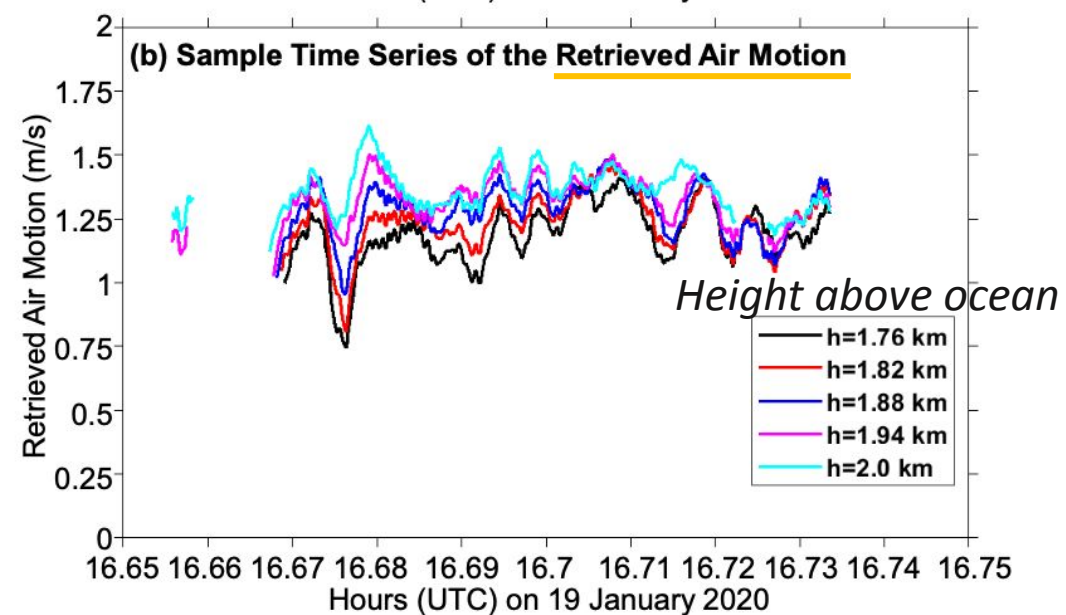
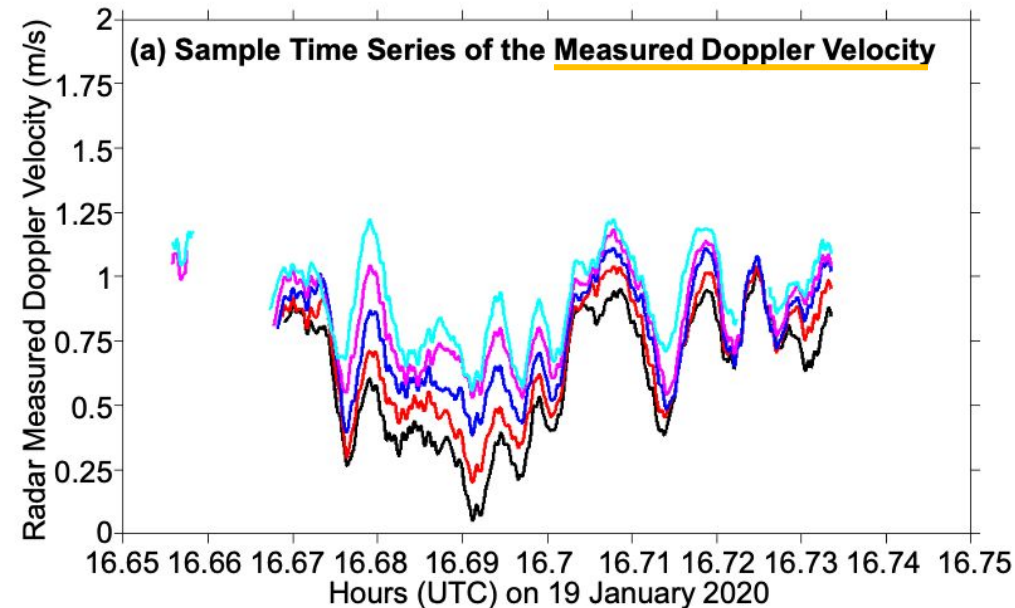
