8E
120.0E
120.2E
120.4E
120.6E
120.8E
121.0E
121.2E
121.4E
121.6E
m
9000
6000
5000
4000
3000
2000
1000
750
500
250
100
5
1
-1
-400
dBZ
80
70
65
60
55
50
45
40
35
31
27
24
21
18
15
12
9
6
3
0
-5
-10
-20
-30

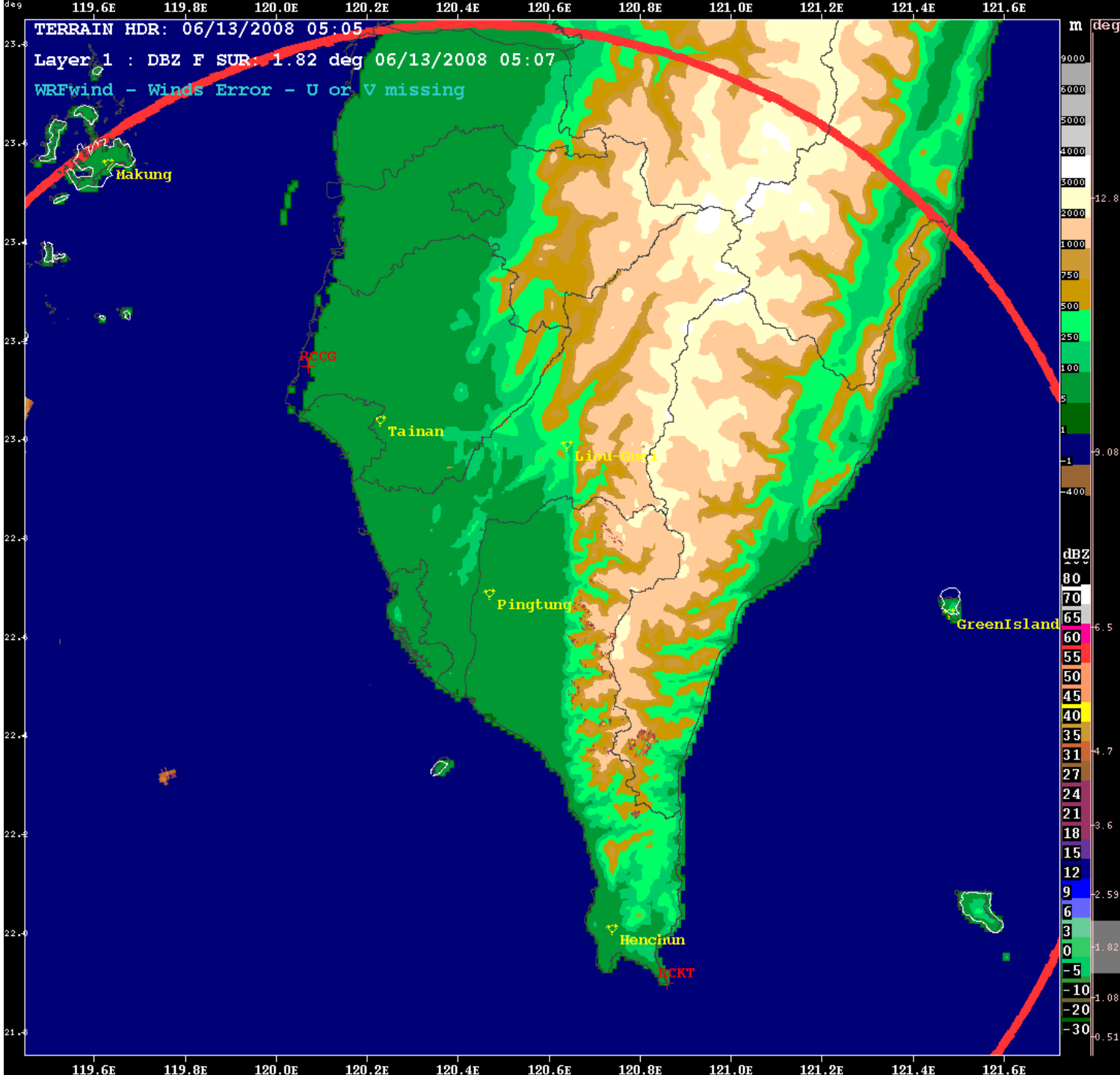
June 8


TERRAIN HDR: 06/08/2008 05:25
Layer 1 : DBZ F SUR: 1.1 deg 06/08/2008 05:24
WRFwind - Winds Error - U or V missing
Makung
RCCG
Tainan
Liou-Guei
Pingtung
GreenIsland
Henchun
RCKT
119.6E
119.8E
120.0E
120.2E
120.4E
120.6E
120.8E
121.0E
121.2E
121.4E
121.6E
m
deg
dBZ
1.1
0.5

June 9


TERRAIN HDR: 06/09/2008 05:25
Layer 1 : DBZ F SUR: 1.81 deg 06/09/2008 05:22
WRFwind - Winds Error - U or V missing
Makung
RCCG
Tainan
Pingtung
GreenIsland
Henchun
RCKT
119.6E
119.8E
120.0E
120.2E
120.4E
120.6E
120.8E
121.0E
121.2E
121.4E
121.6E
m
deg
dBZ

June 13


TERRAIN HDR: 06/13/2008 05:05
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WRFwind - Winds Error - U or V missing
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RCCG
Tainan
Liu-Gui
Pingtung
GreenIsland
Henchun
RCKT
119.6E
119.8E
120.0E
120.2E
120.4E
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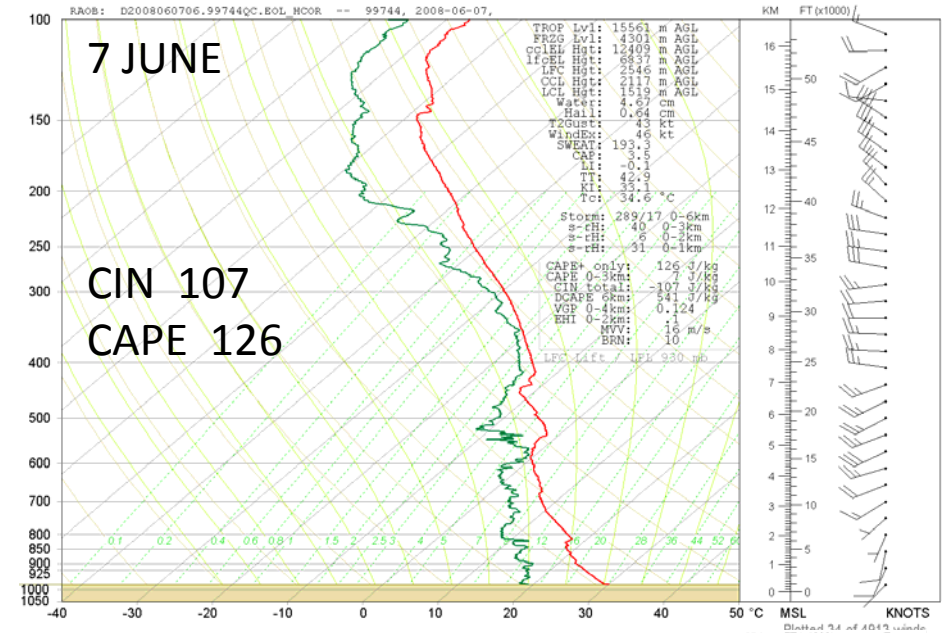
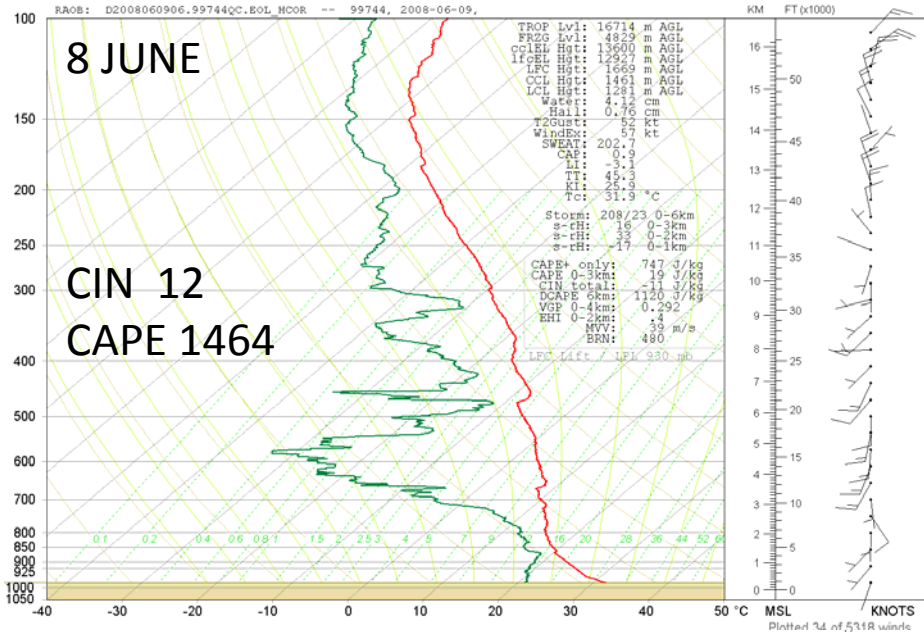
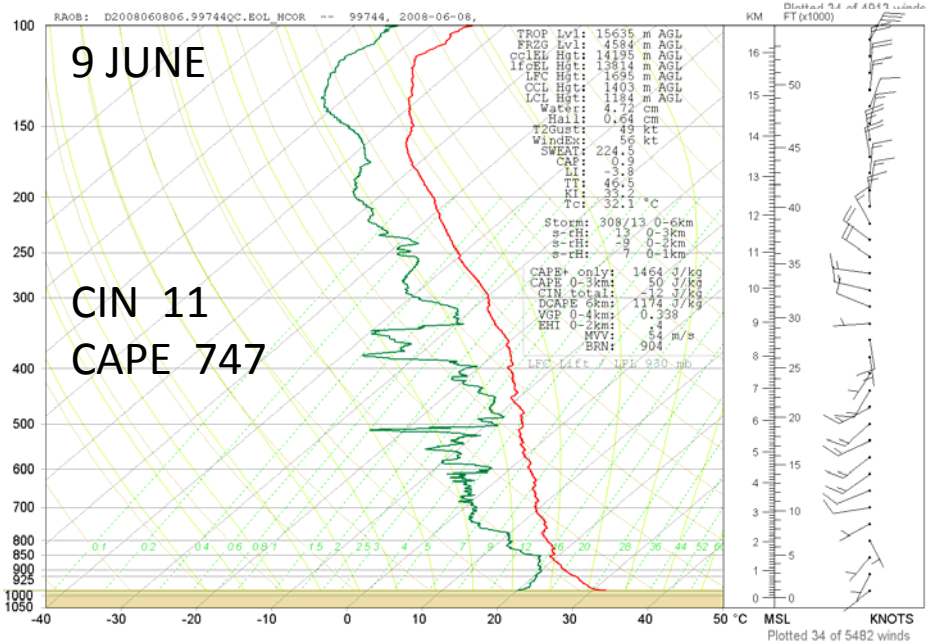
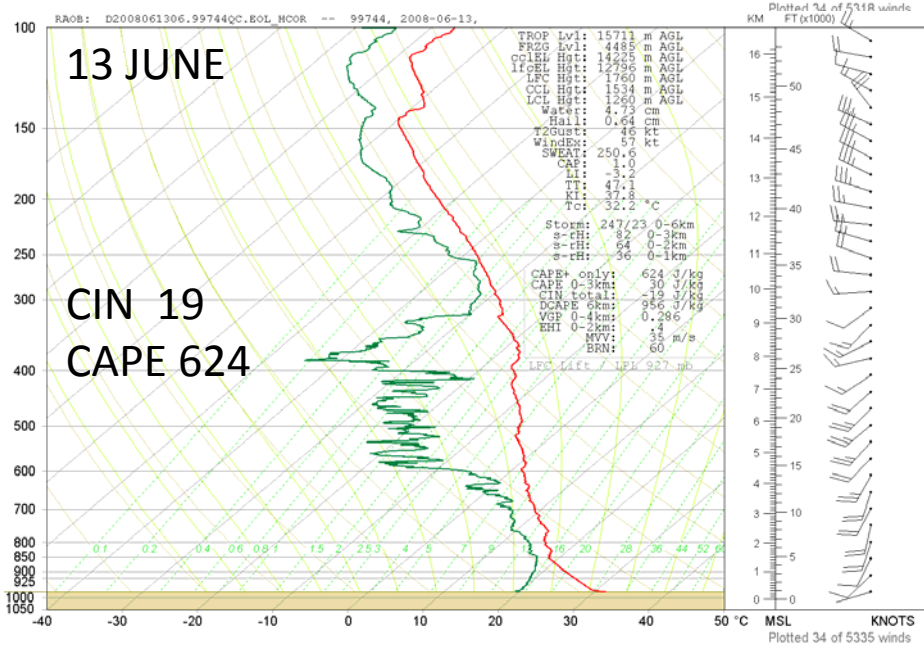
121.2E
121.4E
121.6E
m
deg
dBZ

