

屏東平原海風環流之雷達觀測特徵

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2014.09.16

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P3中尺度研究室

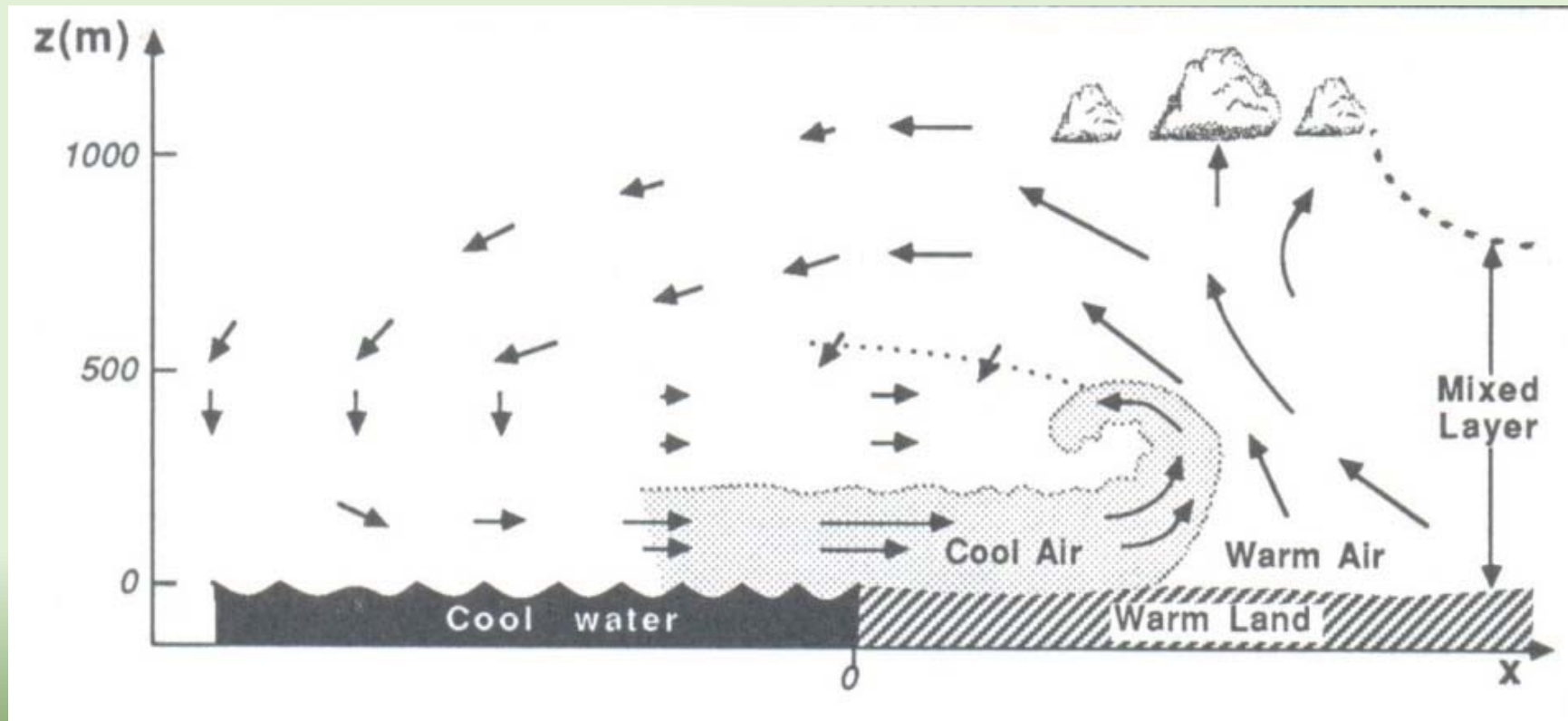
Mesoscale Research Lab (P3 Lab), Department of Atmospheric Sciences, NTU



