

Refined analysis of the generation of AACCP and related storm top phenomena

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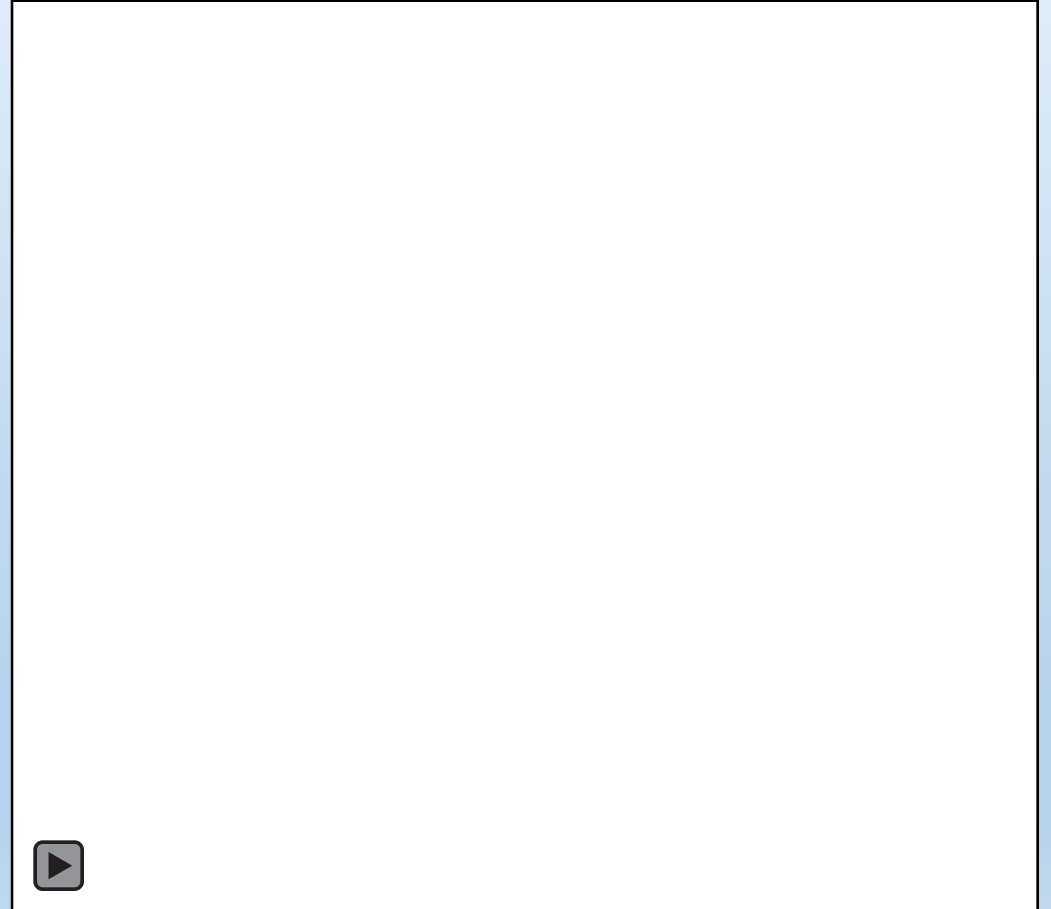
Storm top features

- Overshooting top (OT)
- Above anvil cirrus plumes (AACCP)
- Jumping Cirrus (JC)
- Cold-U (V)
- Close-in Warm Area (CWA)
- Cold Ring (CR)
- Pancake Cloud (PC)
- Ship waves (SW)
- Radial Cirrus (RC)