Liou-Guei Sounding 06 UTC (14 L)









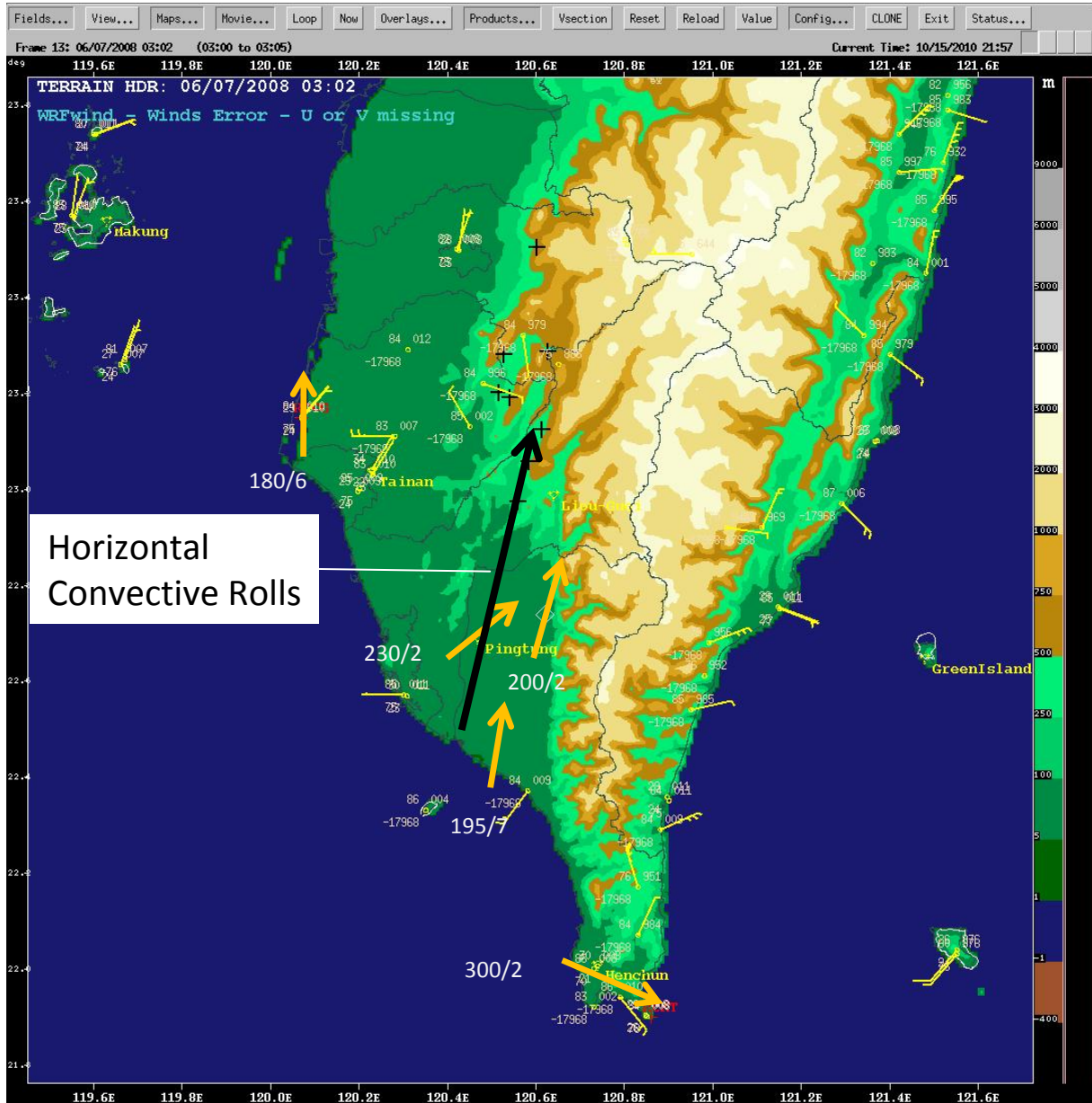
07 June 2008

CI between 14-17 L

Winds @11 L
~ 500 m height 200/7 m/s
3km height 255/7 m/s

CIN 95
CAPE 424

Winds 11 L



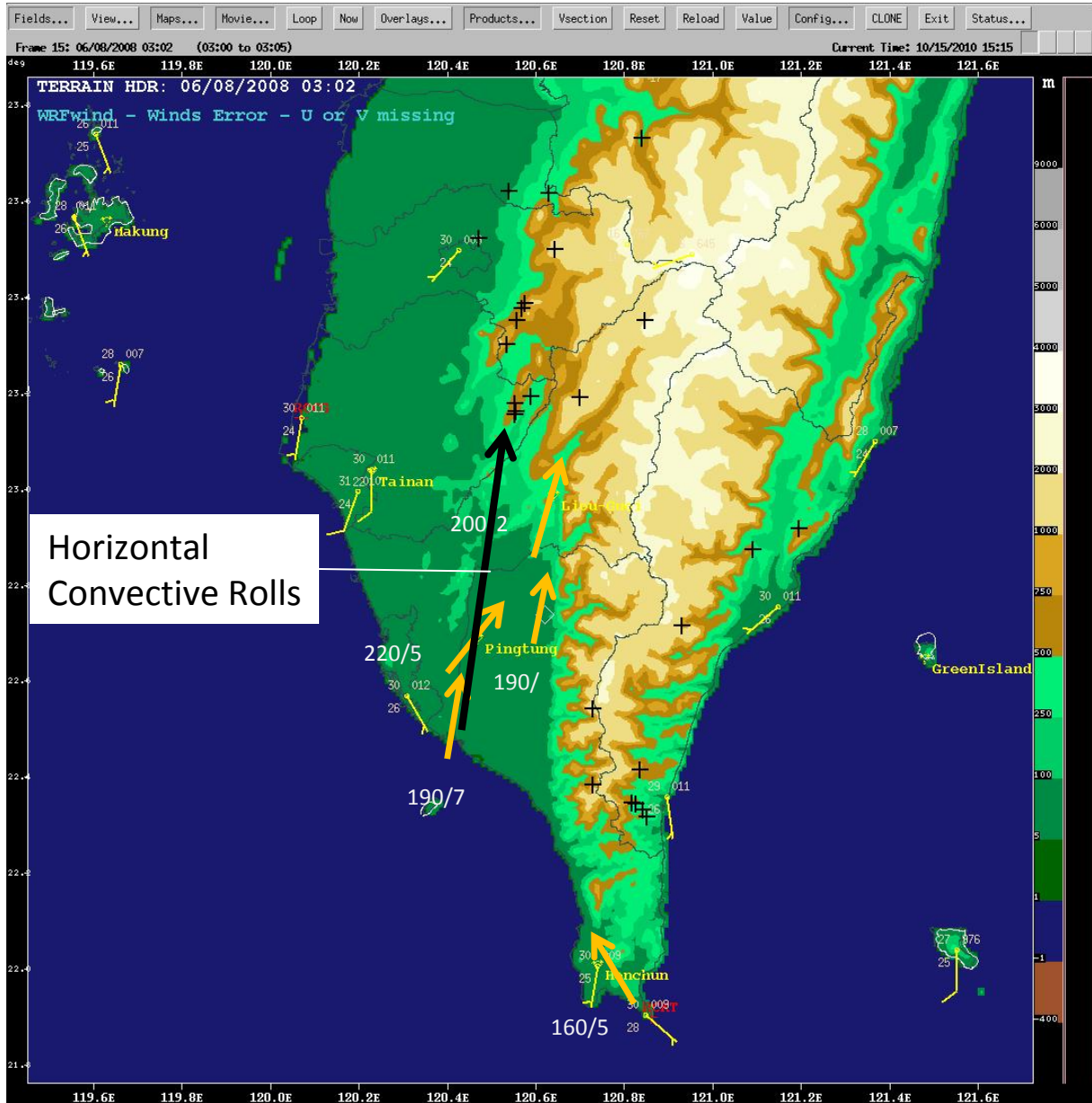
08 June 2008 03 UTC

Winds 14 UTC no 11 L winds from soundings

CI between 10-18 L

