

PISTON 2019 Daily Science Summary

21 September Daily Summary: T.S. Tapah and Rough Seas

PISTON 2, R/V Sally Ride

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Once again, the Sally Ride found herself under the influence of tropical storm Tapah as we transited north back to a NW location in our operations box (Fig.1). The ship sat in the long convective tail with southwesterly flow setting up banded features in the domain, in addition to typical shallow convective cells (Fig. 2). The sky was dark, with thick altostratus clouds from 7-10 km (Fig. 3, 4). The sea swells were 2 m with peaks near 3 m, and the winds were sustained for most of the day at 20 knts.

Unfortunately, due to the rough seas Tapah was throwing at us (7+ degree rolls were frequent, and a 15 deg was observed), RHIs were put on hold for most of the day. During this time, 5 minute rain scans were run to use the rest of the 10 minute volume. The exception to this was a small storm with a high ZDR core which RHIs were aimed at around 1045Z. To try to learn more about these high ZDR core storms, RHIs were performed with just a single (H) polarization in order to get an LDR retrieval. By alternating between single- and dual-pol scans in quick succession (less than one minute between scans), we were able to match up a high-ZDR core with LDR in the same region (Fig. 6). There was no noticeable change in LDR within the ZDR core, suggesting that particle orientation or mixed-phase processes are not the reason for the high ZDR values. Unexpectedly, however, these scans did show that LDR is apparently very high in regions of sea spray just above the ocean surface. The reason for this is currently unknown.

Oceanography instruments were returned to the water around 10AM LT today, as the ship resumed its meandering at 2 knts across the 10nm radius circle we were in previously at 18 N, 126 E.

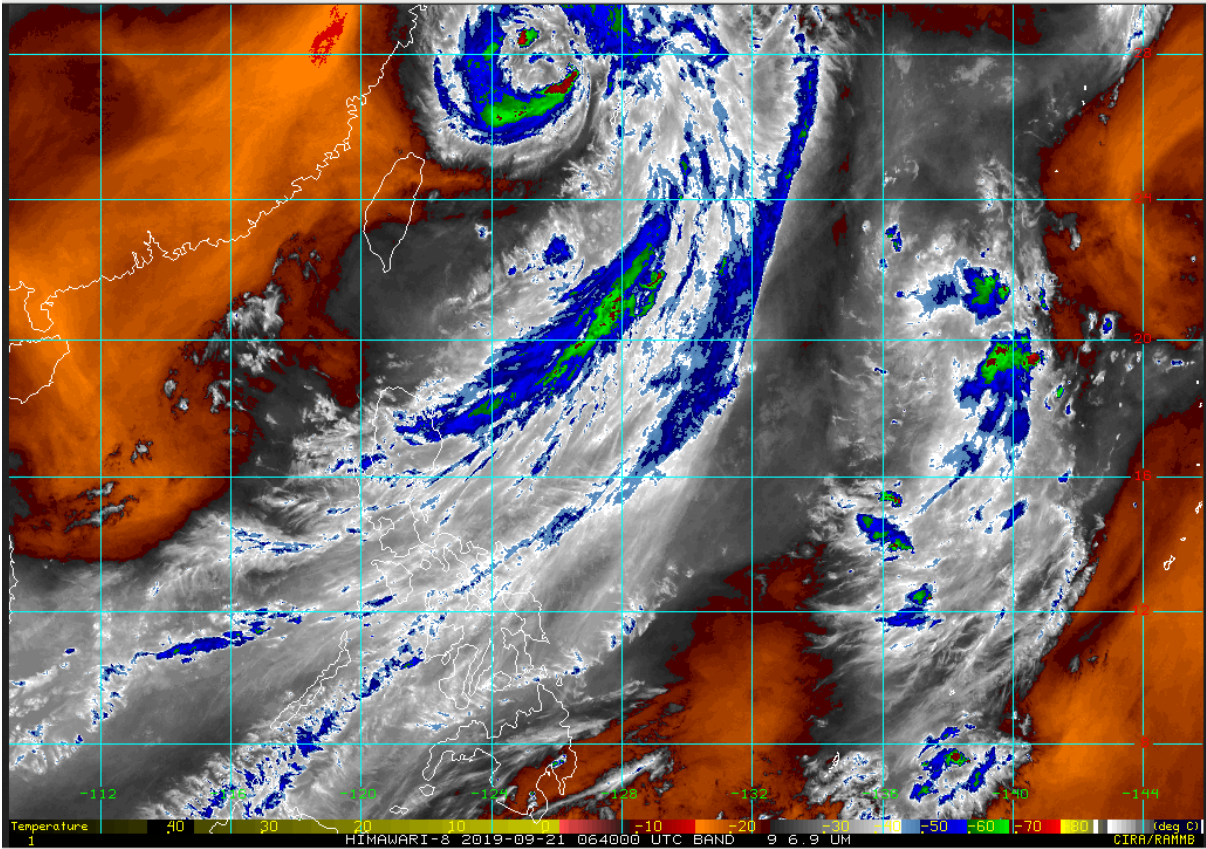


Fig. 1: Himawari-8 band 9 image of Tapah at 0640 UTC.