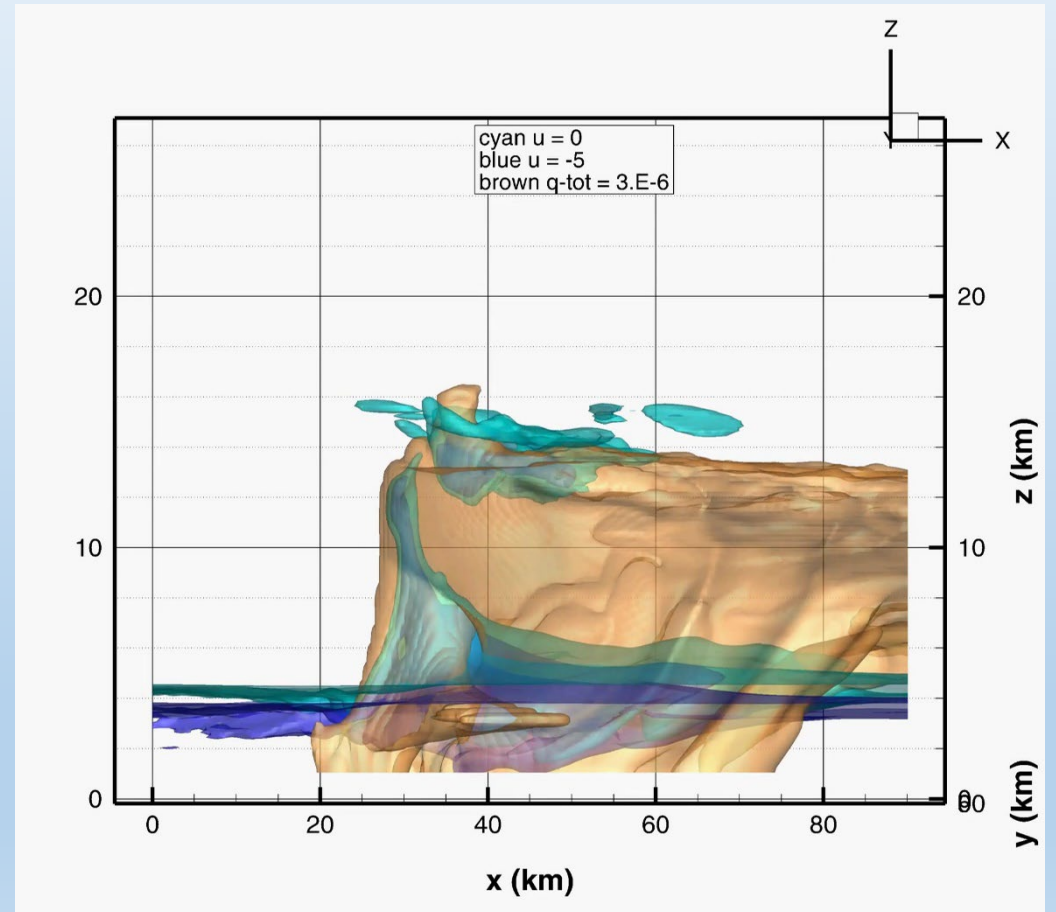
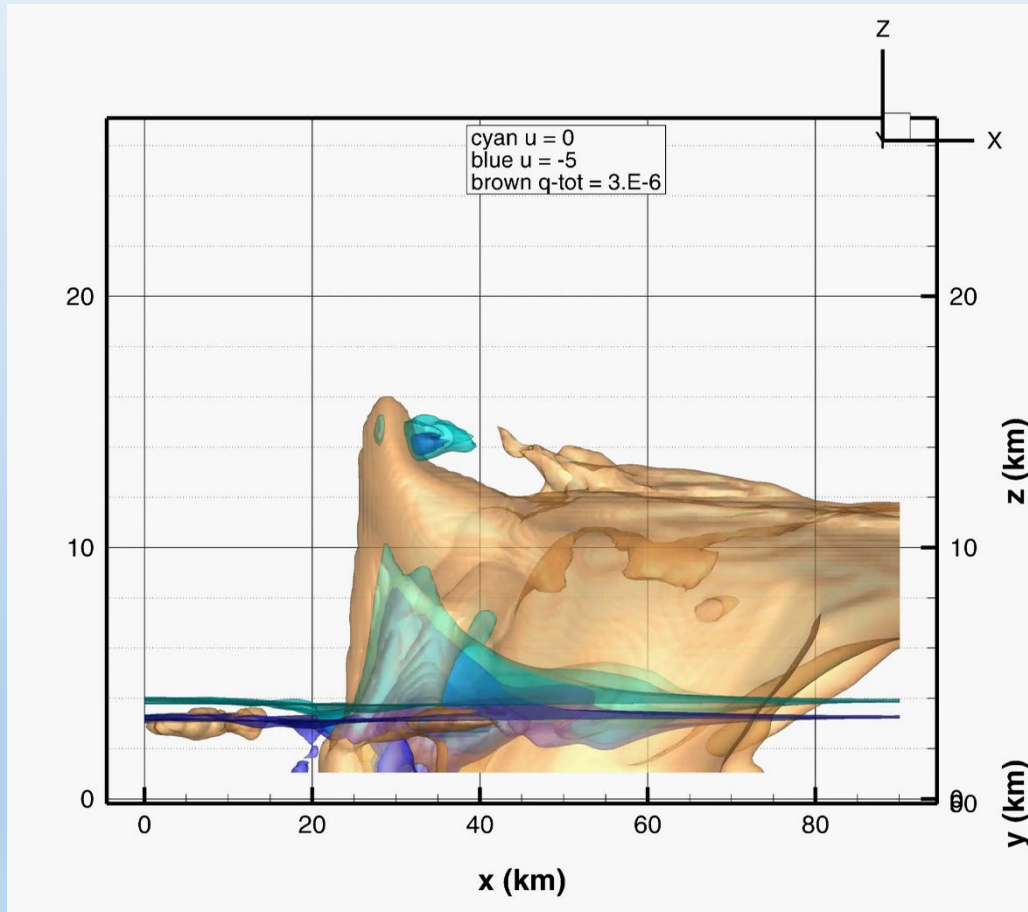


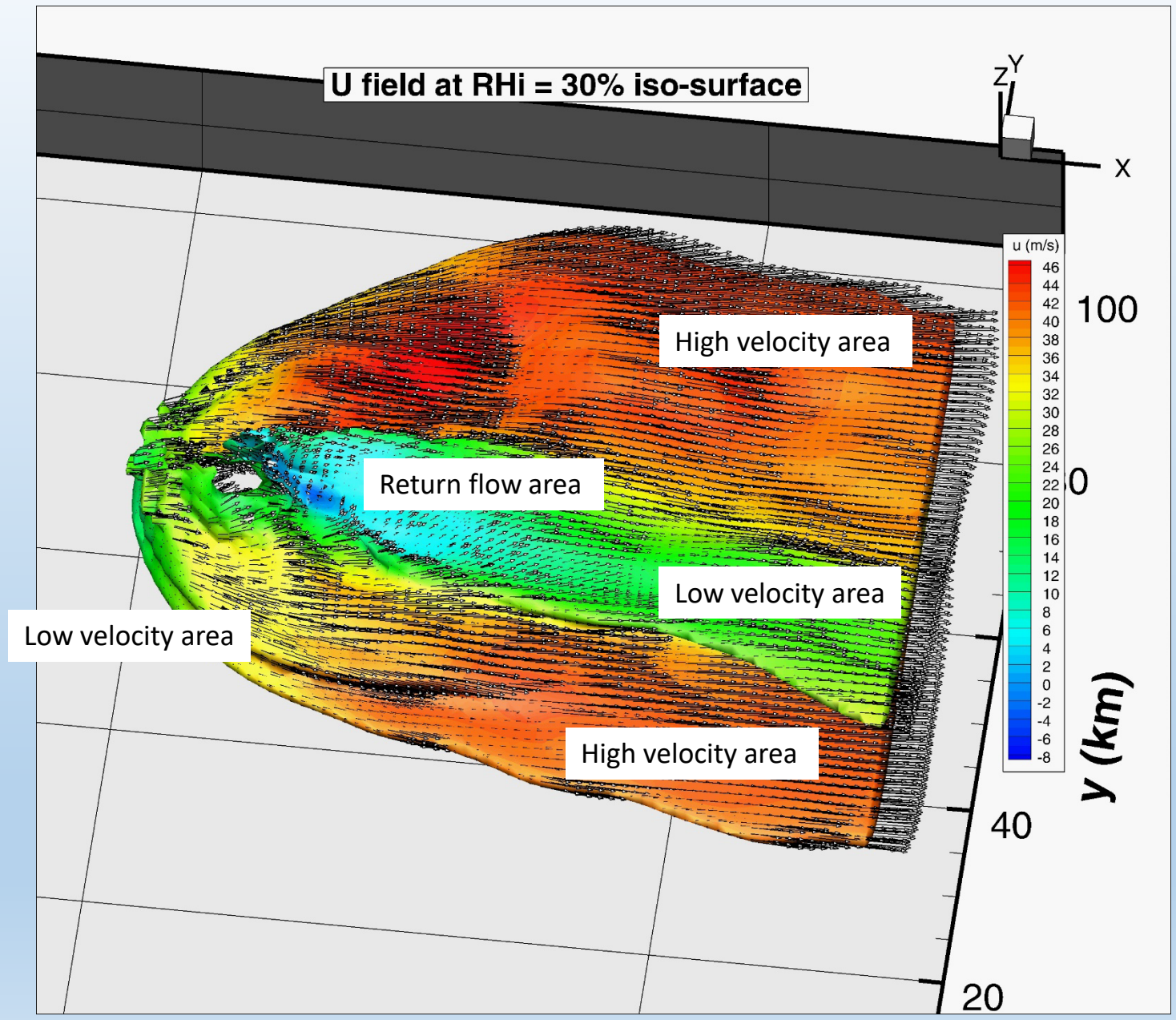
Blocking effect of thunderstorms on the ambient winds