Winds @14 L
~ 300 -500 m height 190/7 m/s
3km height 255/5 m/s

CIN 12
Cape 1464



09 June 2008

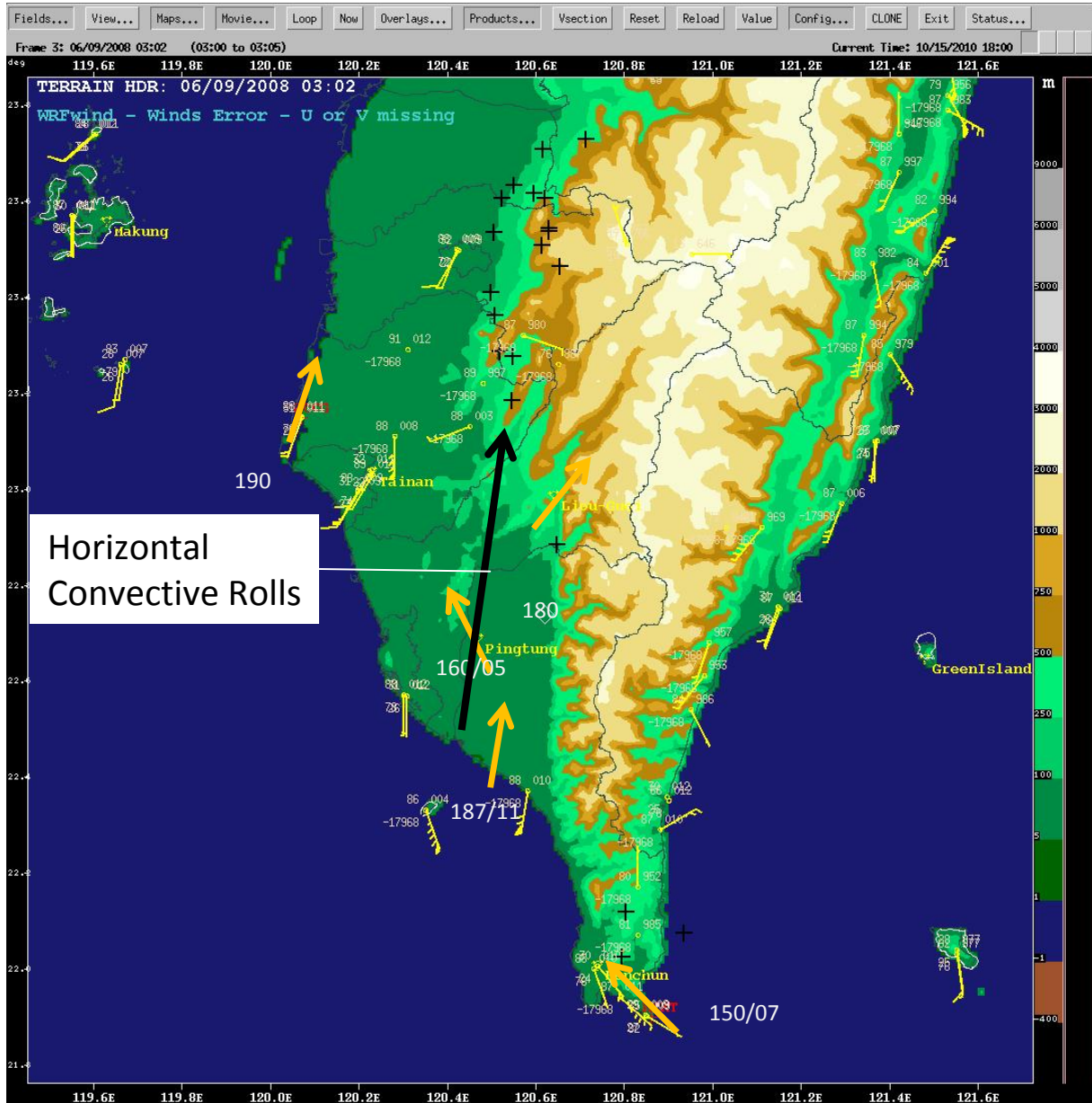
CI between 11 - 20 L

Winds @11 L
~ 500 m height 190/11

3 km height 190/6 m/s

CIN 11
Cape 747

Winds 11 L



13 June 2008

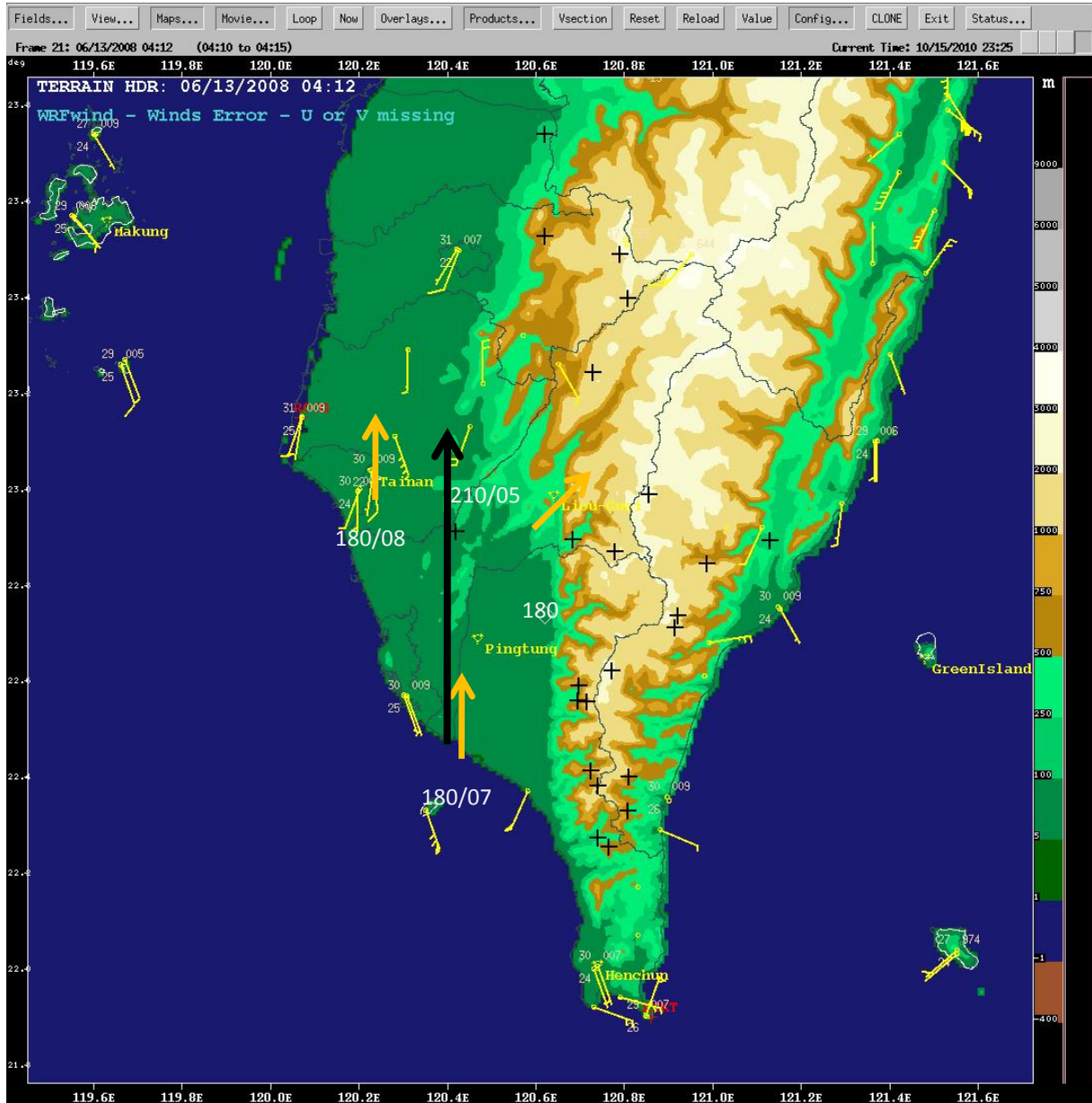
CI between 12 - 17 L

Winds @ 14 L
