PISTON 2019 Daily Science Summary

19 September Daily Summary: On the tails of Tapah

PISTON 2, R/V Sally Ride

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Most of the day was pretty quiet again, with few scattered echoes moving fast from SW to NE that were hard to catch with RHIs. The soundings throughout the day showed nearly saturated air above 500 mb, with a dry pocket below. Strong easterlies dominated the upper levels, with strong SSW flow in the low levels. CAPE values were a moderate 2000 J/kg. Meanwhile, 95W was upgraded to TD18 and then finally to TS Tapah (Fig. 1). Early in the day there was a GPM overpass, but there was very little precipitation in the domain. Around 0800 UTC, some cells started moving into the domain and were scanned with high-resolution RHIs to reveal another interesting cell with extremely large reflectivity and differential reflectivity (Fig. 3). Of note are two features we have also seen in other scans of these types of cells. The first is the extremely high gradient at the edge of the storm in both Z and Zdr; they basically go from no signal to 50-60 dBZ and 5-7 dB. The second feature is this reflectivity “plume” which seems to spread out on both sides of the updraft like a billow, presenting an almost overhanging echo appearance (Fig. 3).

Around 1800 UTC, bands from TS Tapah started arriving at the ship from the NW. We were not able to turn the ship to view more until 2200 when the winds and waves were more favorable for a northward heading. There were a number of larger cells (in comparison to the ubiquitous scattered warm rain cells) moving through the domain on the eastern side (Fig.4). Everything was moving fairly quickly from southwest to northeast. Scans through the convection to the Northwest revealed surprisingly deep convection, with tops sometimes reaching 14 -16 km (Fig. 5). As 00z rolled around, the leading edge of the convective line had just hit the ship.