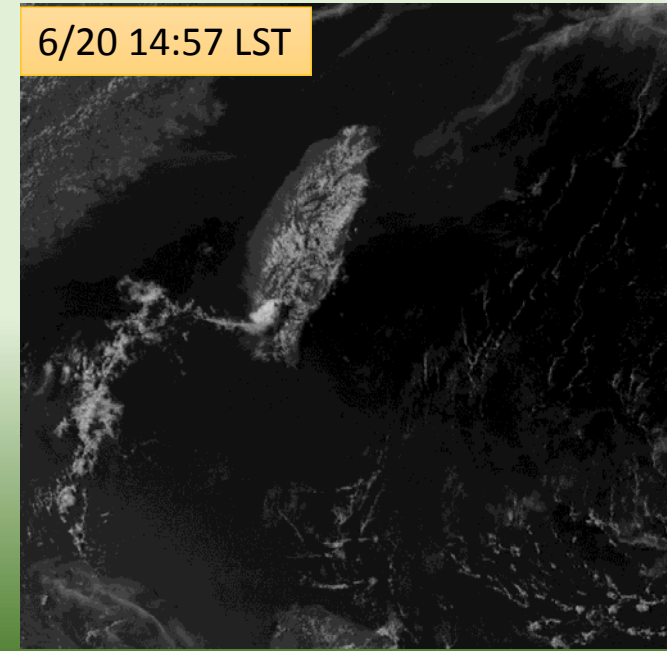
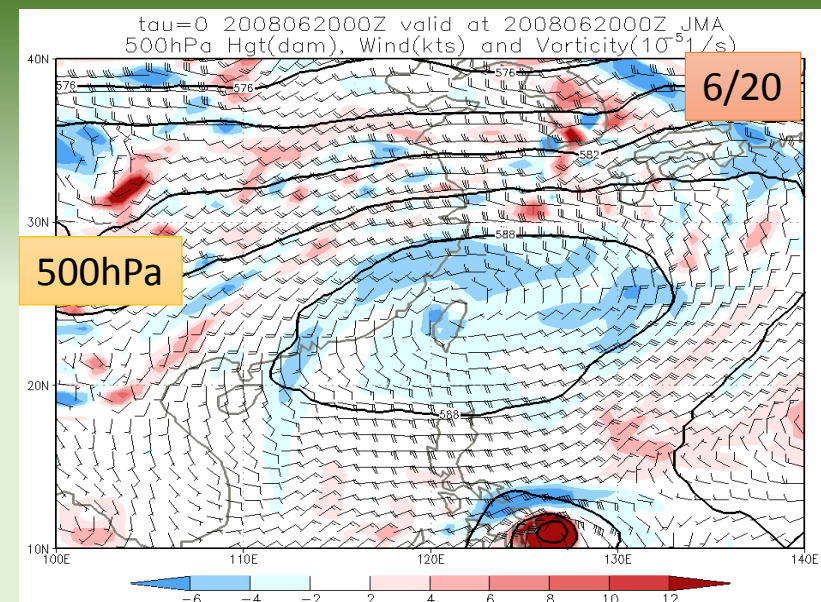
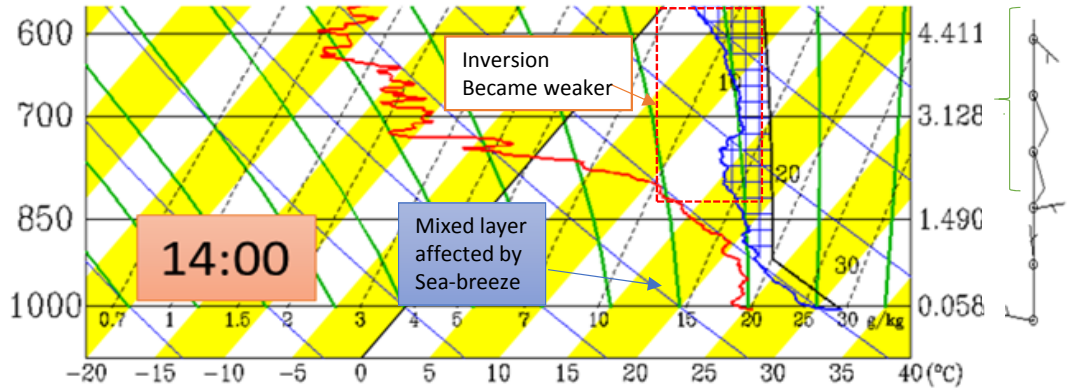
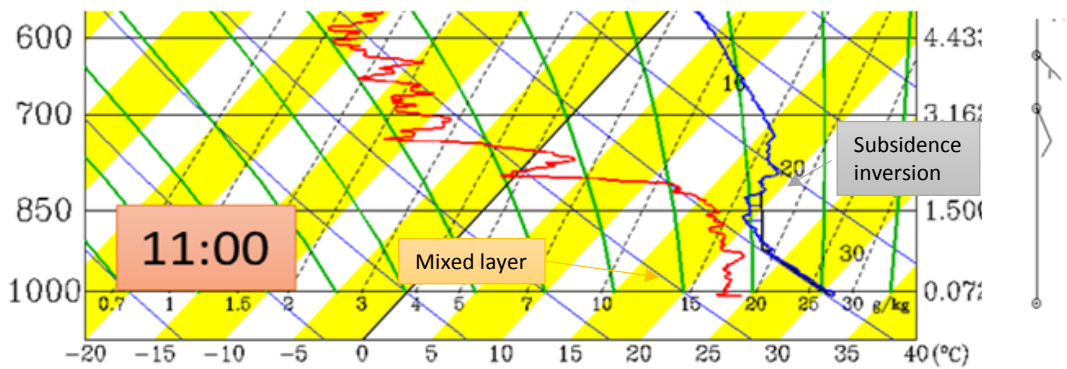
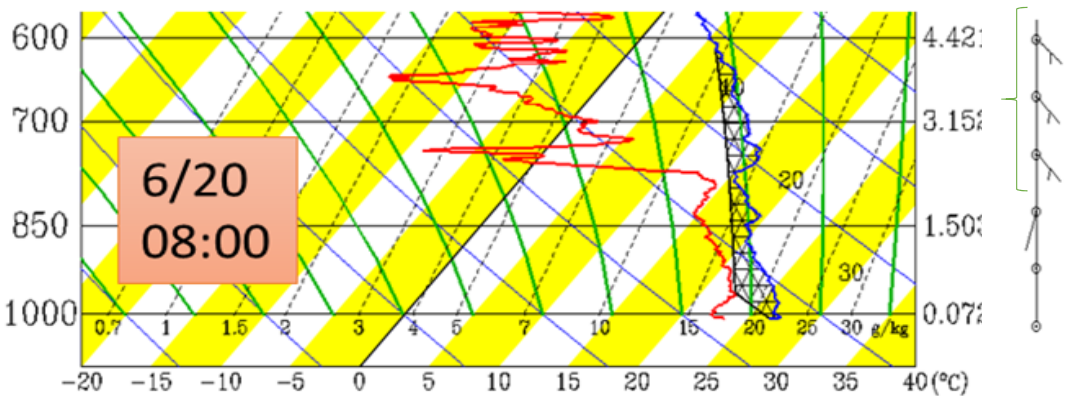
Motivation