~ 500 m height 180/09

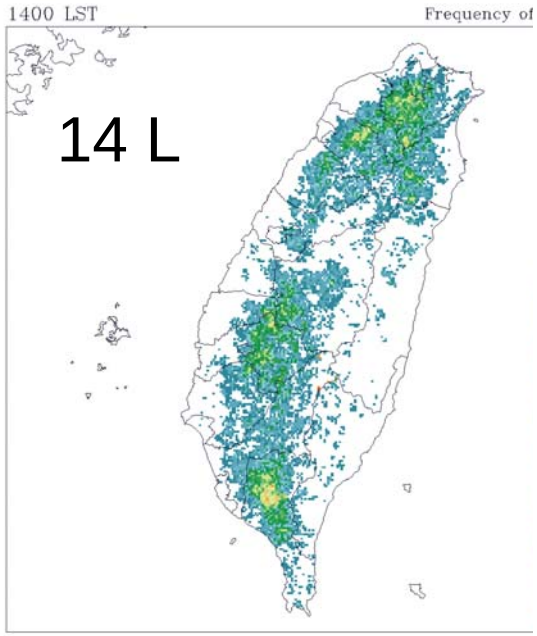
3 km height 210/10 m/s

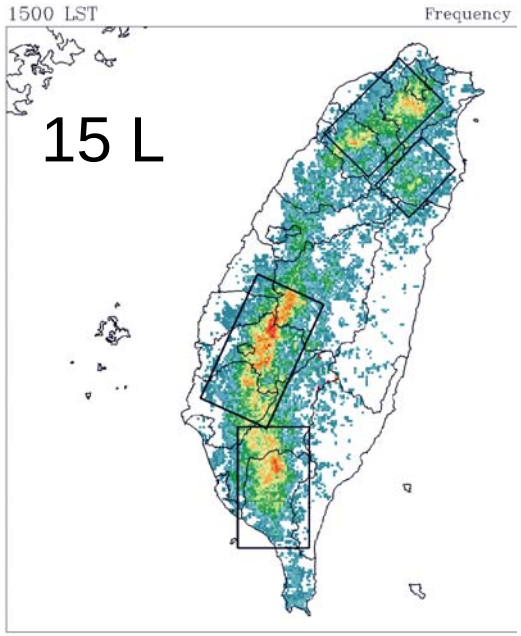
CIN 19
Cape 624

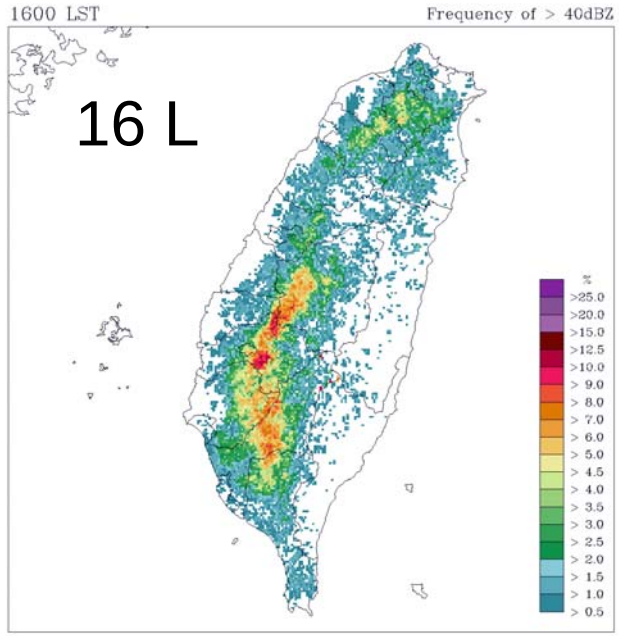
Winds 14 L



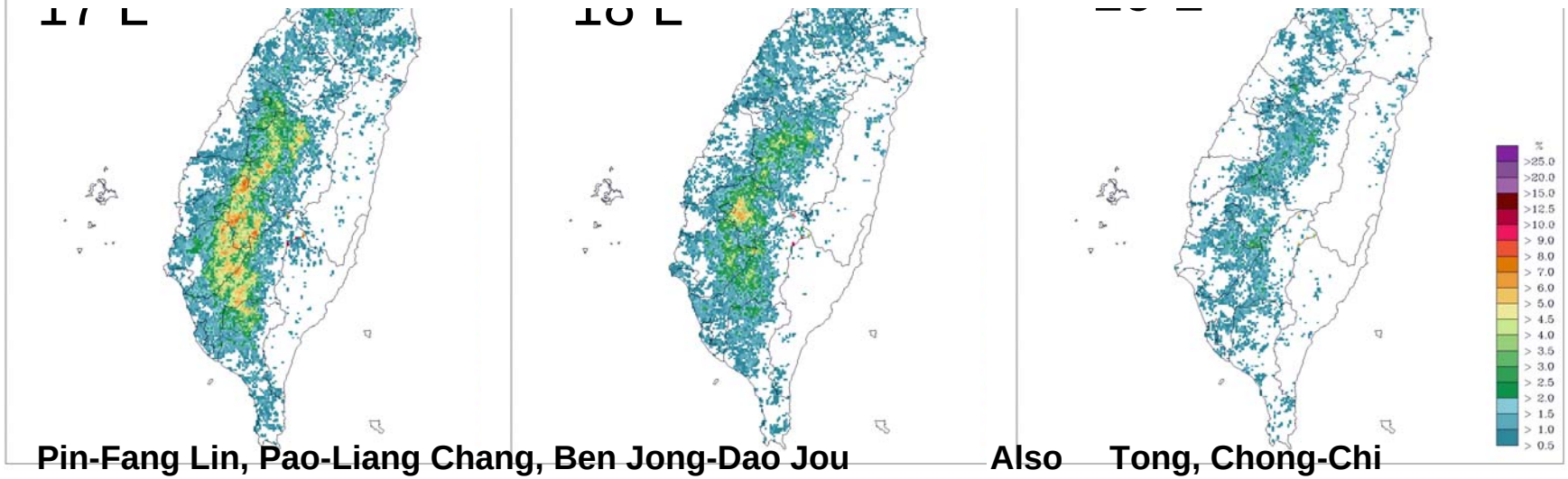
Climatology







What About the hotspot near Taipei