- The thunderstorm behaves as an obstacle to the ambient winds at various points of the storm, producing many observed storm top features both in satellite images and by other platforms.
- Surface energy and momentum are transported vertically by the updraft and convectively generated internal gravity waves to upper levels

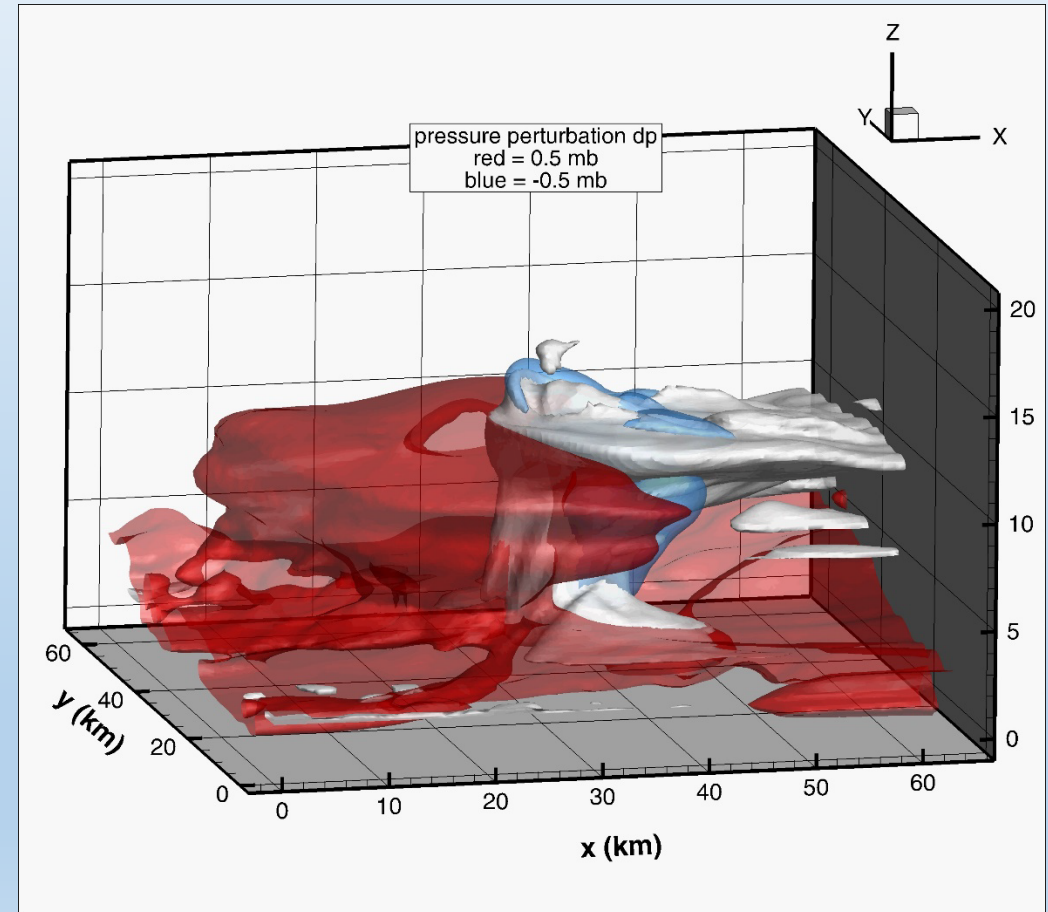
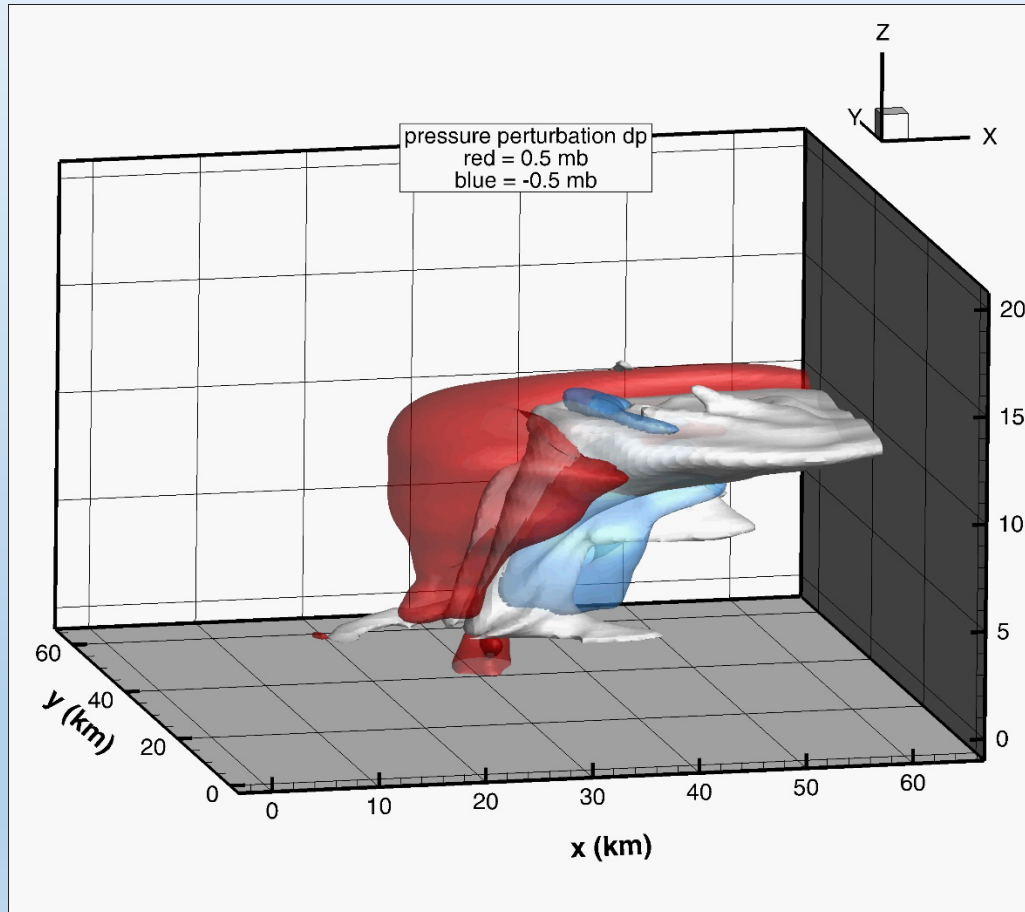