SEAPOL 2019-09-21 06:50:03 PPI 0.5°

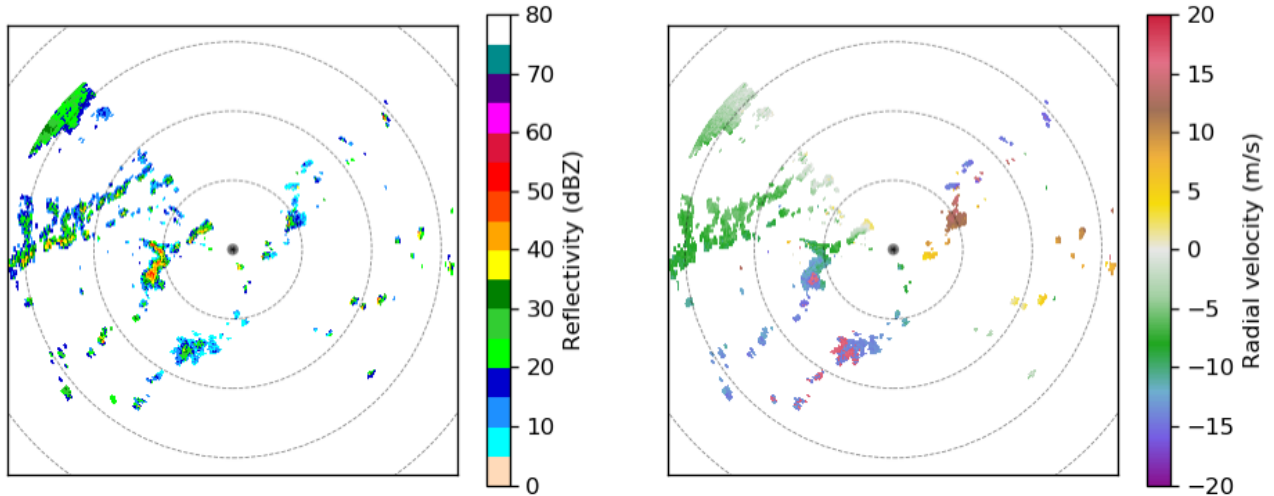


Fig. 2: Typical convection observed today with organized linear features, some larger complexes, and scattered showers.

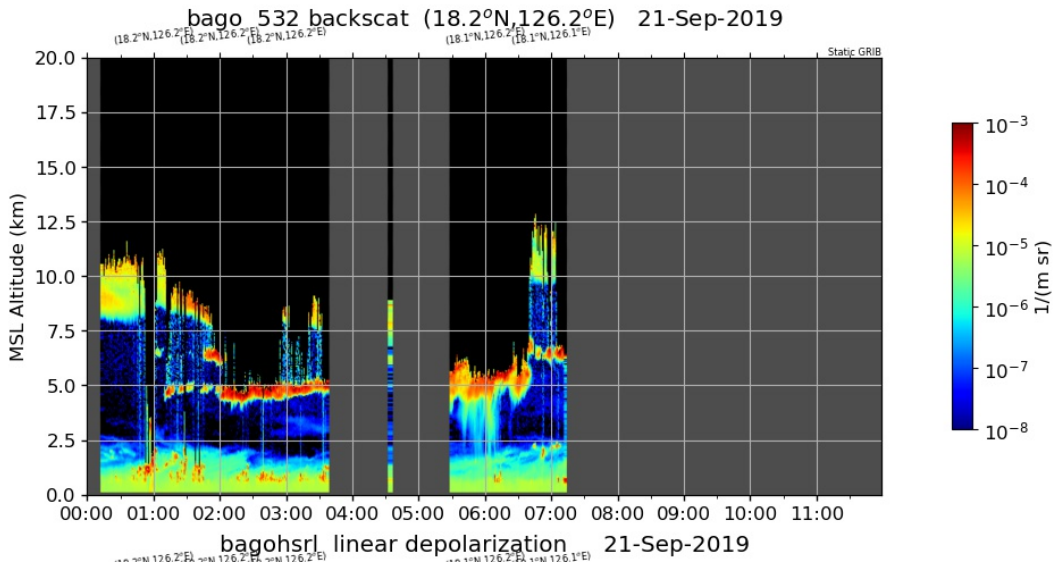


Fig. 3: Lidar backscatter from HSRL. Note the thick Altostratus cloud in the early part of the day.