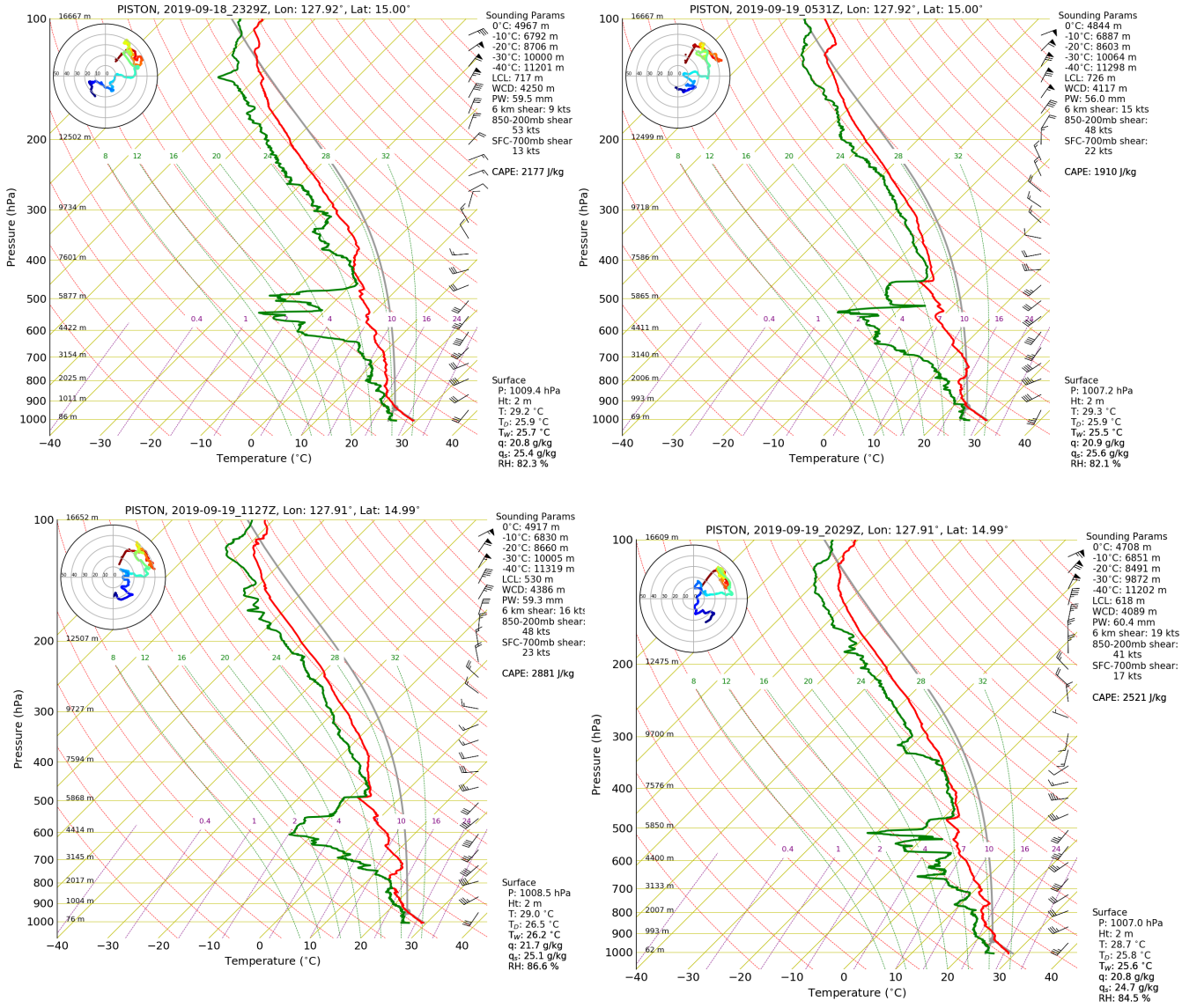

Fig. 1: 00,06,12,18Z soundings

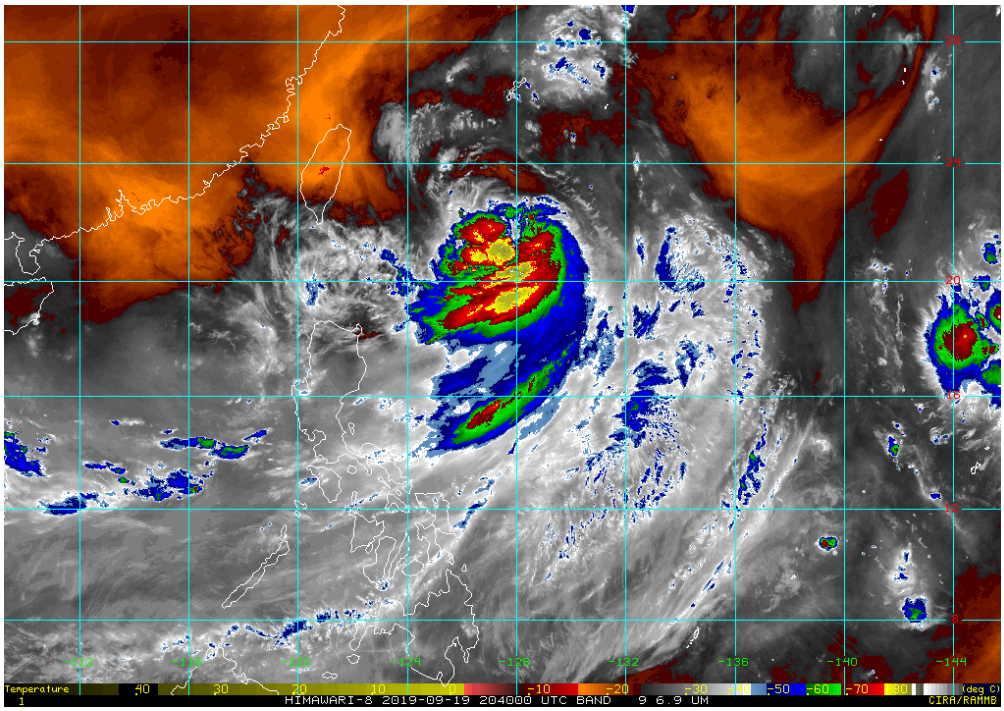

Fig. 2: Tropical Storm Tapah at 2040 UTC. The Sally Ride is at 15 N and 128 E

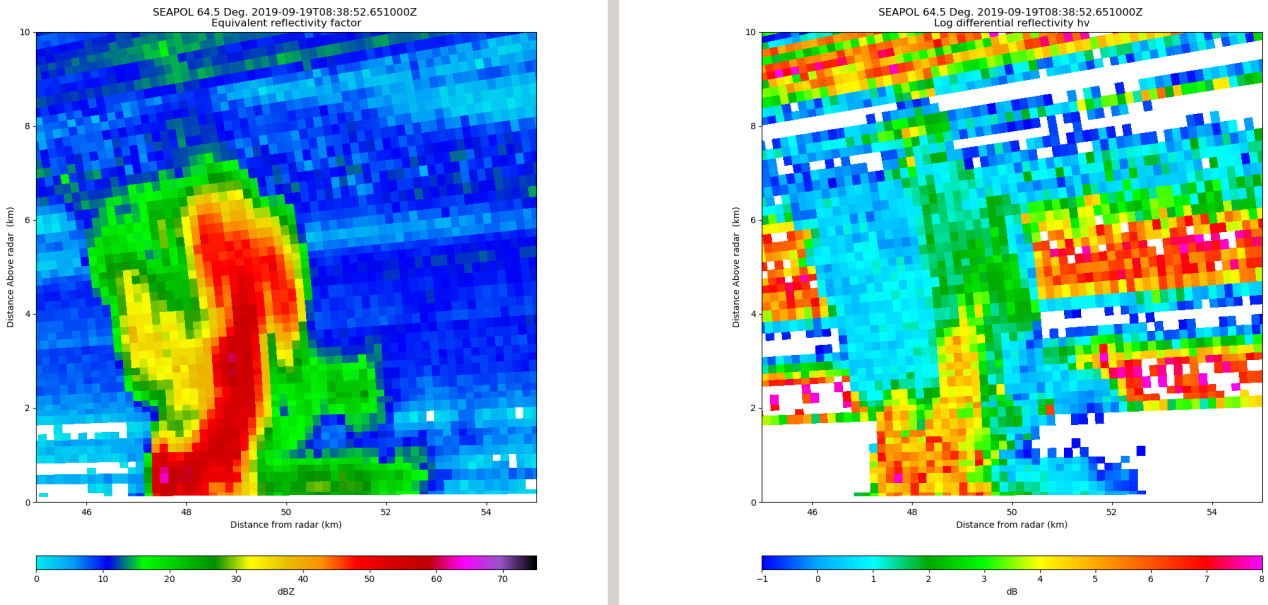

Fig. 3: RHI through a reflectivity plume with high Zdr core and a ‘fountain’ effect.