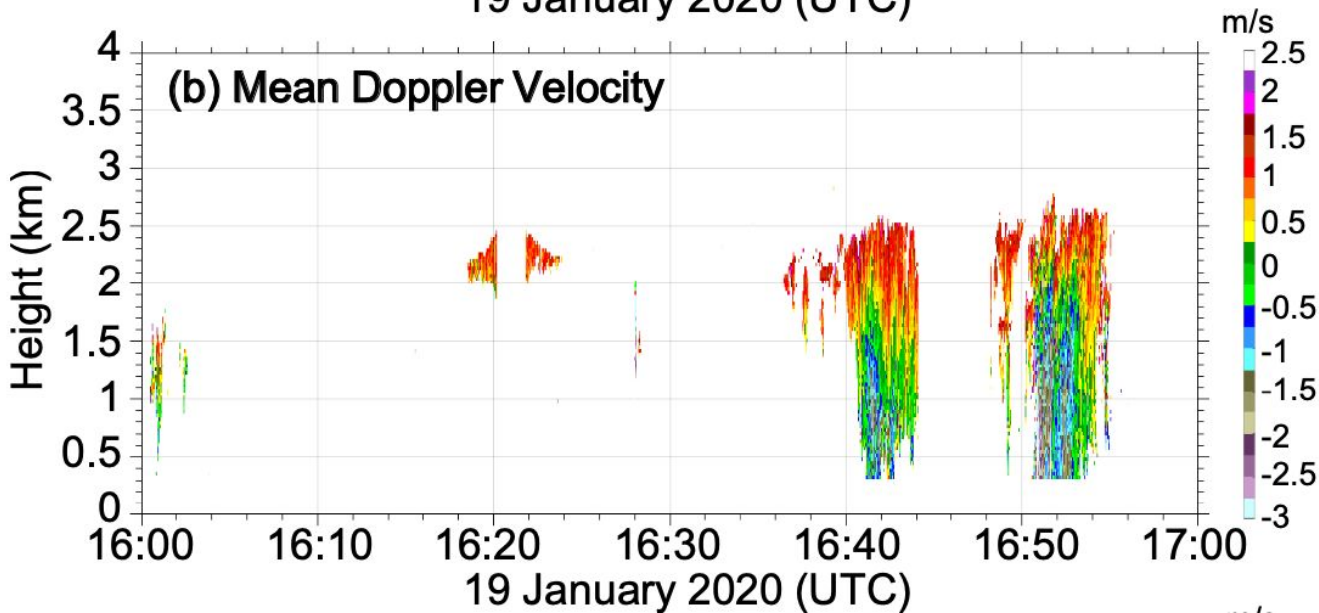
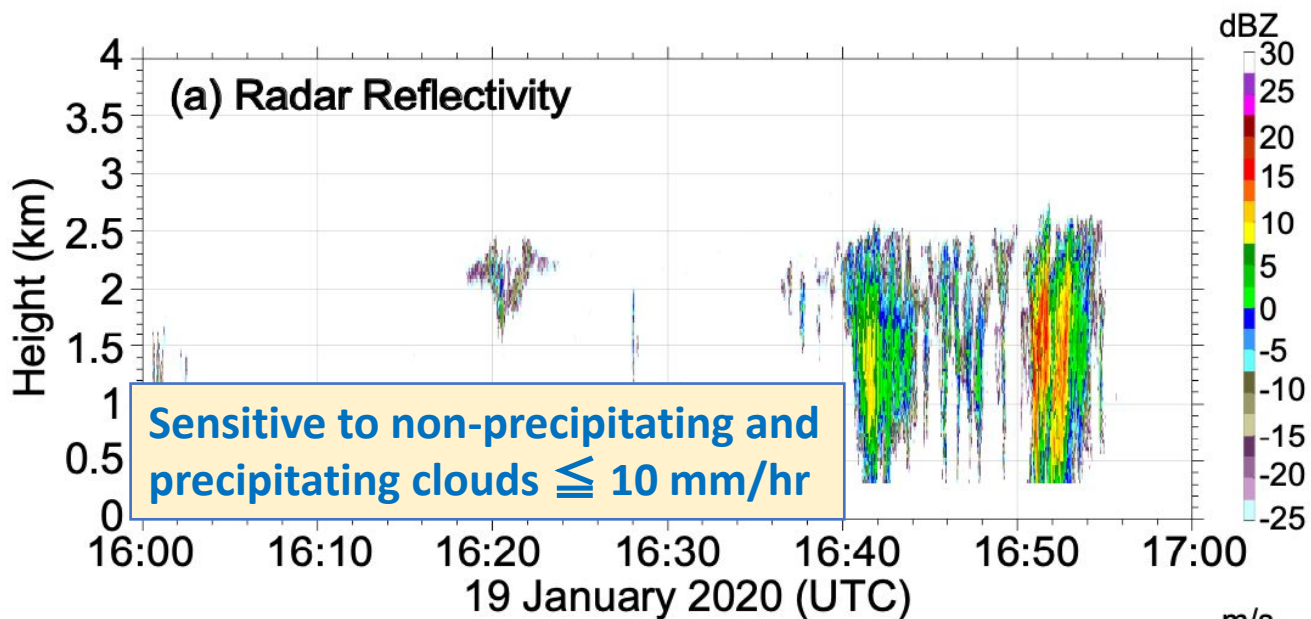