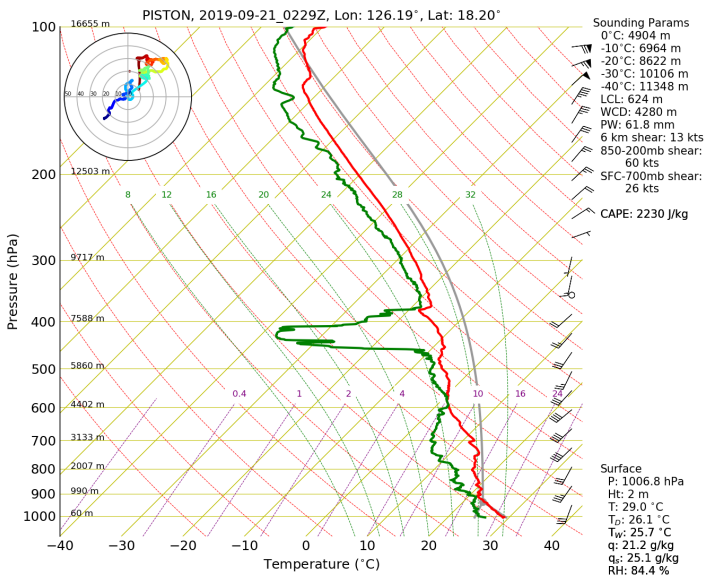


Fig. 4: 03Z Sounding, with an inversion at the same level (7.5km) as the HSRL is seeing a cloud layer

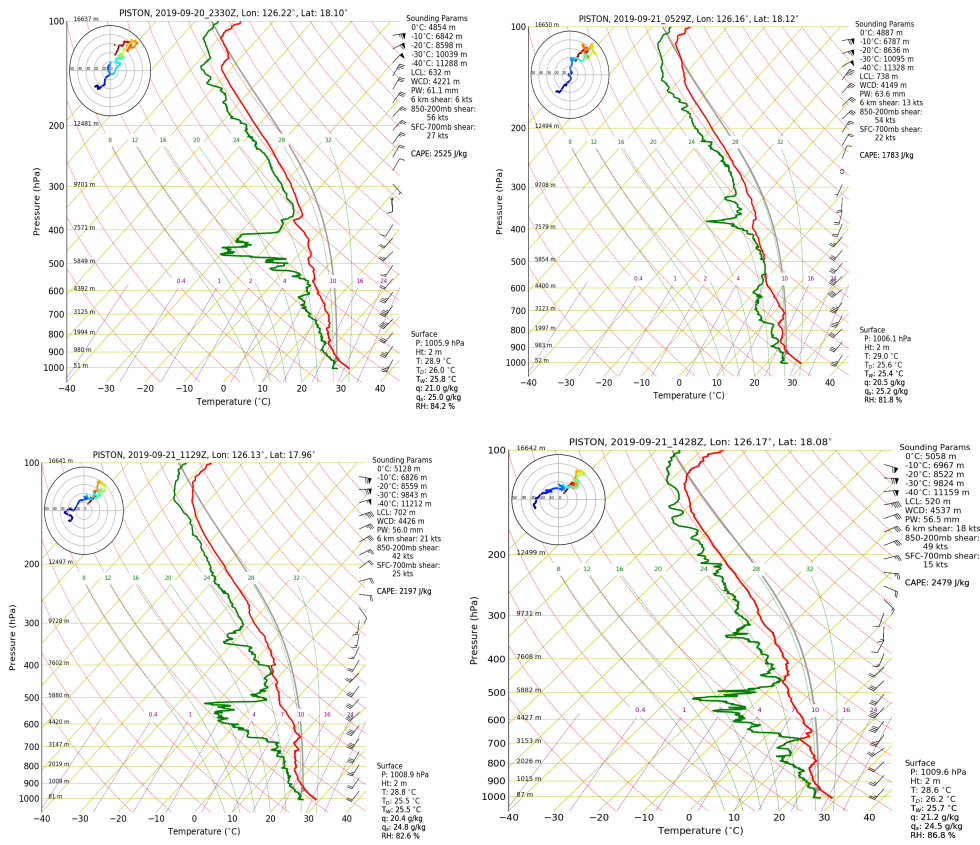
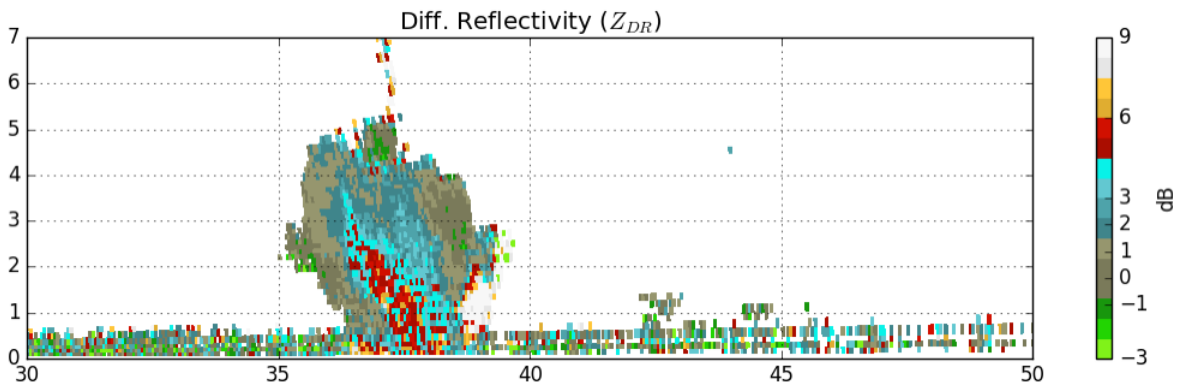
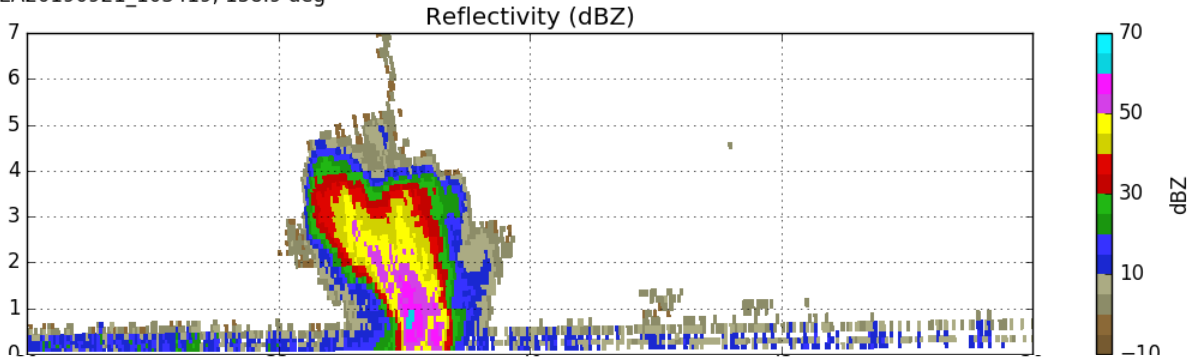