Evidence of blocking

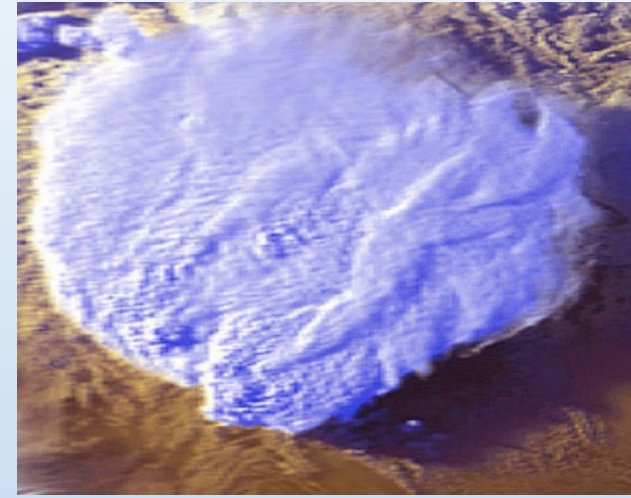
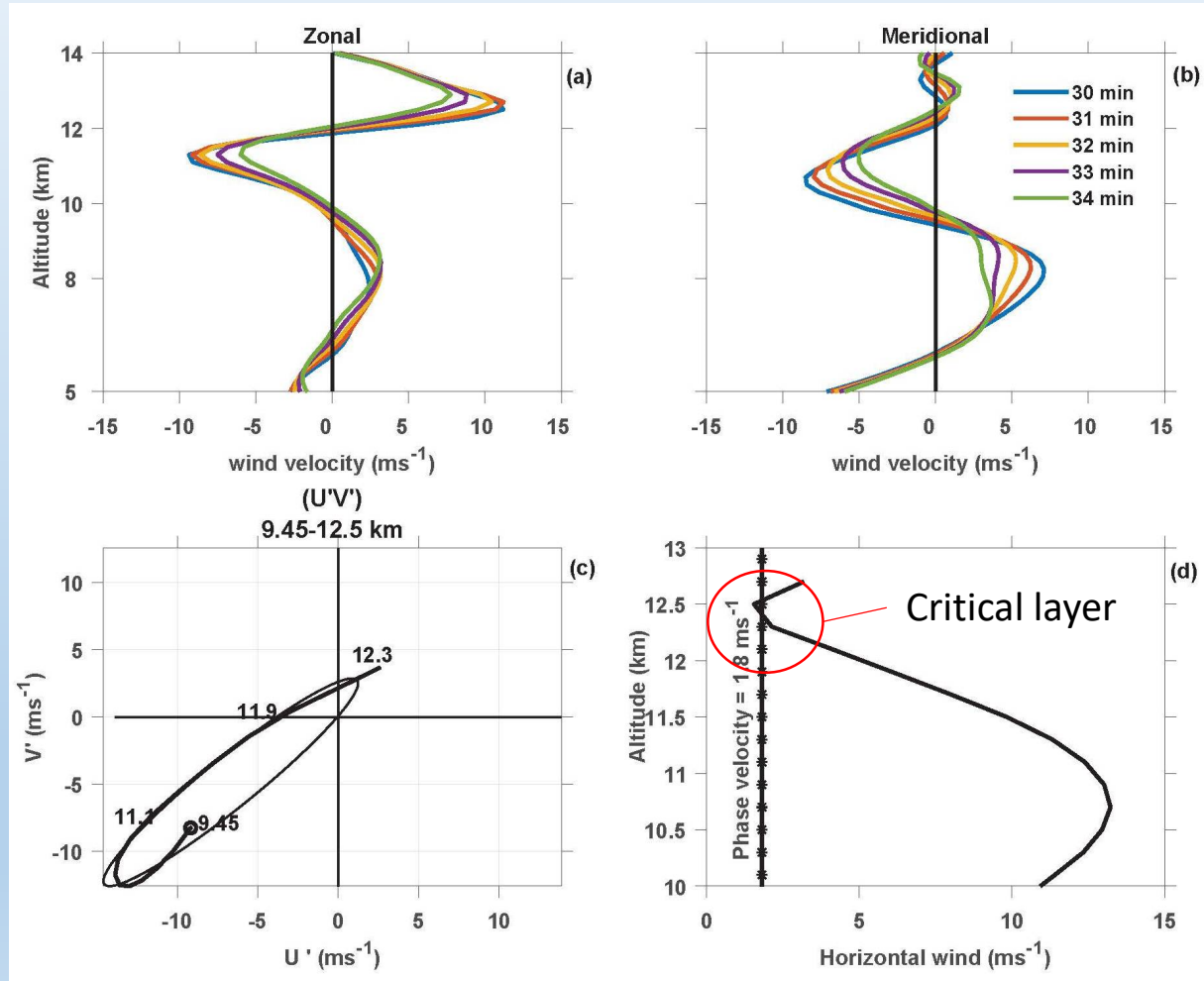