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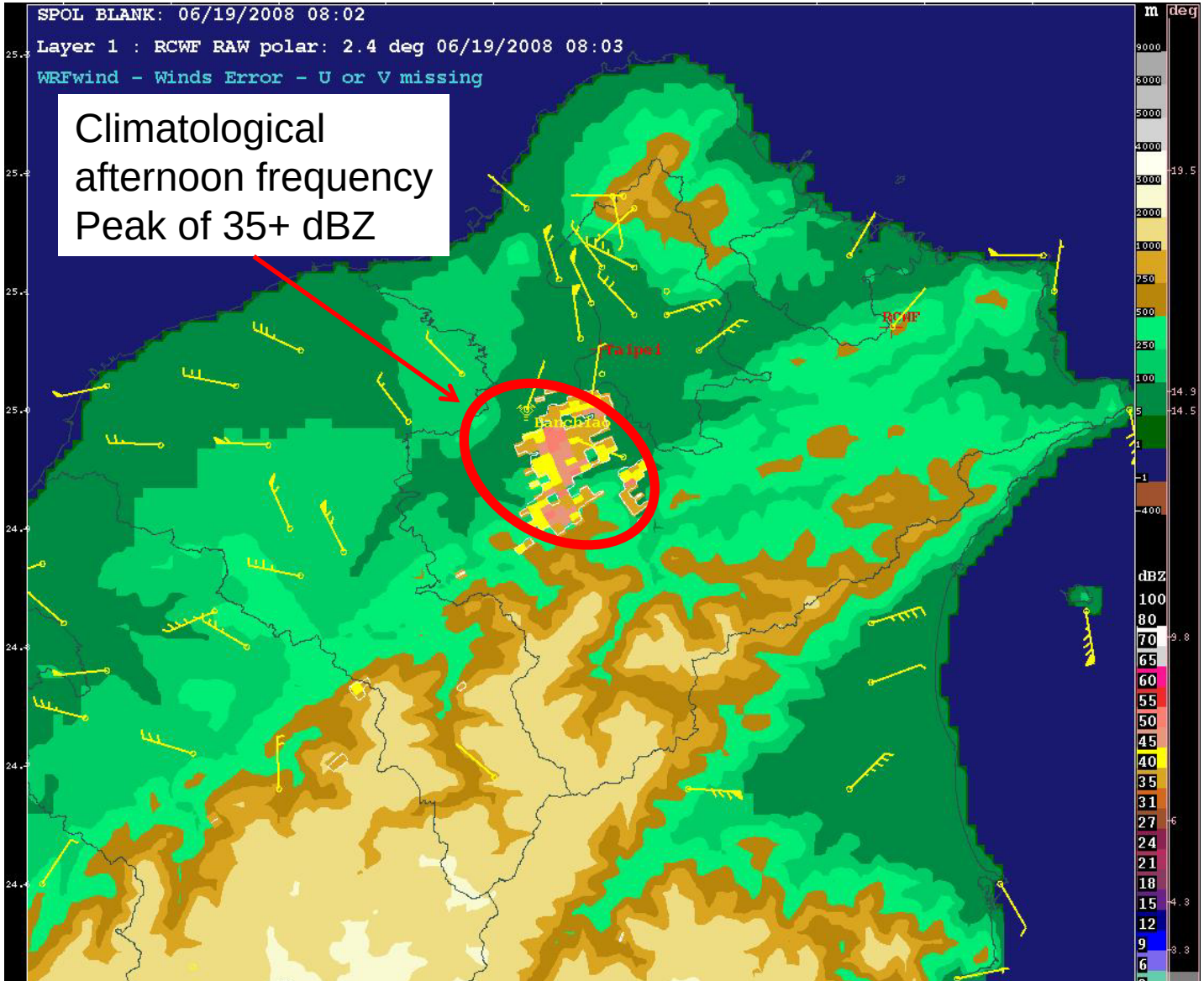
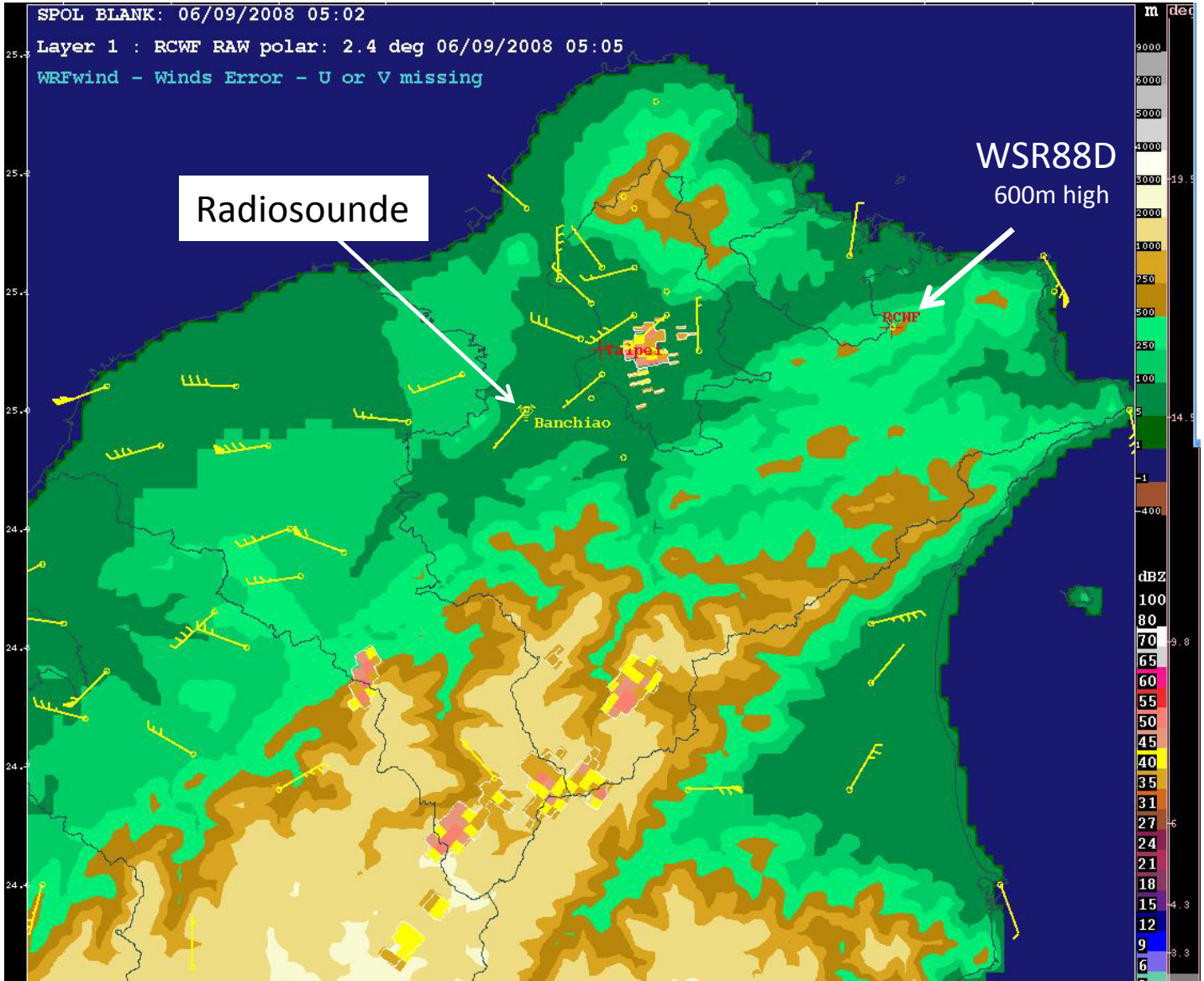
June 19

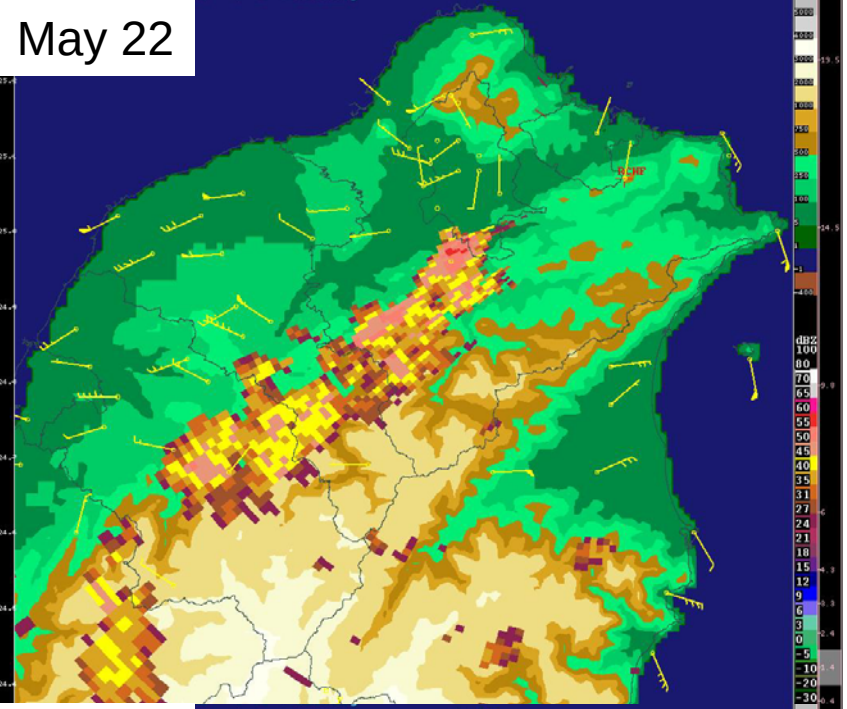

SPOL BLANK: 06/19/2008 08:02
Layer 1 : RCWF RAW polar: 2.4 deg 06/19/2008 08:03
WRFwind - Winds Error - U or V missing
Climatological afternoon frequency Peak of 35+ dBZ
RCWF
Taipei
m
deg
dBZ

