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1: lasp

2: atoc

3: noaa hrd

4: u Miami

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| --- | --- | --- | --- | --- | --- |
| Storm Name | Date (in 2021) | No. of Passes | Mean Sea Level Pressure (hPa) | Surface Wind Speed (kt) | Category (Saffir-Simpson) |
| Grace | 17 Aug | 3 | 1005 | 45 | TS |
| Grace | 18 Aug | 3 | 988 | 70 | 1 |
| Grace | 19 Aug | 3 | 994 | 55 | TS |
| Henri | 20 Aug | 2 | 993 | 60 | TS |
| Henri | 21 Aug | 3 | 988 | 65 | 1 |
| Ida | 27 Aug | 3 | 989 | 70 | 1 |
| Ida | 29 Aug | 1 | 931 | 130 | 4 |
| Sam | 26 Sept | 3 | 928 | 135 | 4 |
| Sam | 27 Sept | 2 | 958 | 105 | 3 |
| Sam | 29 Sept | 2 | 945 | 115 | 4 |

|  |  |  |  |
| --- | --- | --- | --- |
| Cyclone Type | No. of Passes | Mean Cloud Height (km) | Clear Air Presence (%) |
| TS |  |  |  |
| Weak Hurricane (Categories 1-2) |  |  |  |
| Strong Hurricane  (Categories 3-5) |  |  |  |

Cloud heights and extents in tropical cyclone (TC) eyes are poorly resolved by current observational measurements, yet they are directly related to eyewall and boundary layer dynamics, two regions essential for understanding TC intensity change. In this study, we present new findings gained from using airborne compact Raman lidar (CRL) measurements to observe TC inner-core cloud structures. CRL data were collected from five TCs during the 2021 Hurricane Season, with cyclones ranging from weak tropical depressions to intense Category 4 storms.  Physical processes of interest captured by this dataset include eyewall replacement cycles, extratropical transitions, and TC structures right before rapid intensification.

With a 6 meter vertical resolution and the ability to distinguish between precipitation and clouds, CRL data are used to find eye and eyewall cloud heights for each TC. The CRL also collects two dimensional profiles of temperature and water vapor which link eye dynamics to thermodynamics. Tail Doppler radar and flight level measurements complement the CRL data and highlight the full, three-dimensional TC structure in regions of dense clouds and precipitation. These results help to fill a knowledge gap on TC inner-core cloud structure and stress the importance of convective clouds in eye processes, contradicting the more accepted belief that stratocumulus clouds uniformly fill the TC eye.

**Brush up on how the crl finds wvmr and temperature!! Be able to explain**