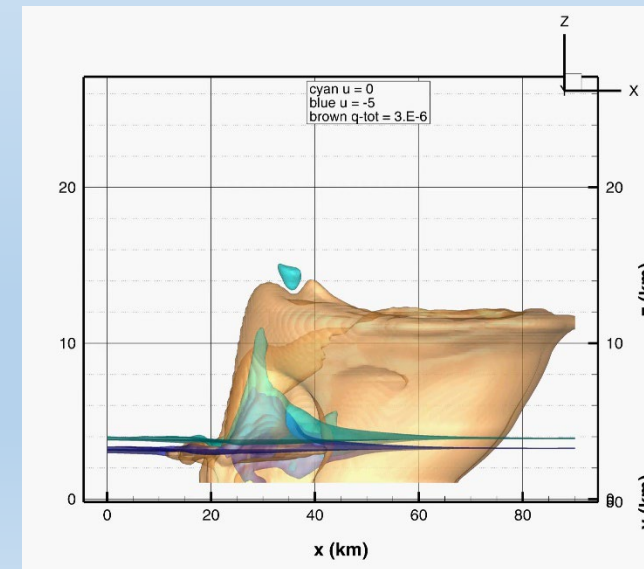
Windward – high pressure, lee – low pressure



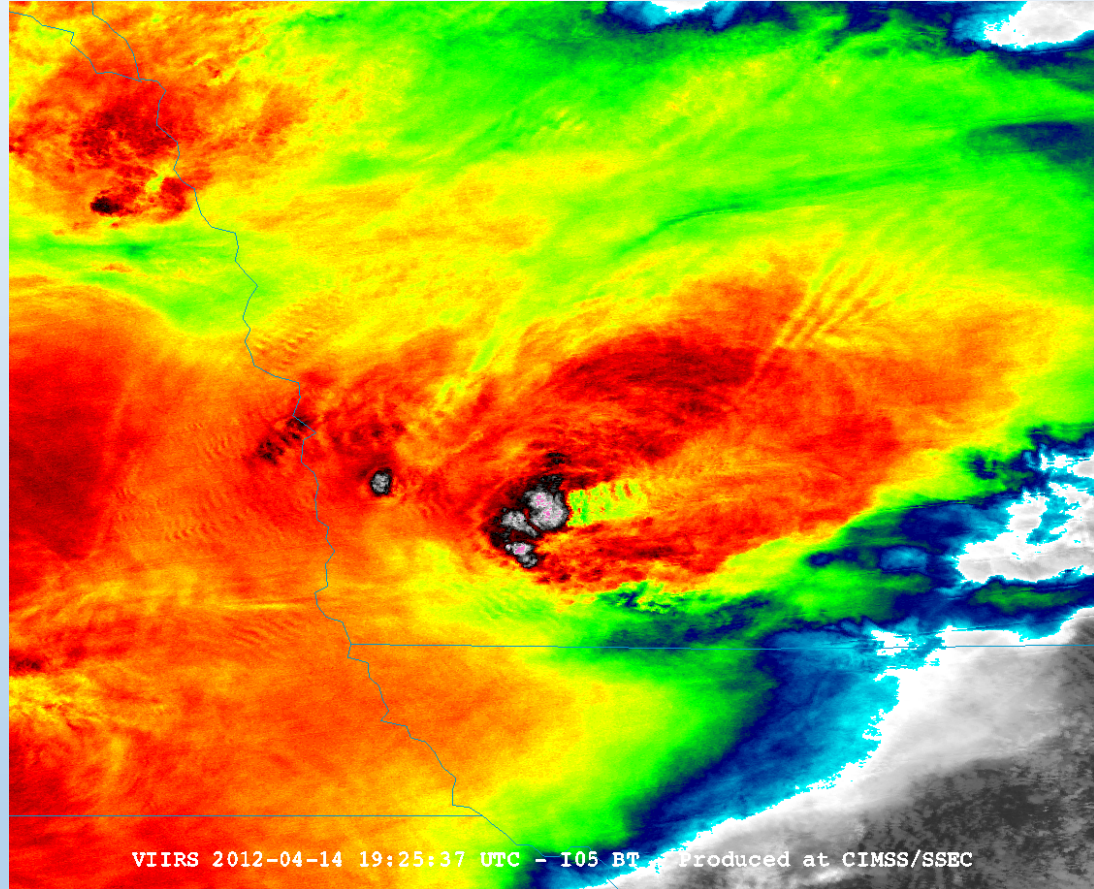
Above anvil cirrus plumes (AACCP)