Existing Instrumentation

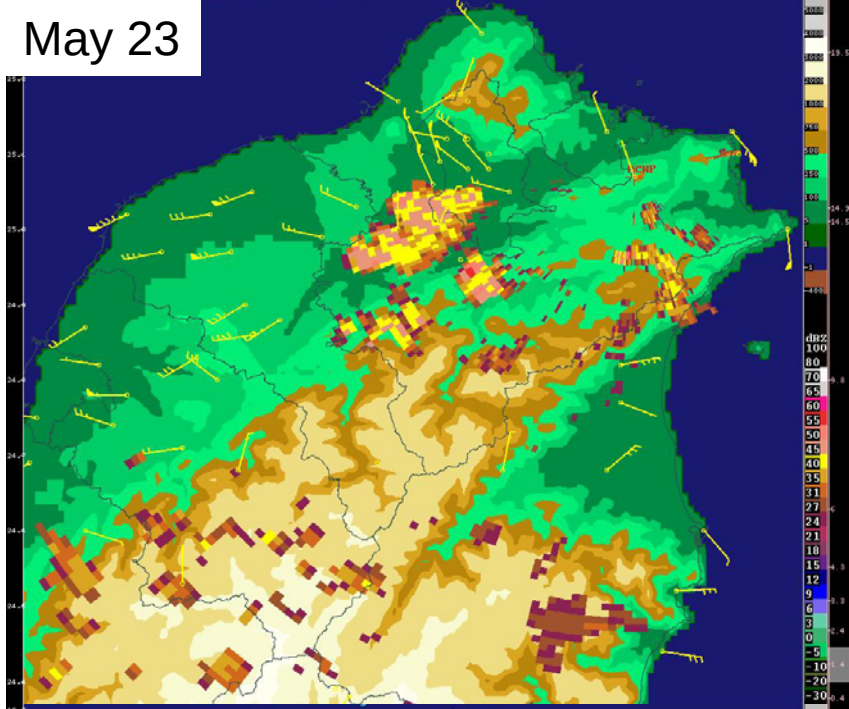
June 9



May 22

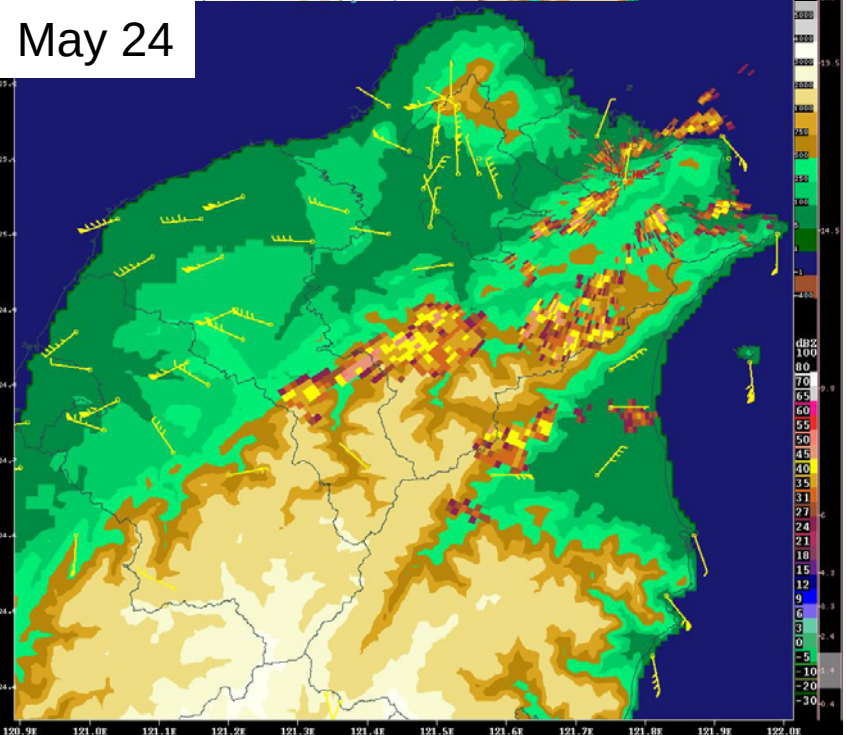


May 23

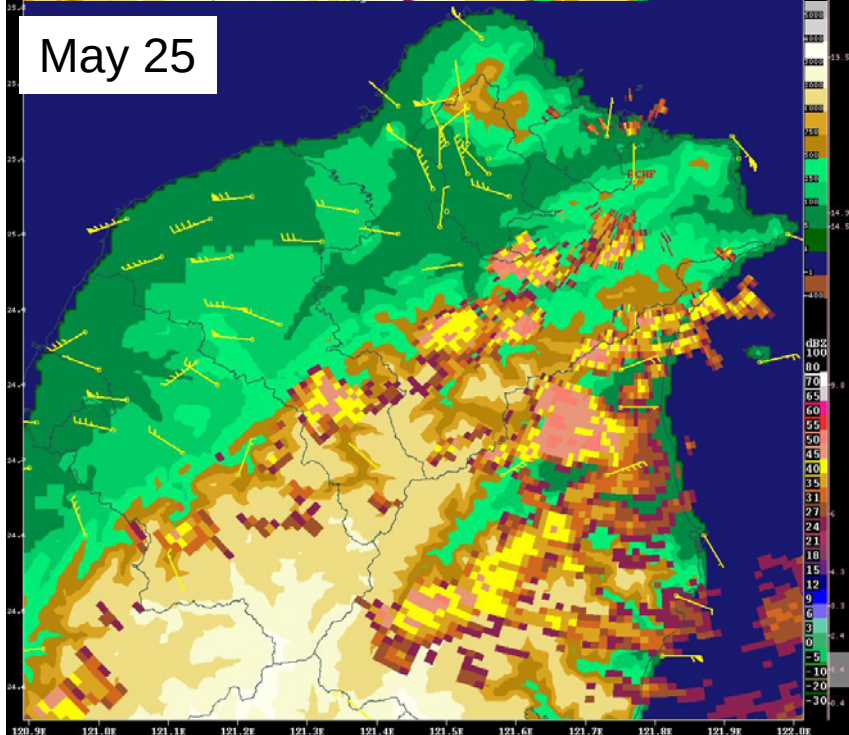


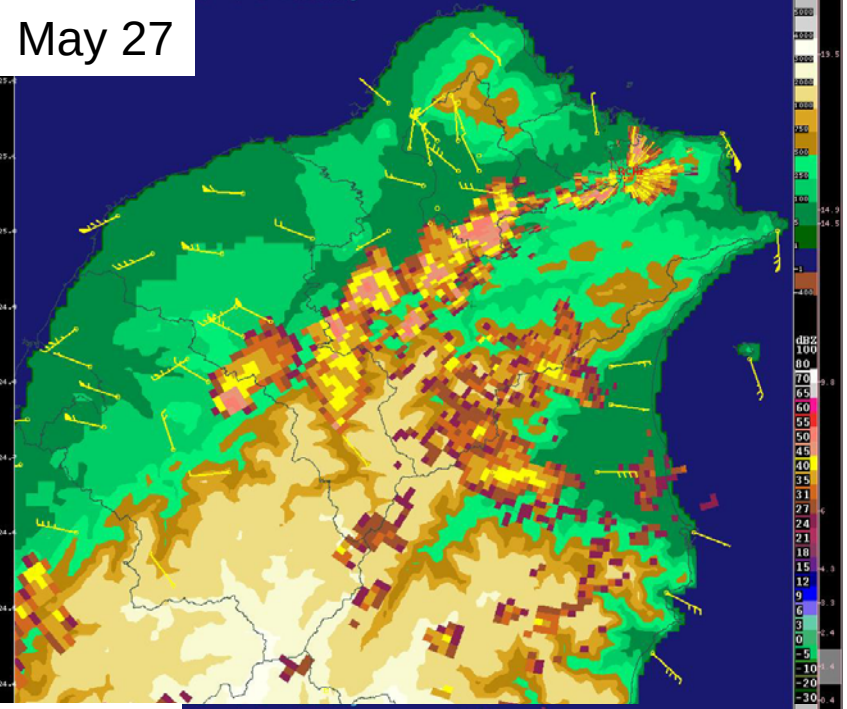
Examples of initiation near Taipei

May 24

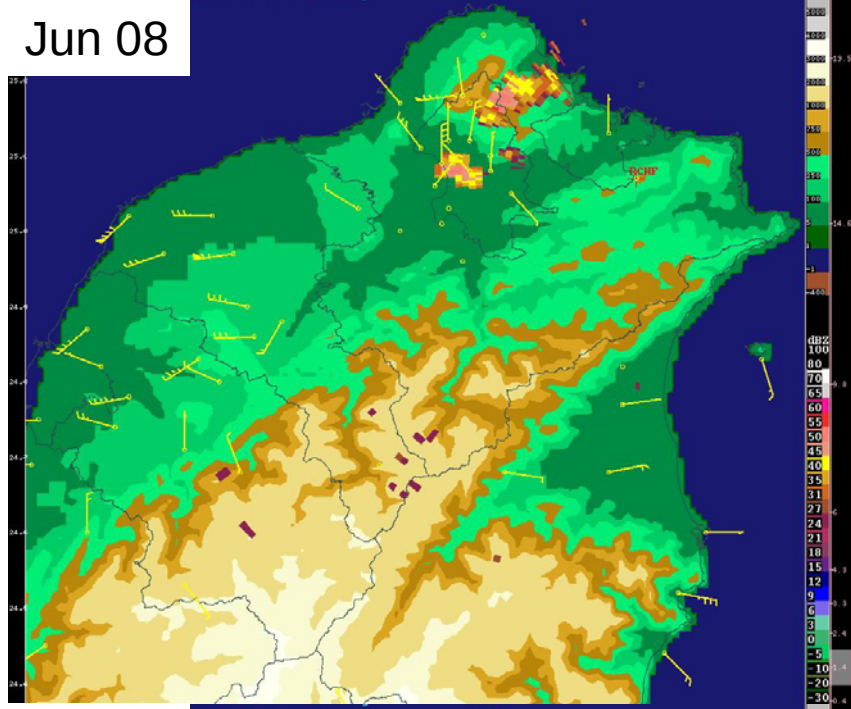


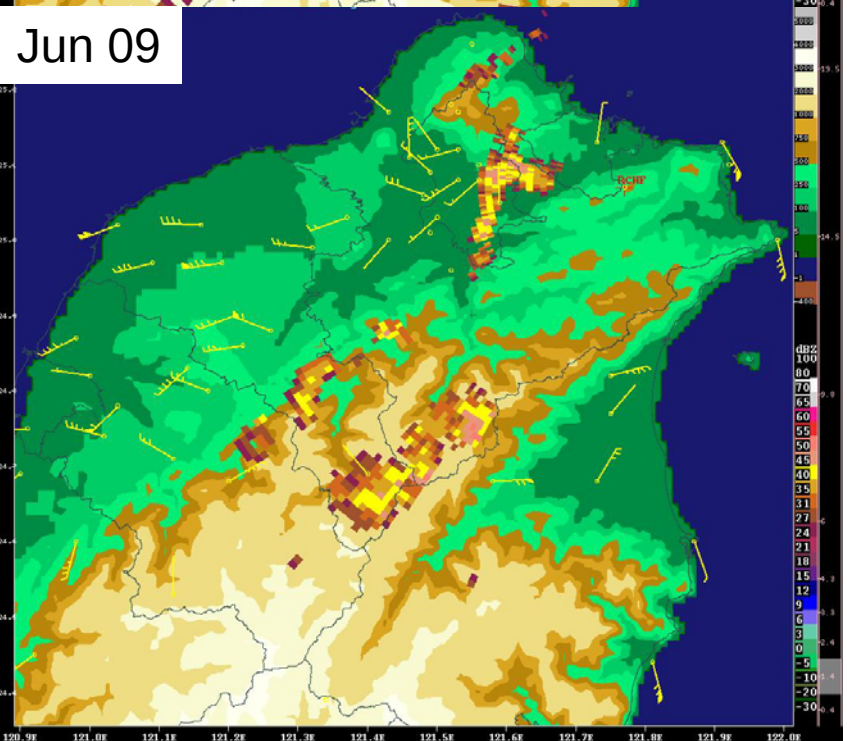
May 25

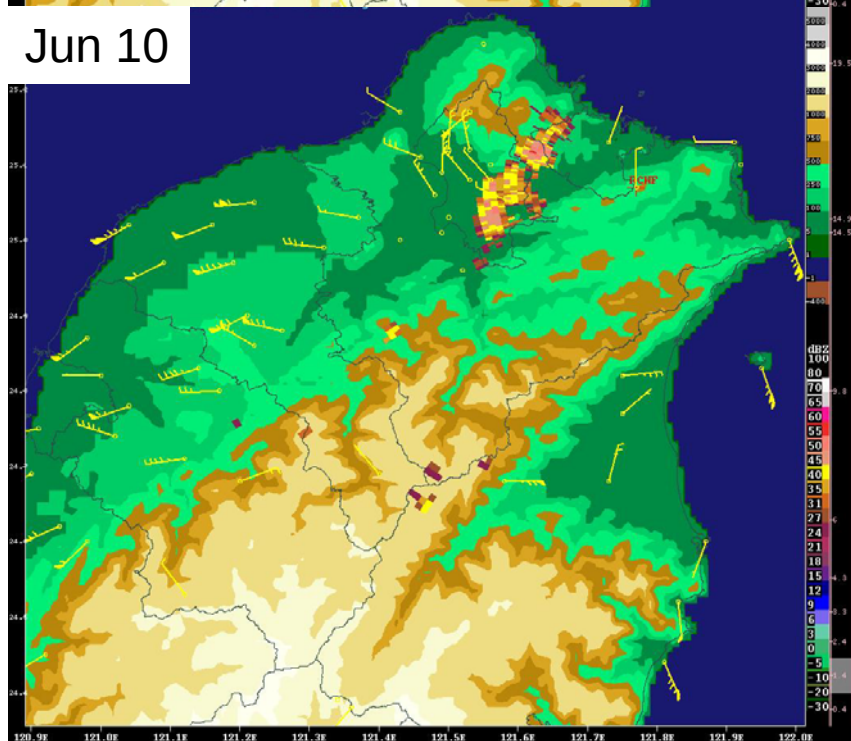


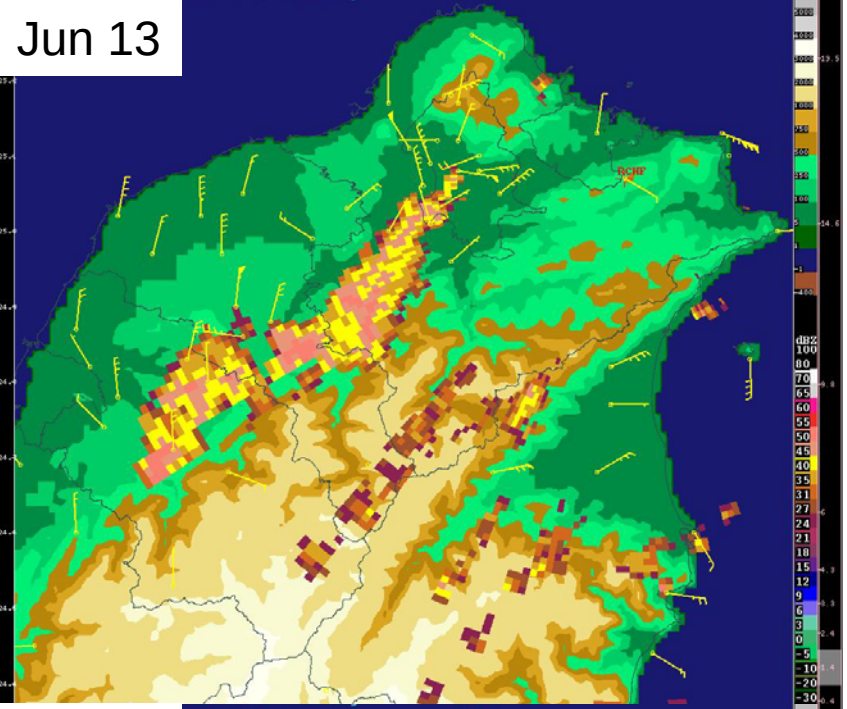