W-band radar on P-3 aircraft

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Radar measurements and air-motion retrievals from ATOMIC 2020 P-3 aircraft experiment (*Chen et al. 2024*)



W-band radar on P-3 aircraft

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3 key
recent
papers
out of
39

Chen, H., C. W. Fairall, C. R. Williams and E. J. Thompson, 2023: "Vertical Air Motion Retrievals From Airborne W-Band Cloud Radar," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 16, pp. 9350-9357, 2023, <https://doi.org/10.1109/JSTARS.2023.332234>

Fairall, C. W., S. Y. Matrosov, C. R. Williams, and E. J. Walsh, "Estimation of Rain Rate from Airborne Doppler W-Band Radar in CalWater-2". *Journal of Atmospheric and Oceanic Technology* 35, 3, 593-608, <https://doi.org/10.1175/JTECH-D-17-0025.1>

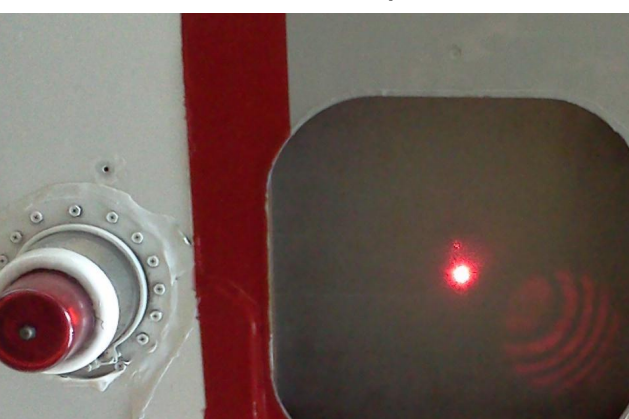
Moran, K., S. Pezoa, C. W. Fairall, C. R. Williams, T. Ayers, A. Brewer, S. P. de Szoeke, and V. Ghate, 2012: "A motion-stabilized W-band radar for shipboard observations of marine boundary-layer cloud". *Bound.-Layer Meteor.*, 143, 3–24, <https://doi.org/10.1007/s10546-011-9674-5>

belly of P-3, without plexiglass window



W-band
antenna

belly of P-3, with transparent window



Specs:

- senses non-precipitating and precipitating clouds < 10 mm/hr, including sea spray+ fog
 - cloud fraction and height statistics
 - vertical air motion profiles in cloud or rain
- pitch/roll stabilized by aircraft
- Doppler velocity corrected for heave afterwards
- dbz attenuation corrected w/ surface return
- 7.5 km range @ 30 m Δz
 - ... can go out to 16 km with coarser Δz
- resolution: 0.5 sec
- measures vertical profiles of:
 - reflectivity and rain rate (*Fairall et al. 2018*)
 - spectrum width (*diversity of hydrometeors*)
 - Doppler velocity looking down...
= *hydrometeor fall speed + vertical air motion*
 - vertical air motion (*Chen et al. 2024 IEEE*)
 - cloud microphysics (drop size) information

radar electronics inside P-3,
next to dropsonde chute