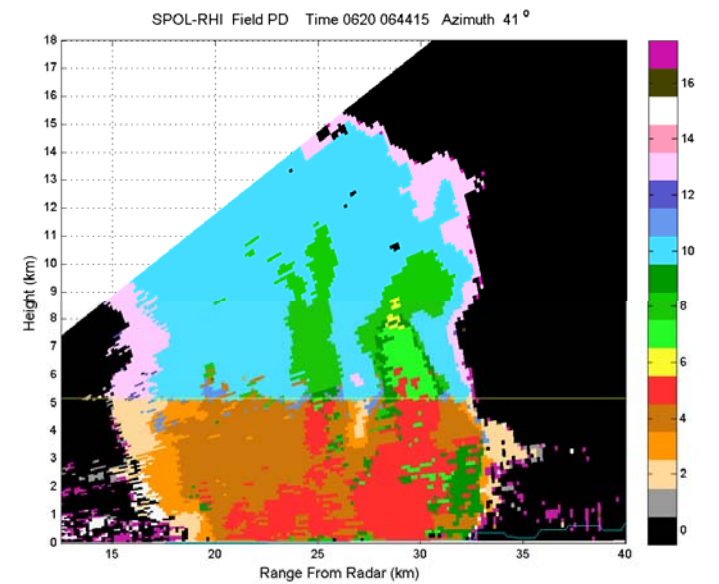
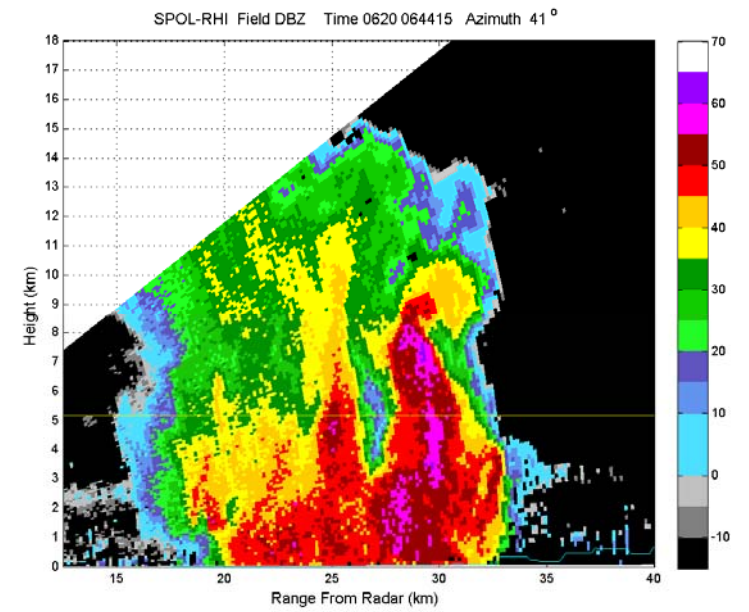
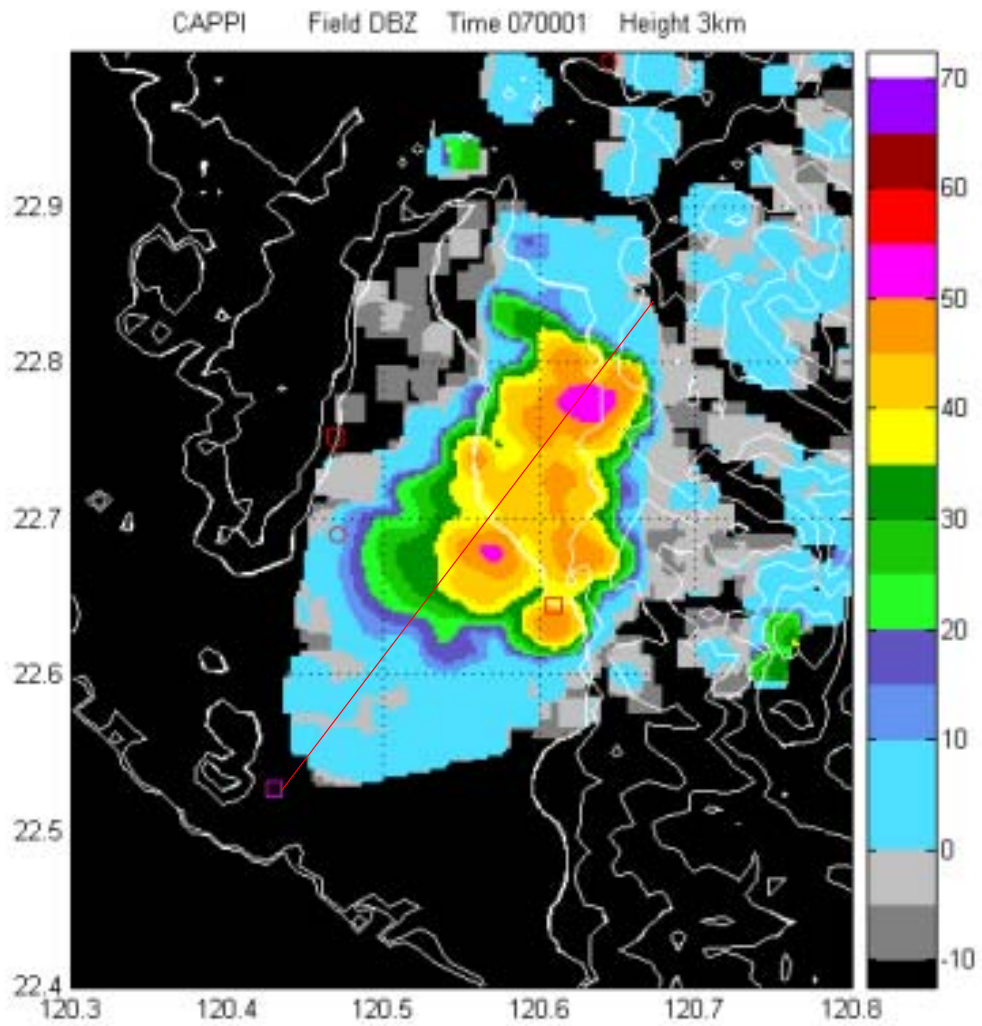
- Although previous studies show the occurrence of thunderstorm is related to sea breeze circulation, the process of storm initiation is not well-known in Taiwan. So far, the understanding of structure of sea breeze circulation and evolution is limited.
- The study use intensive soundings and high resolution SPOL radar data to analyze focus on a thunderstorm system on 20 June 2008 to understand the structure and evolution of sea breeze circulation and local circulation, and how they play role on initiating thunderstorm.

Sea breeze system (SBS)