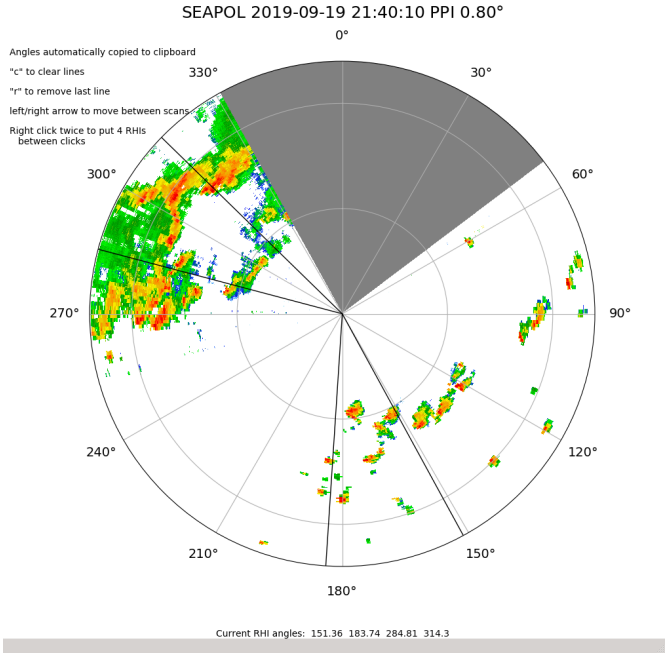

Fig. 4: Larger scattered convection to the SE of the ship, and organized deep convection in the Tapah band at 2140 UTC.

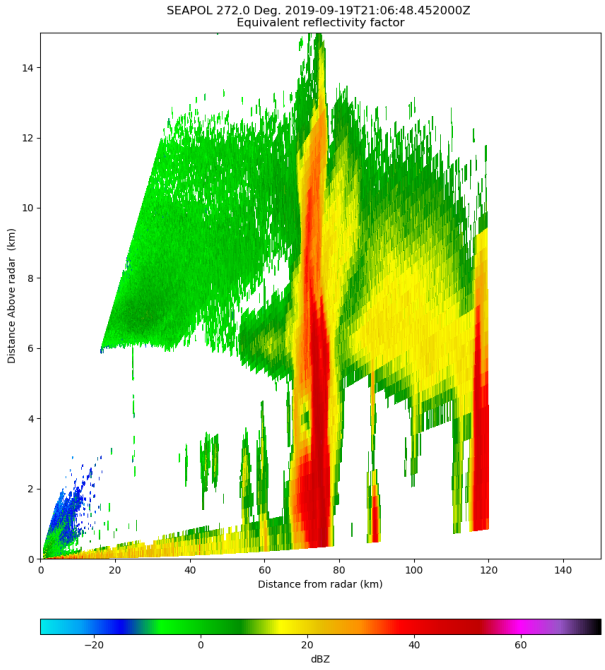

Fig. 5: Deep convective core along the leading line of the Tapah rainbands (2106 UTC).