Fig. 5: 00,06,12,18Z soundings

SEA20190921_103419, 158.9 deg



SEA20190921_103505, 159.0 deg

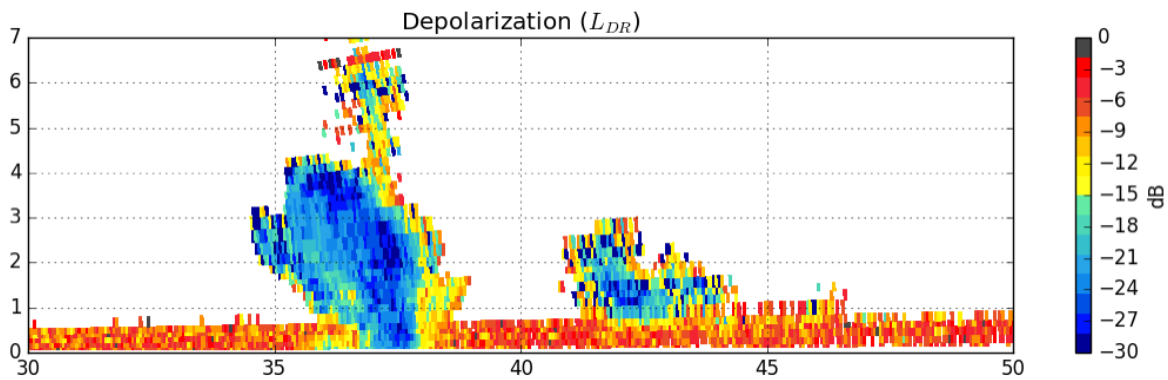


Fig. 6: RHIs of reflectivity (top), differential reflectivity (middle), and LDR (bottom) on a storm with a high-ZDR core. While LDR doesn't appear to be impacted by the ZDR core, this scan also shows that sea clutter apparently results in a very high LDR.