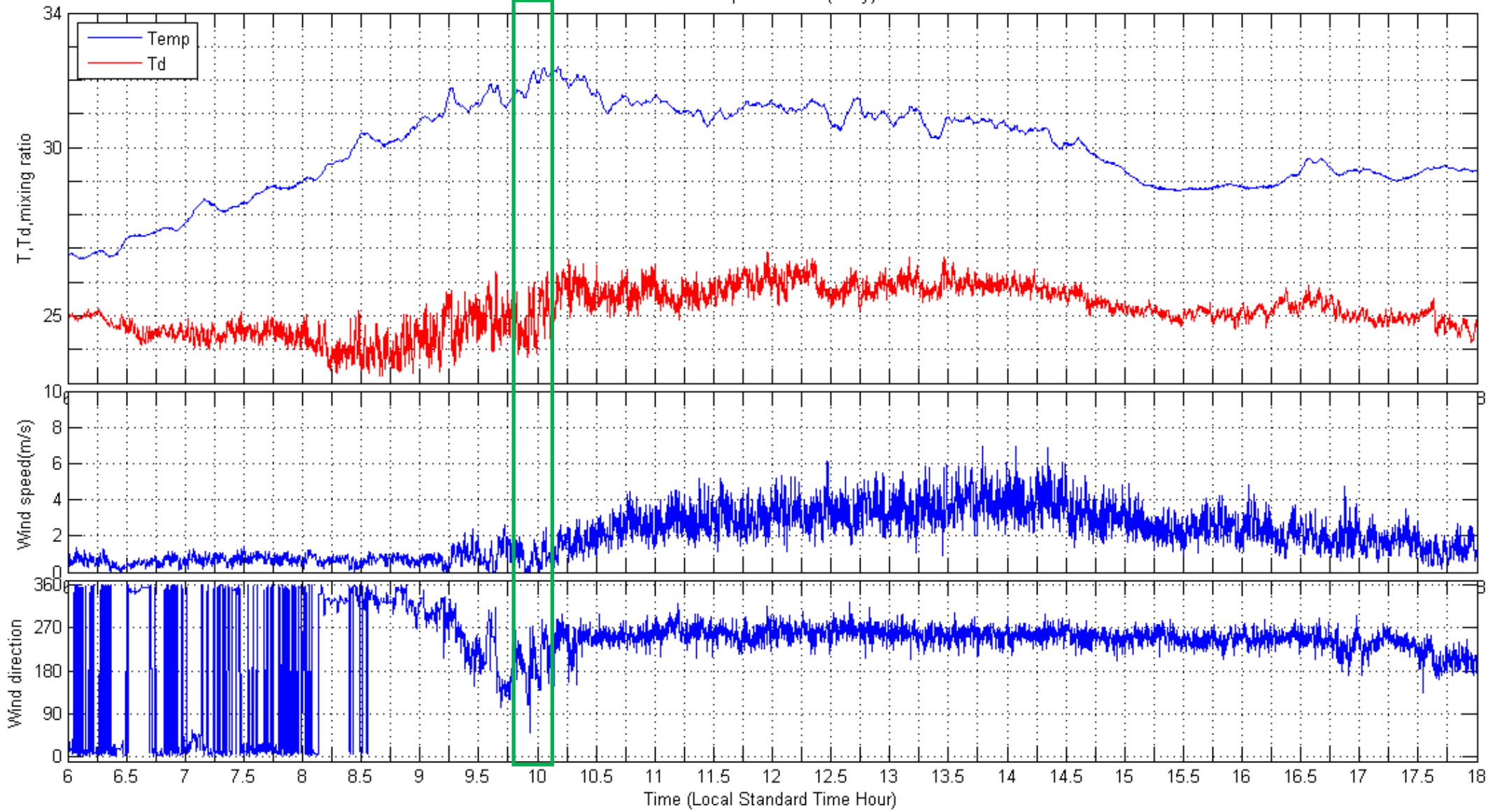


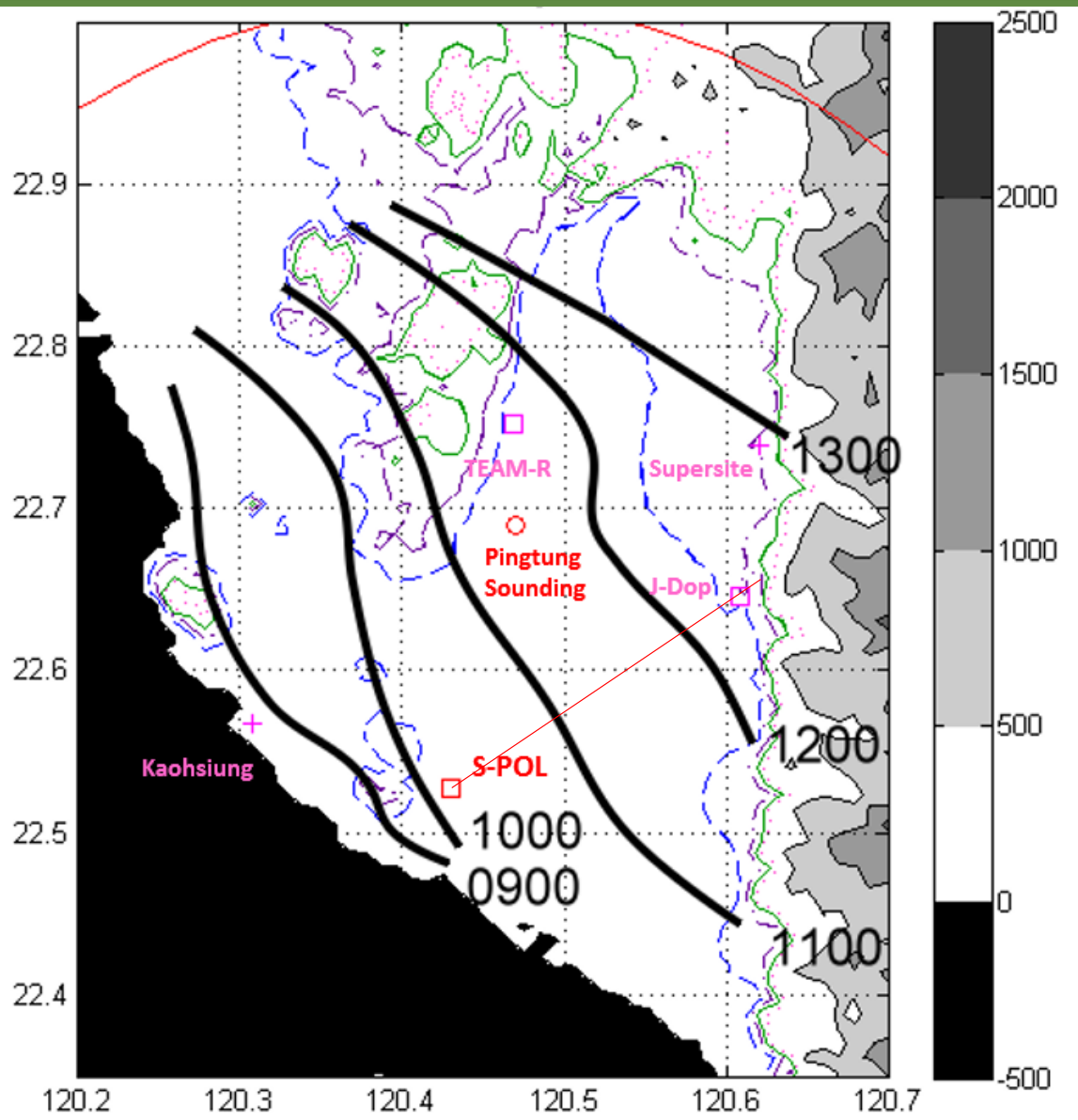
R.B.Stull 1988



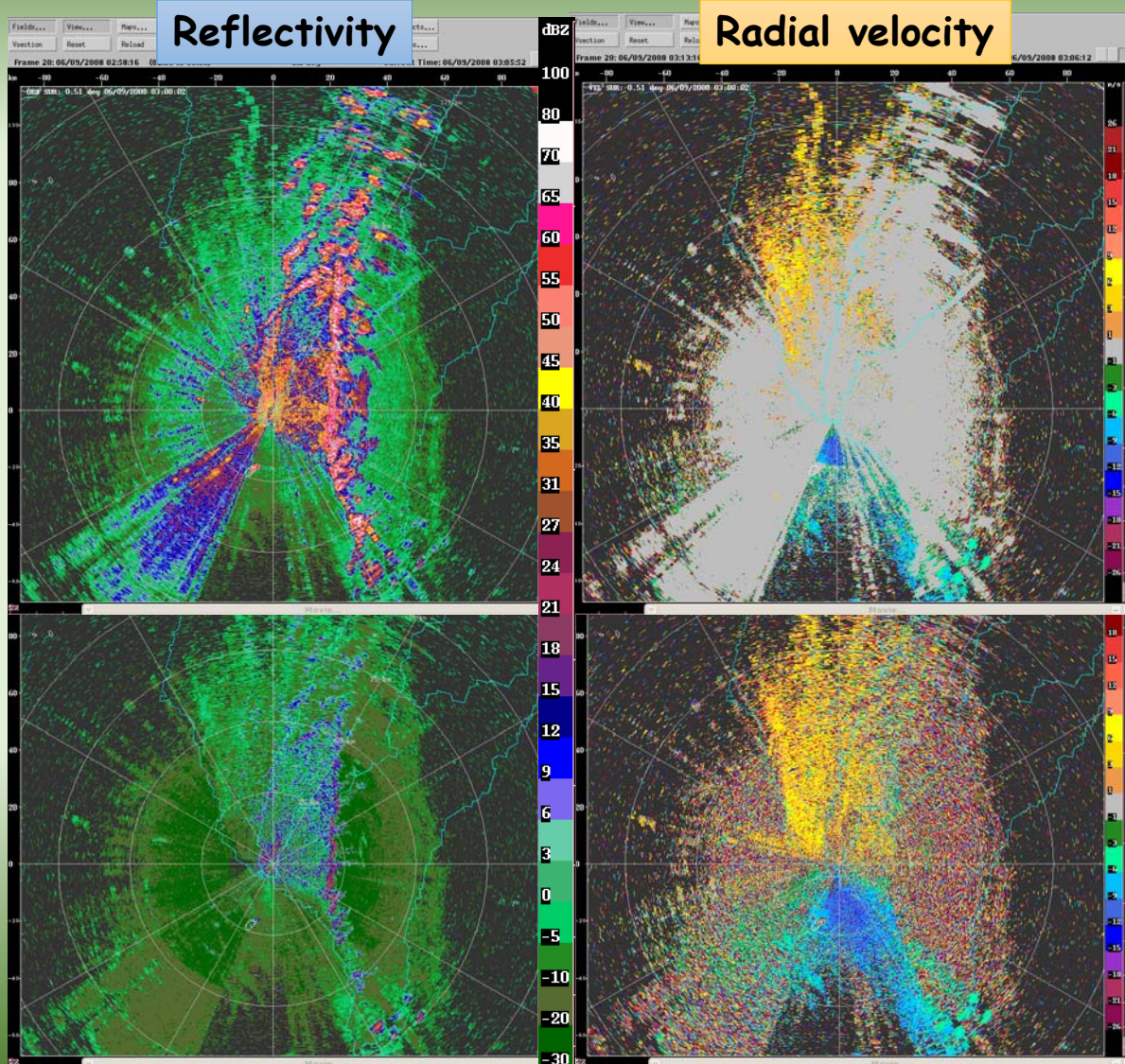


20080620 spol-mwas (Day) data