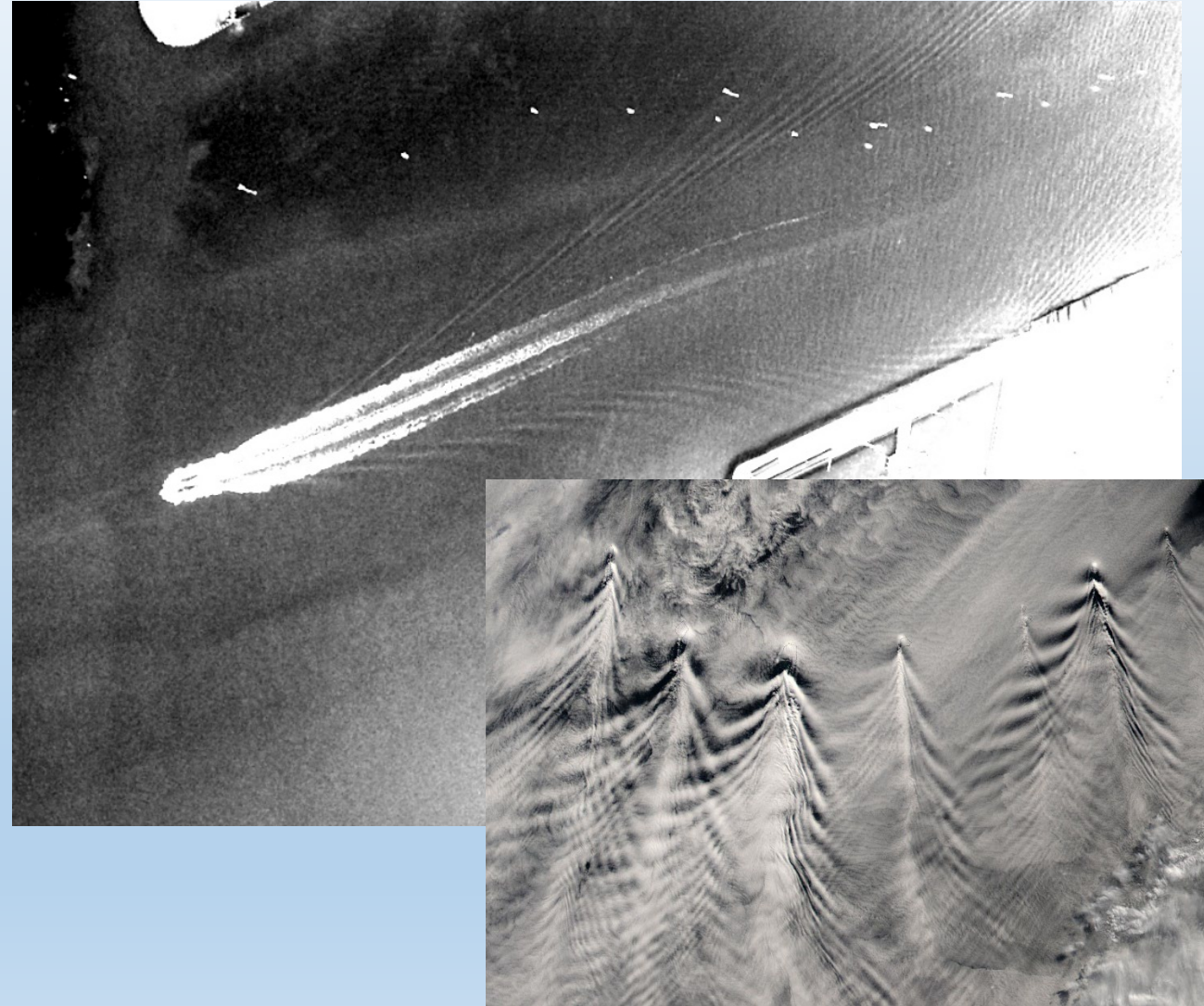
Courtesy of Martin Setvak



Ship waves – resistance of the obstacle



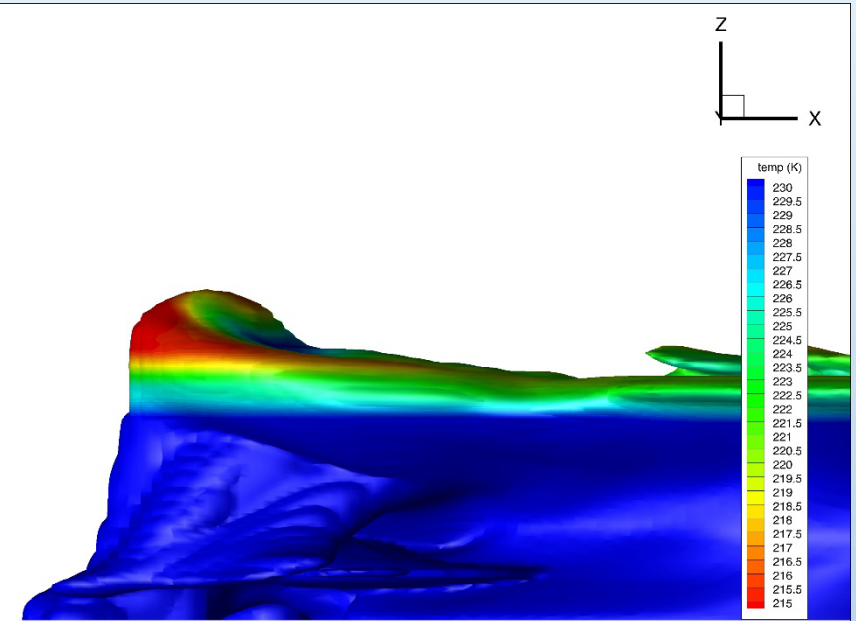
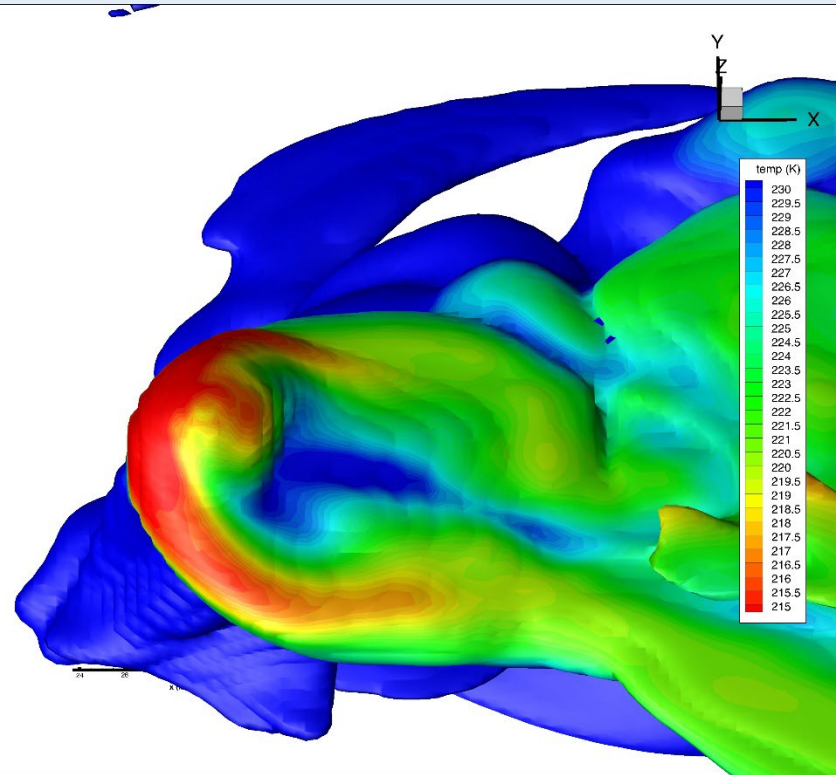
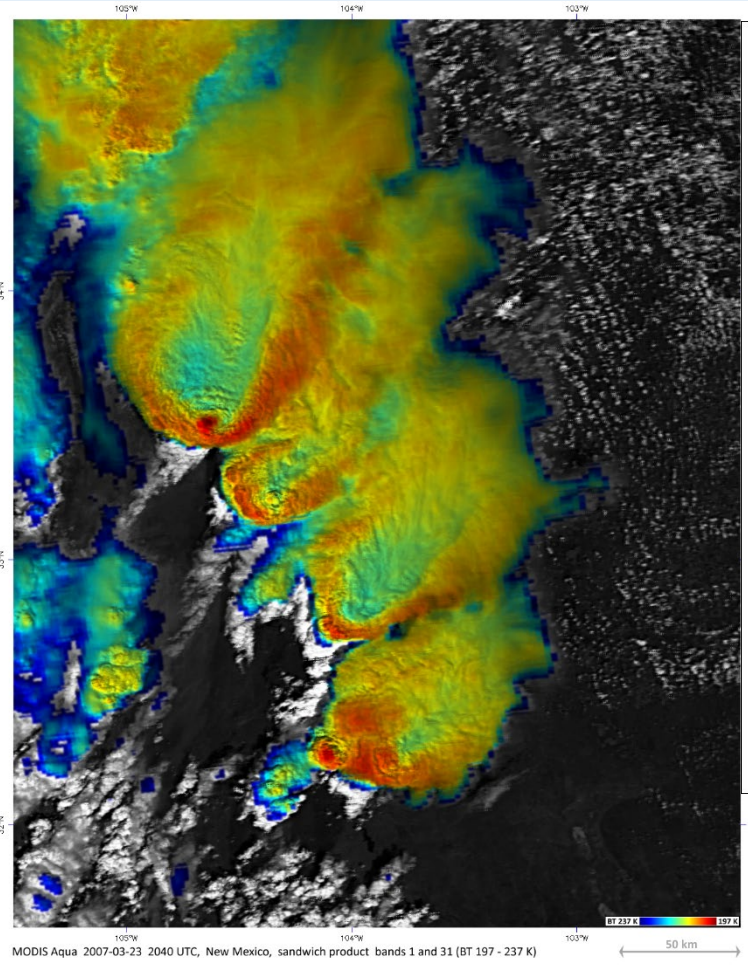
Courtesy of Kris Bedka)