Examples of initiation near Taipei

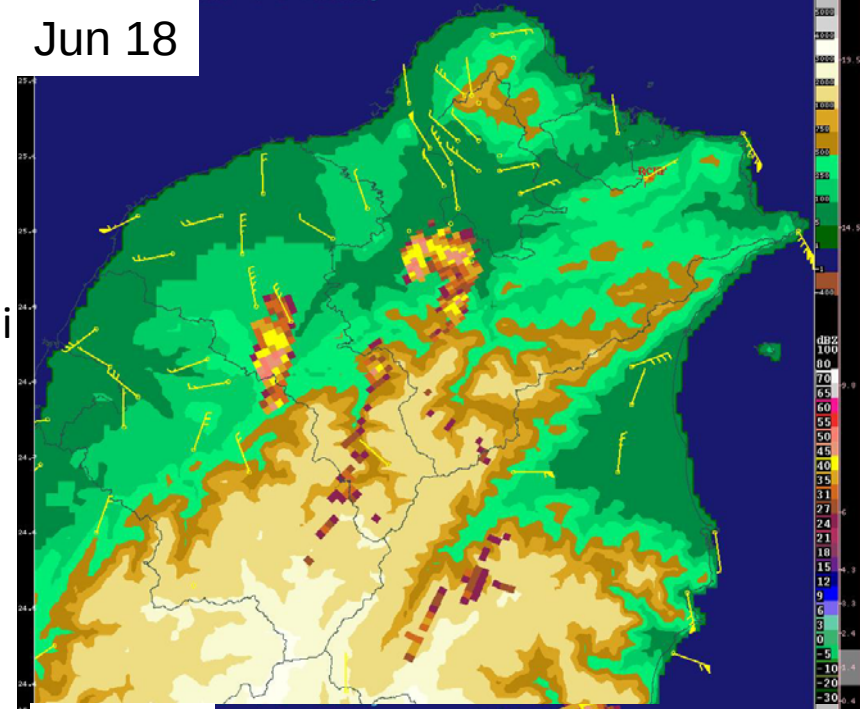


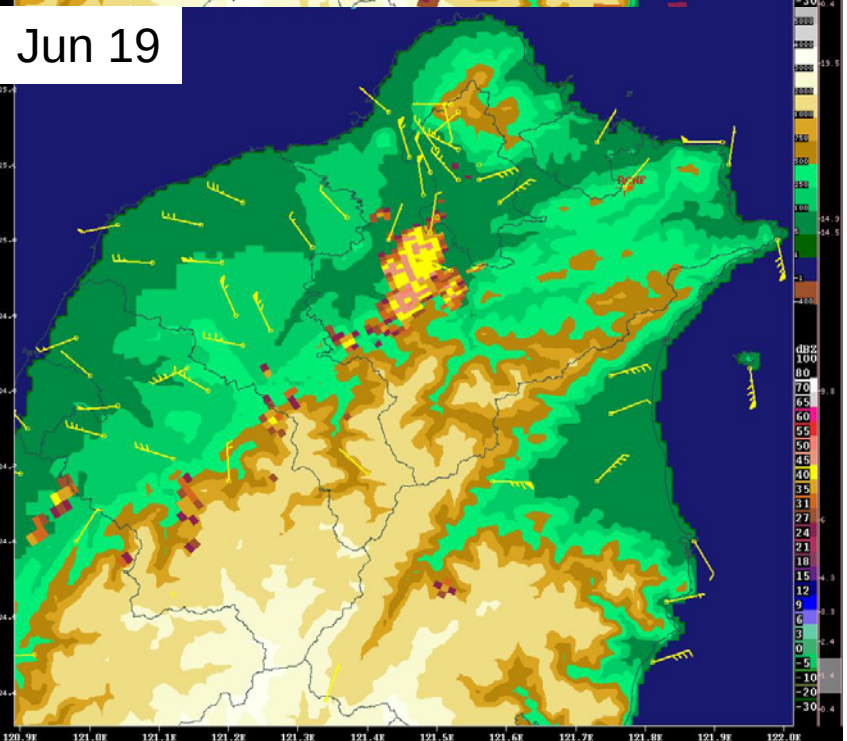


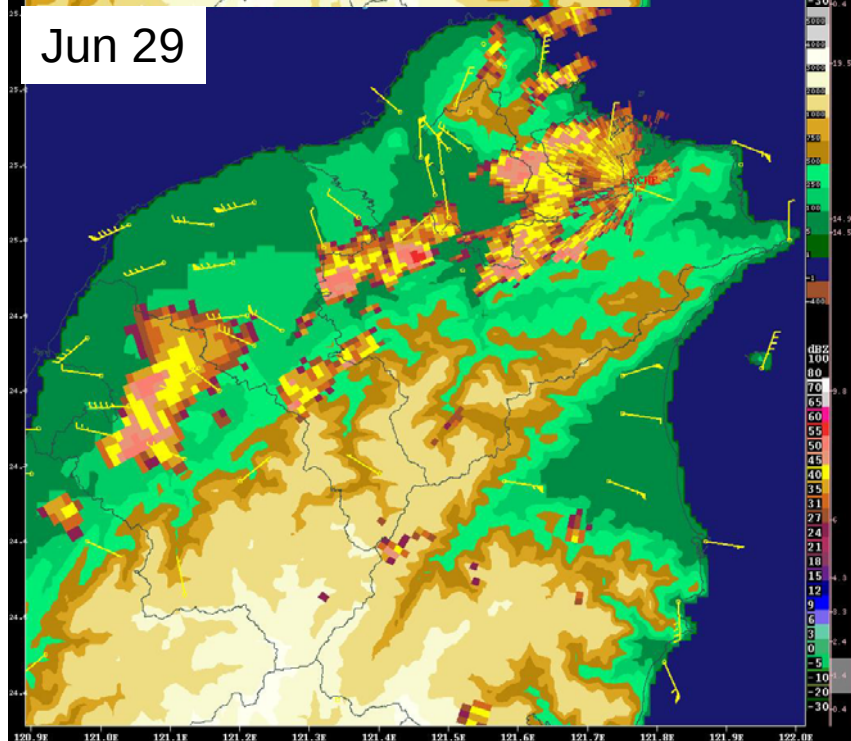




Examples of initiation near Taipei

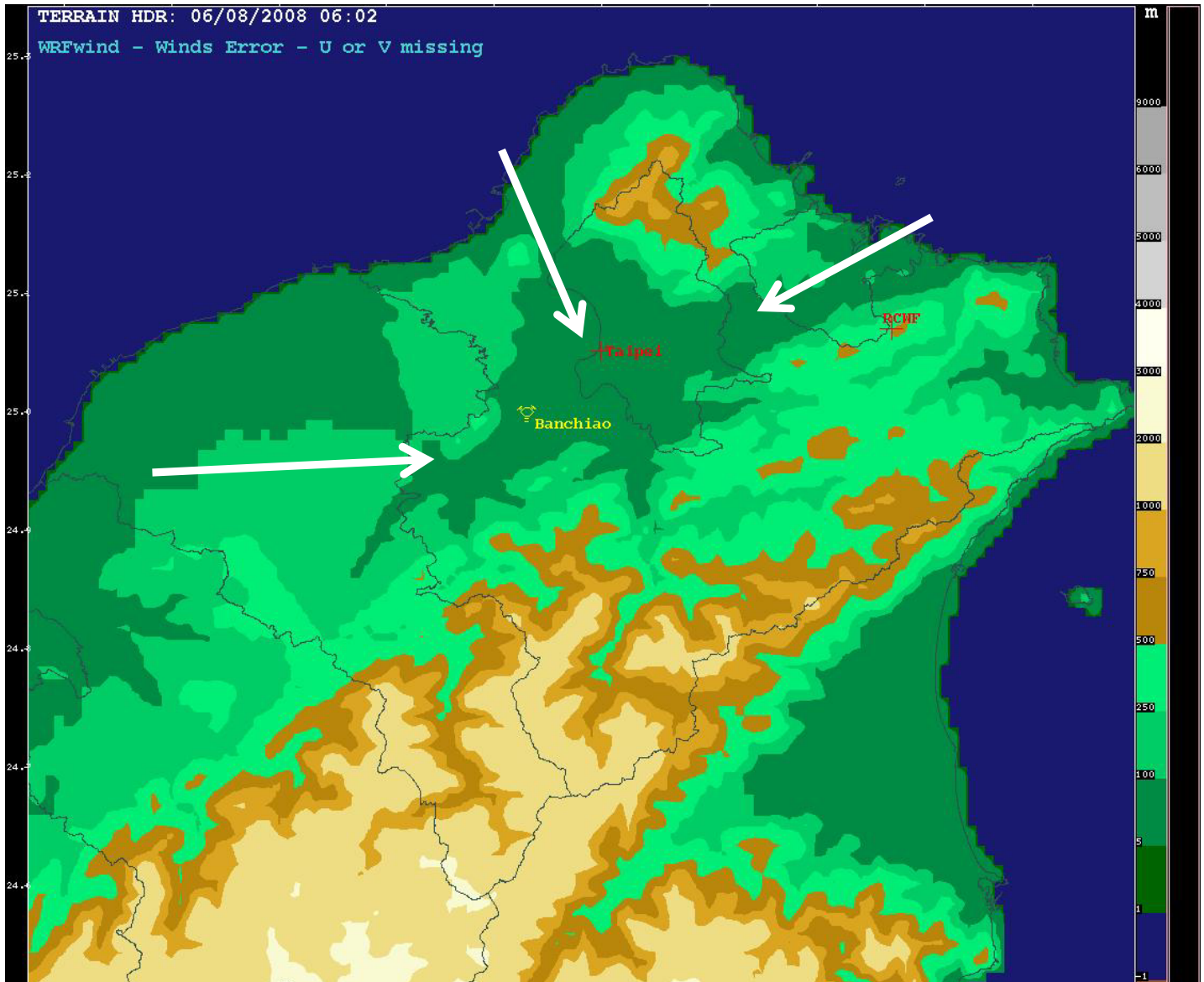






Converging air flow into Taipei basin

- .Need to carefully map and relate to initiation
- Depth of these low-level flows



How to proceed ?

1. Learn from Taiwan forecasters and researchers
2. High quality wind analysis (VDRAS)