Clutter Mitigation Decision (CMD) Filter Applied



No clutter filtering

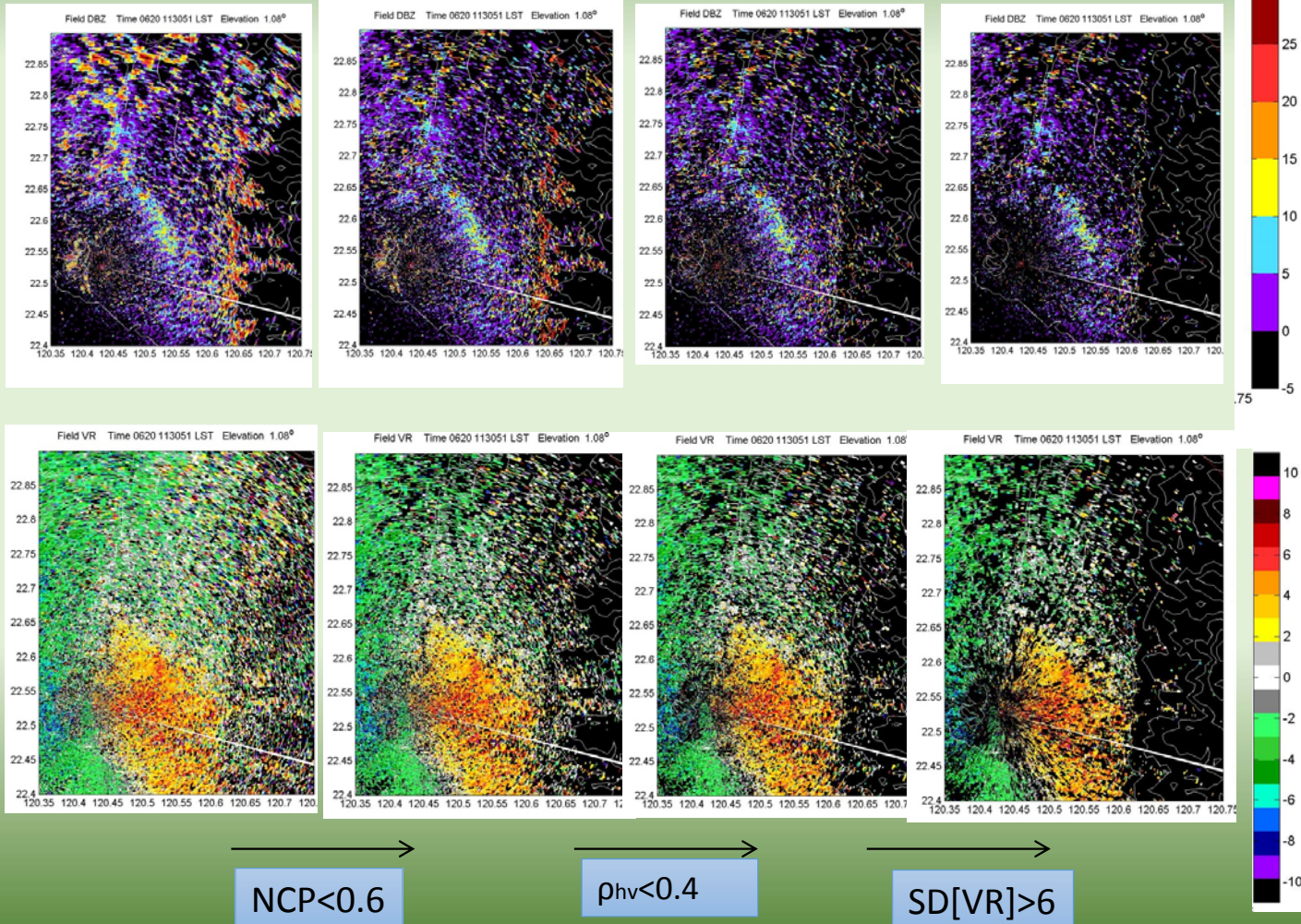
Clutter Mitigation Decision (CMD) Filter Applied