NOAA

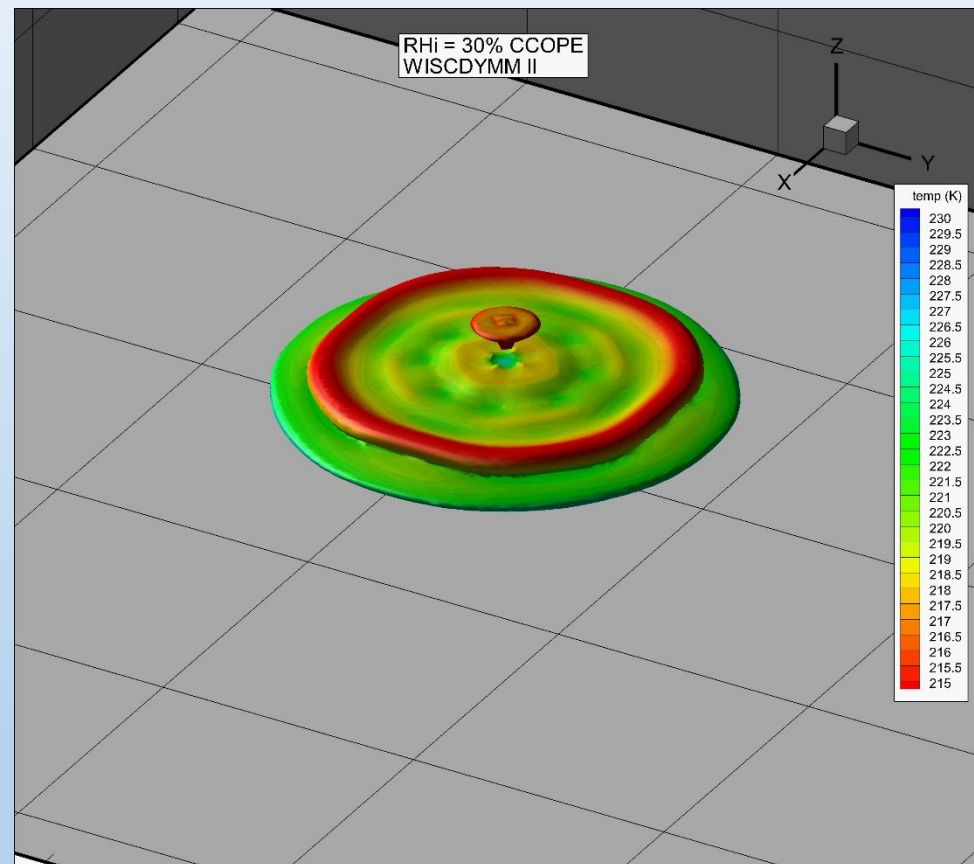
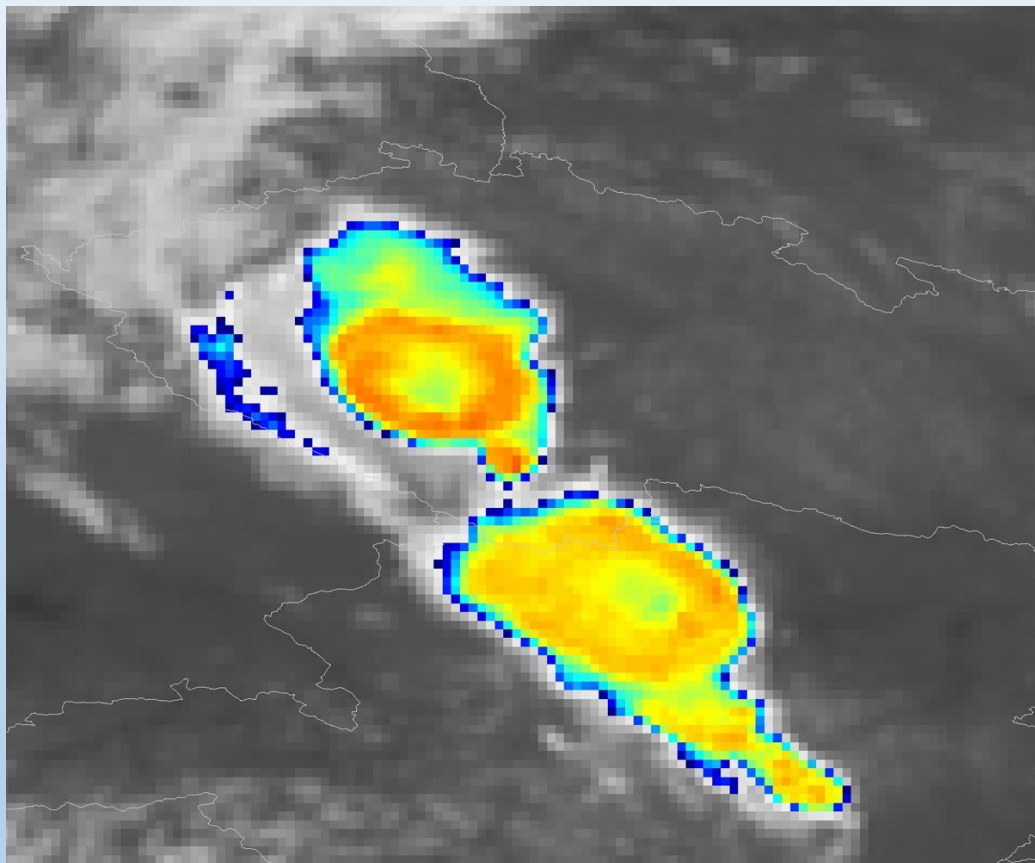
Cold U (V) and CWA

windward side – cloud surface forced higher due to the obstacle
lee side – air descends rapidly