3. Develop predictors for nowcasting system
4. Future experiments ?

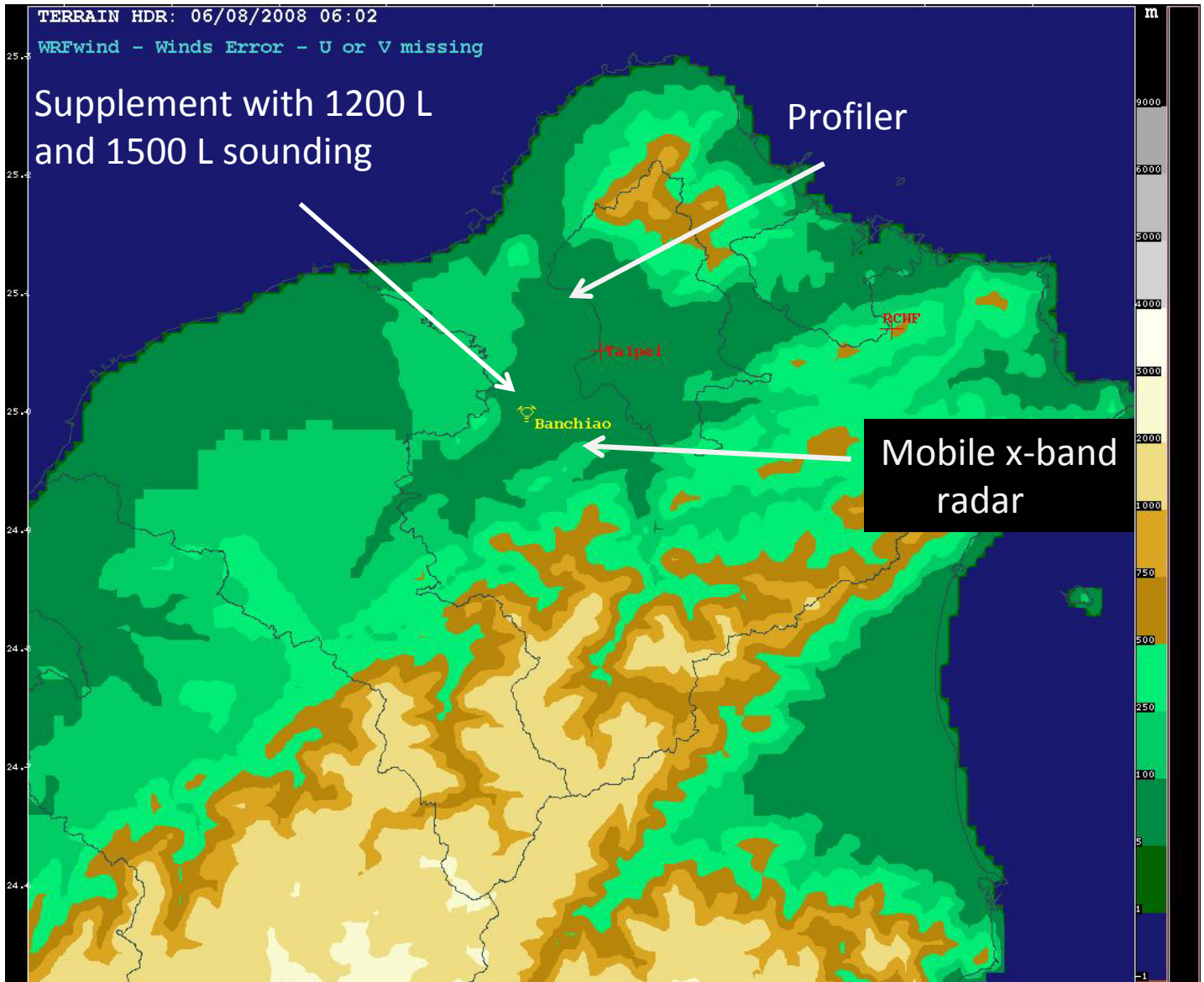

DOESHA
Xie xie

Thoughts on a proposed experiment for northern Taiwan

Objective: Through improved scientific understanding develop convective storm nowcasting techniques for northern Taiwan with the emphasis on weakly forced synoptic situation.

Time: 2011 and 2012

Proposed Instrumentation Enhancement



Proposed Instrumentation Enhancement