Clear echo signal process-Filtering method :

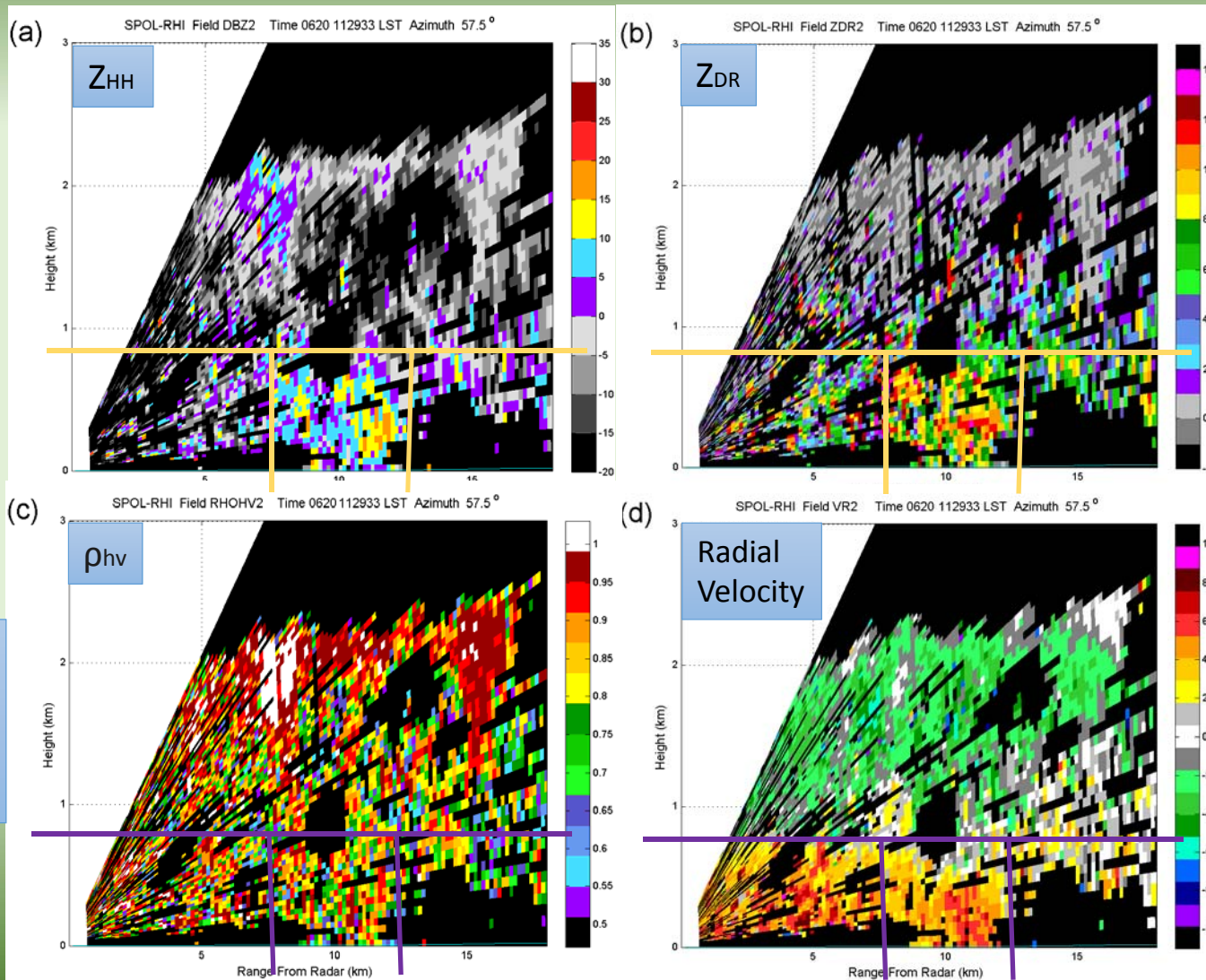
NCP:
Normalied
Coherent
Power

ρ_{hv}
為水平與垂直偏極化電場
個別發射後接受到的電場
之時間序列相關性，

SD[VR]:
相鄰7波束之徑向風場
標準差



The S-POL 57.5 degree azimuth RHI scans at 1129LST