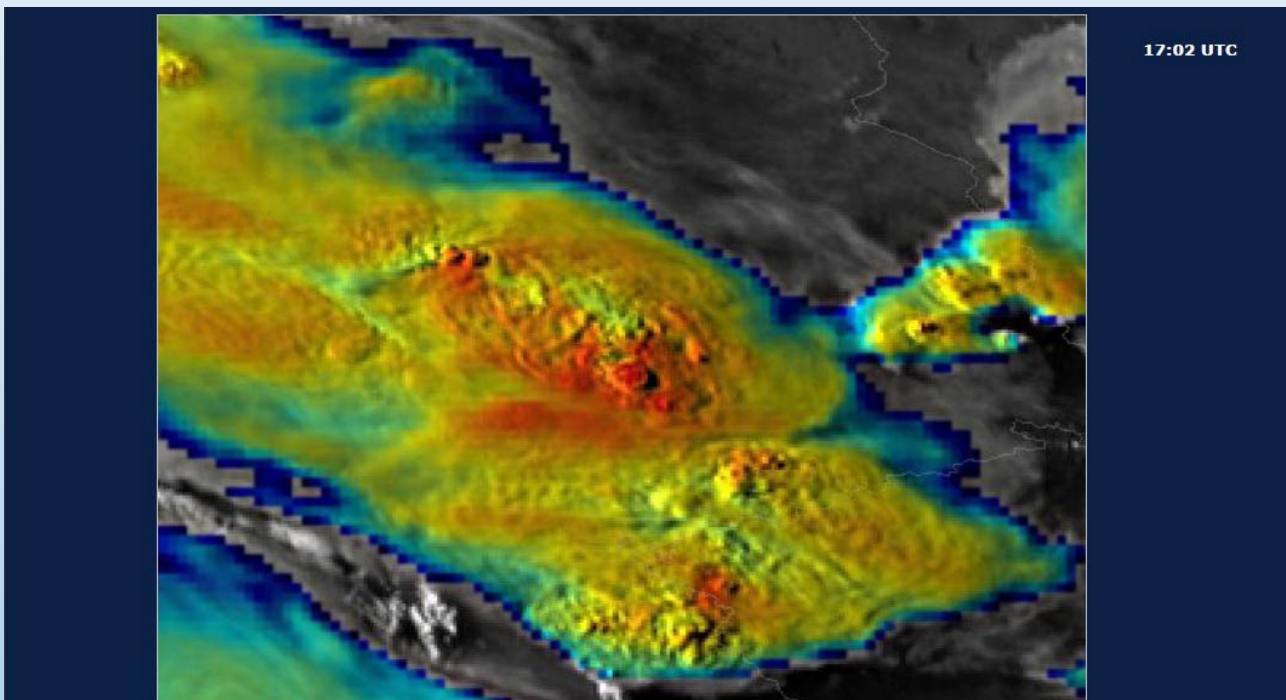
Courtesy of Martin Setvak)

When shear is weak - cold ring, pancake



Courtesy of Martin Setvak)

Pancake clouds observed

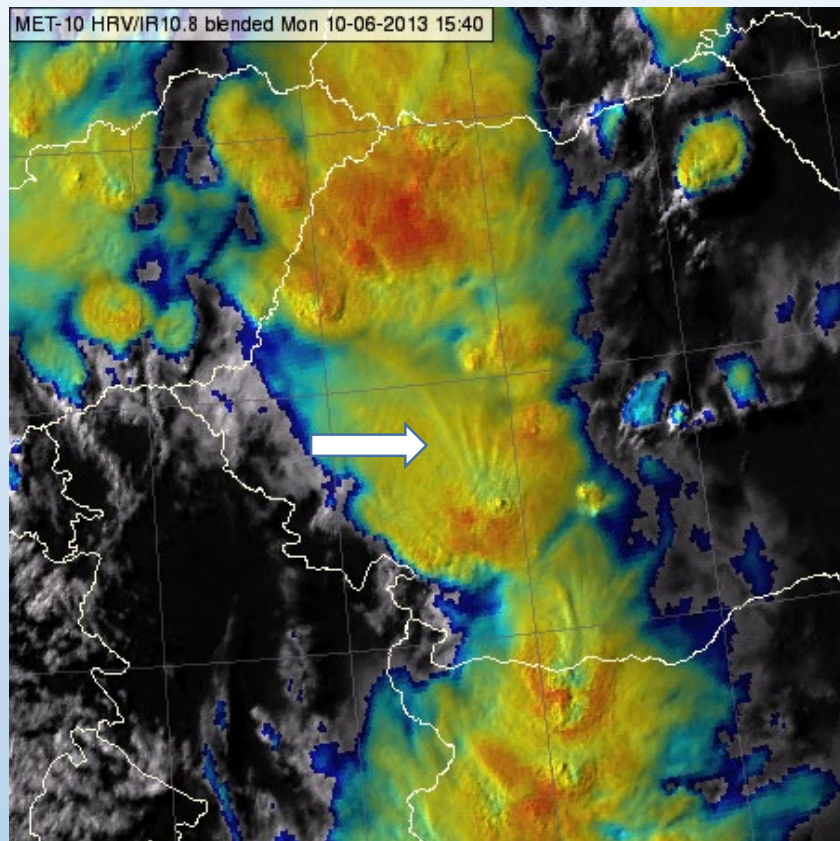


Courtesy of Martin Setvak)



Courtesy of Po-Hsiung Lin

radial cirrus – interference phenomena



Courtesy of Maria Putsay

Same phase, frequency, amplitude, constant wind
2 point sources. $D = 3.5 \lambda$