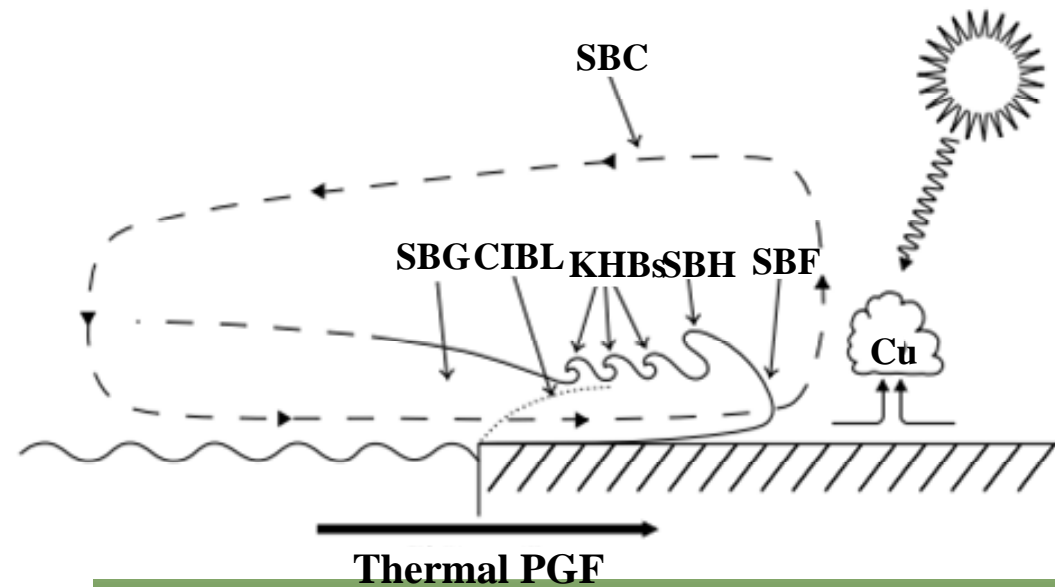
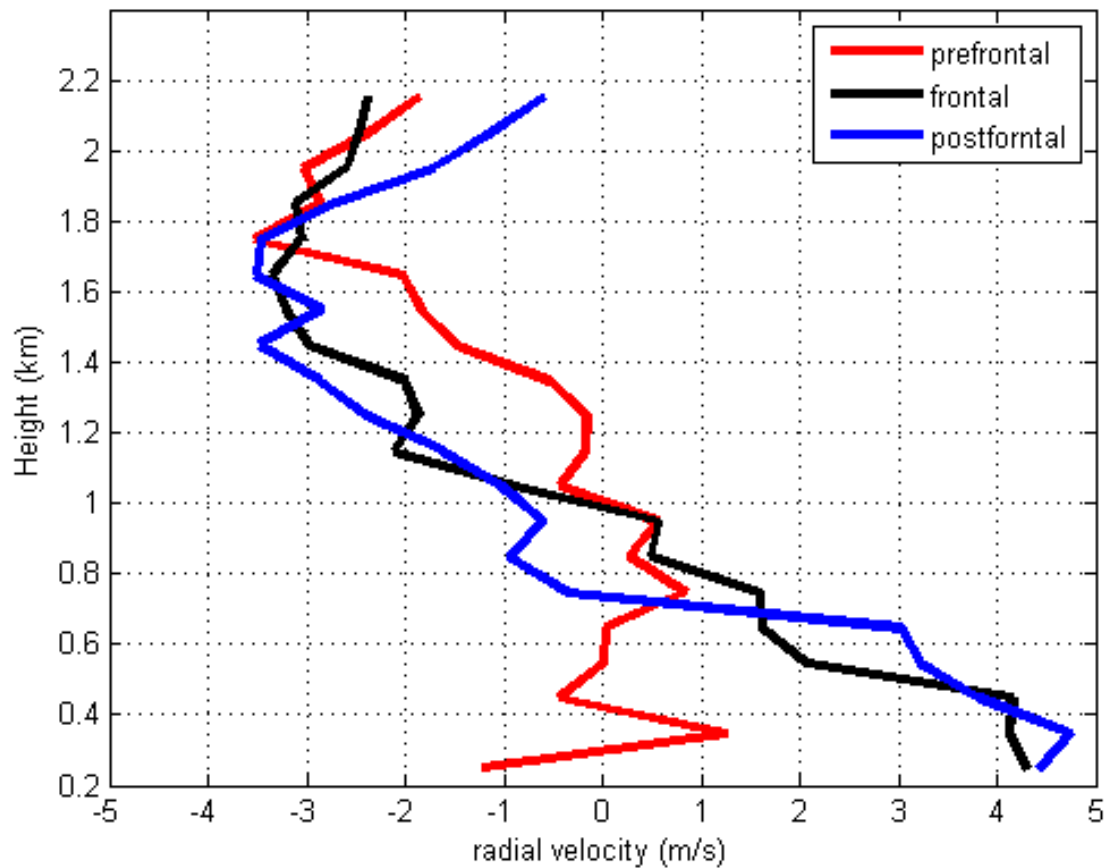


$ZDR = 10 \log_{10}(Z_{HH}/Z_{VV})$
 差分反射率
 Differential Reflectivity
 可看粒子扁平率

ρ_{hv}
 為水平與垂直偏極化電場
 個別發射後接受到的電場
 之時間序列相關性，
 通常其值大於0.95為純態水象粒子，
 介於0.9至0.95為混合態粒子，
 小於0.9則多為生物粒子或雜訊

Small difference of Radial Velocity at 1129LST

SPOL average radial velocity at 57.5 degree azimuth at 1129 LST on 20th June

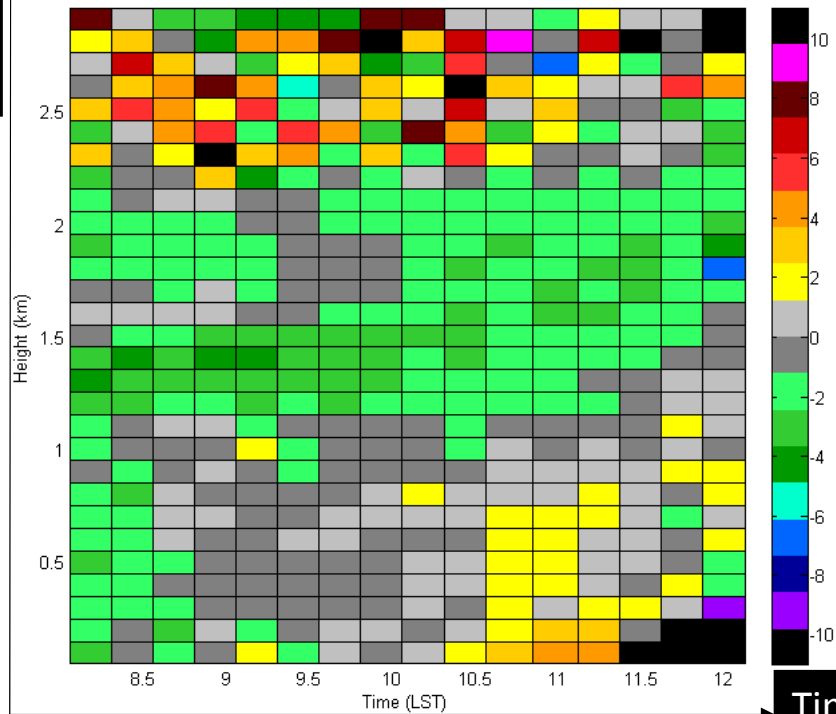


Modified from Miller et al. 2003

Time height variation of averaged radial velocity on the pre-SBF area

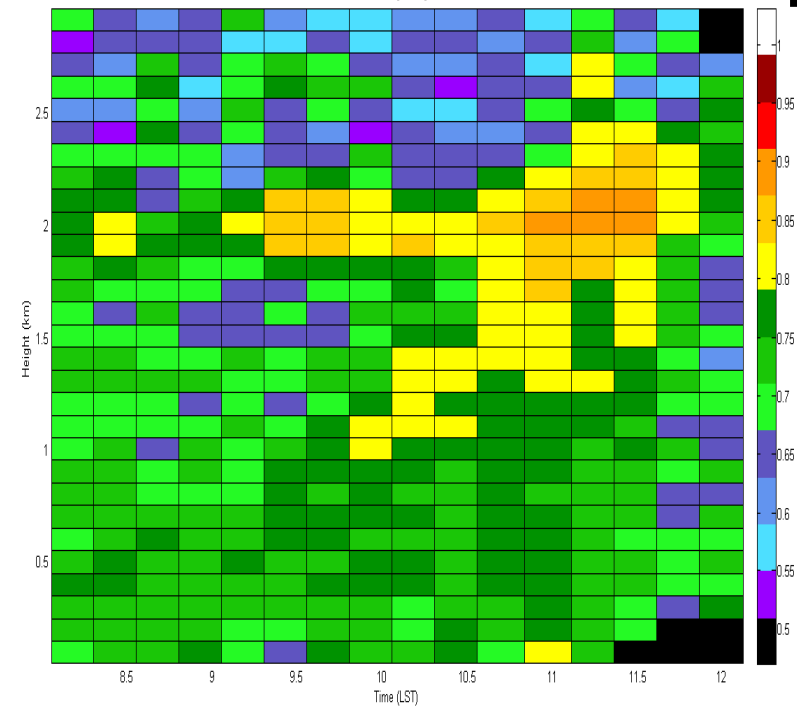
Pre-sea breeze frontal area

SPOL-57.5°RHI Field: Radial Velocity Time-Height diagram of post-Sea Breeze frontal Area on 20th June



Time (LST)

SPOL-57.5°RHI Field: Correlation Coefficient Time-Height diagram of Pre-Sea Breeze frontal Area on 20th June



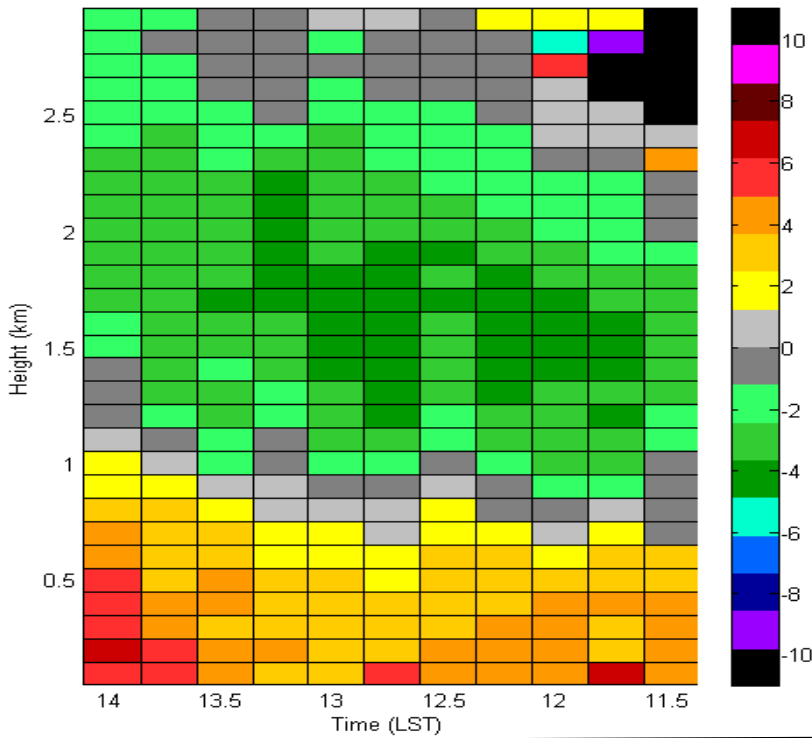
ρ_{hv}

Time height variation of averaged radial velocity on the post-SBF area

Post-Sea breeze frontal area

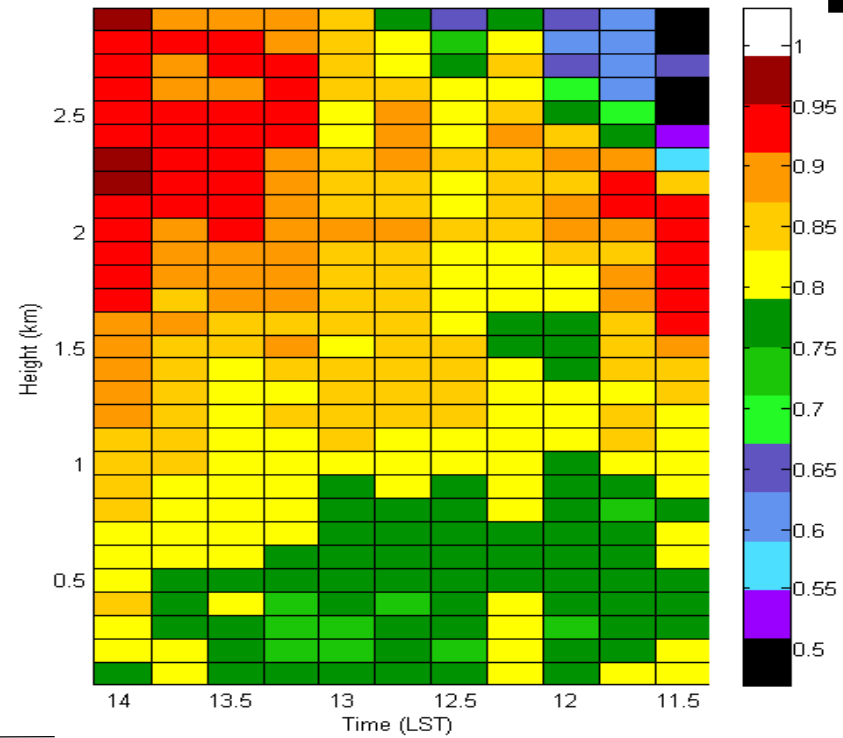
Height (KM)

SPOL-57.5°RHI Field: Radial Velocity Time-Height diagram (postfrontal)



Time (LST)

ρ_{hv}



Conclusion

- At the SPOL RHI scan at 1129LST, the different strength of echo close to the bottom of inversion layer and the different feature in the SBF zone from other region in the mixed layer are recorded.
- By the time height diagram of averaged of S-POL RHI scans at clear day, there are several findings:
 - During the morning, the weak wind of the mixed layer changed from easterly to westerly wind in the prefrontal zone, which still shows the regularity. The change might be caused by the reverse of temperature gradient.
 - The wind speed variation in the postfrontal region is recorded. What makes the wind speed increasing still needs to do further studied.

Thanks for your attention~

