

Future Updates to the Operational SFMR Algorithm

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IOVWST

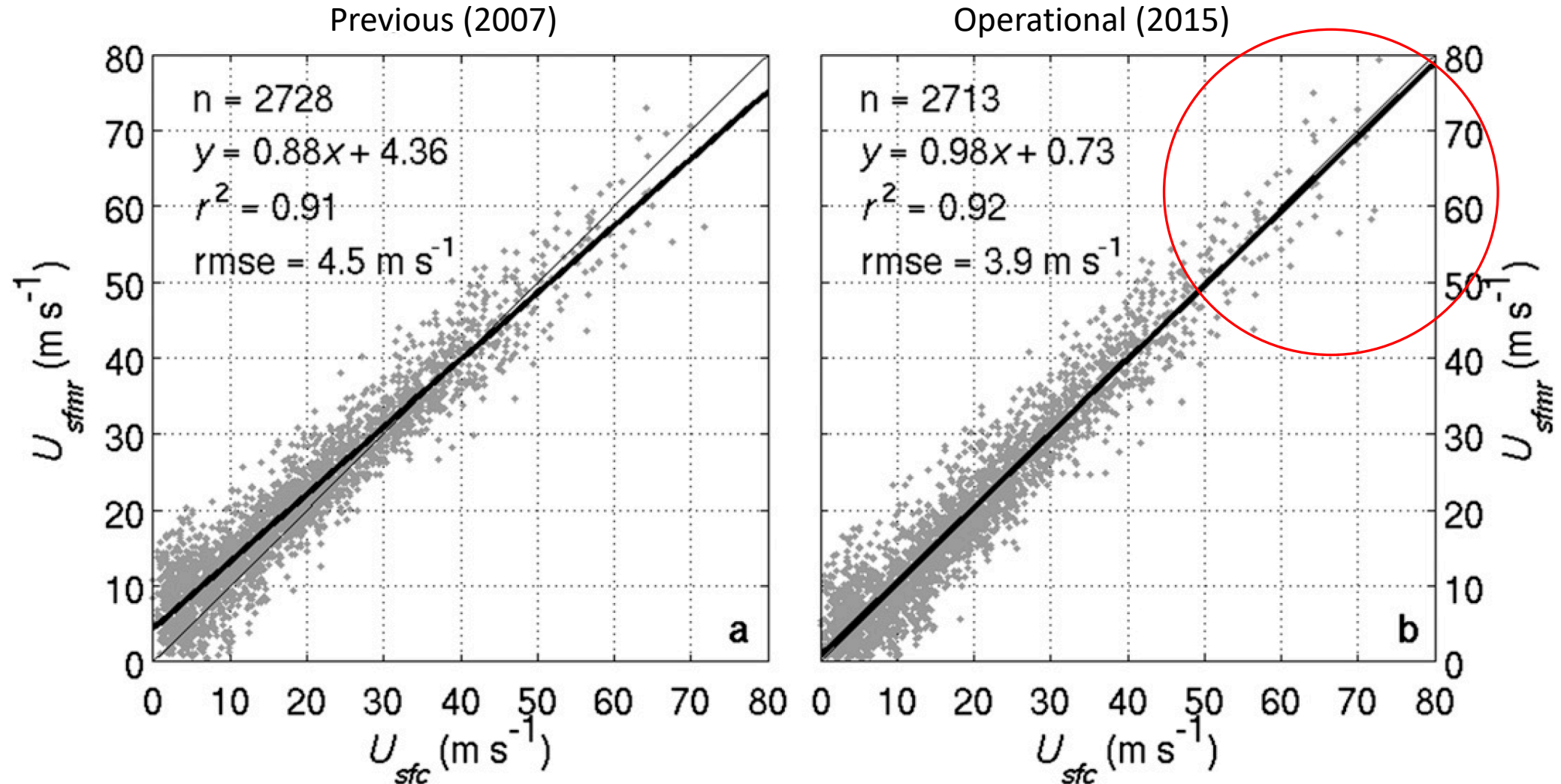
MAY 29, 2019



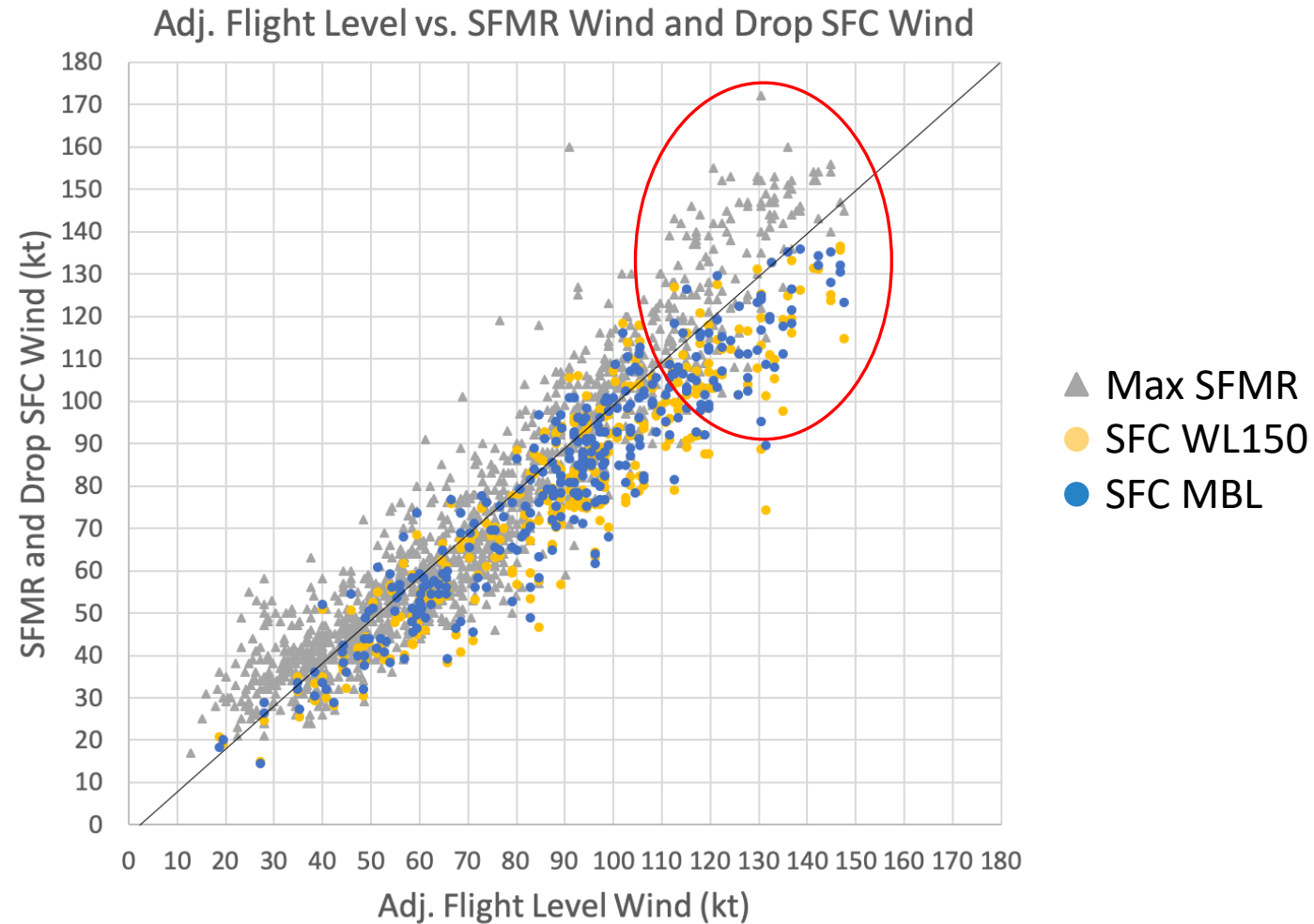
Motivation

- The National Hurricane Center (NHC) has noticed inconsistencies of SFMR winds with other observations over the past few hurricane seasons
 - From Hurricane Michael (2018) report: *“However, there is a significant caveat regarding the SFMR data, as experience during Hurricanes Irma, Jose, and Maria in 2017 suggests the possibility that the SFMR has a high bias at the wind speeds in question. Research to determine if this is the case is currently underway.”*
- Accurate estimation of intensity and wind structure is necessary for accurate forecasts of intensity and potential impacts
 - And for calibration of satellites!

Dropsonde Distribution

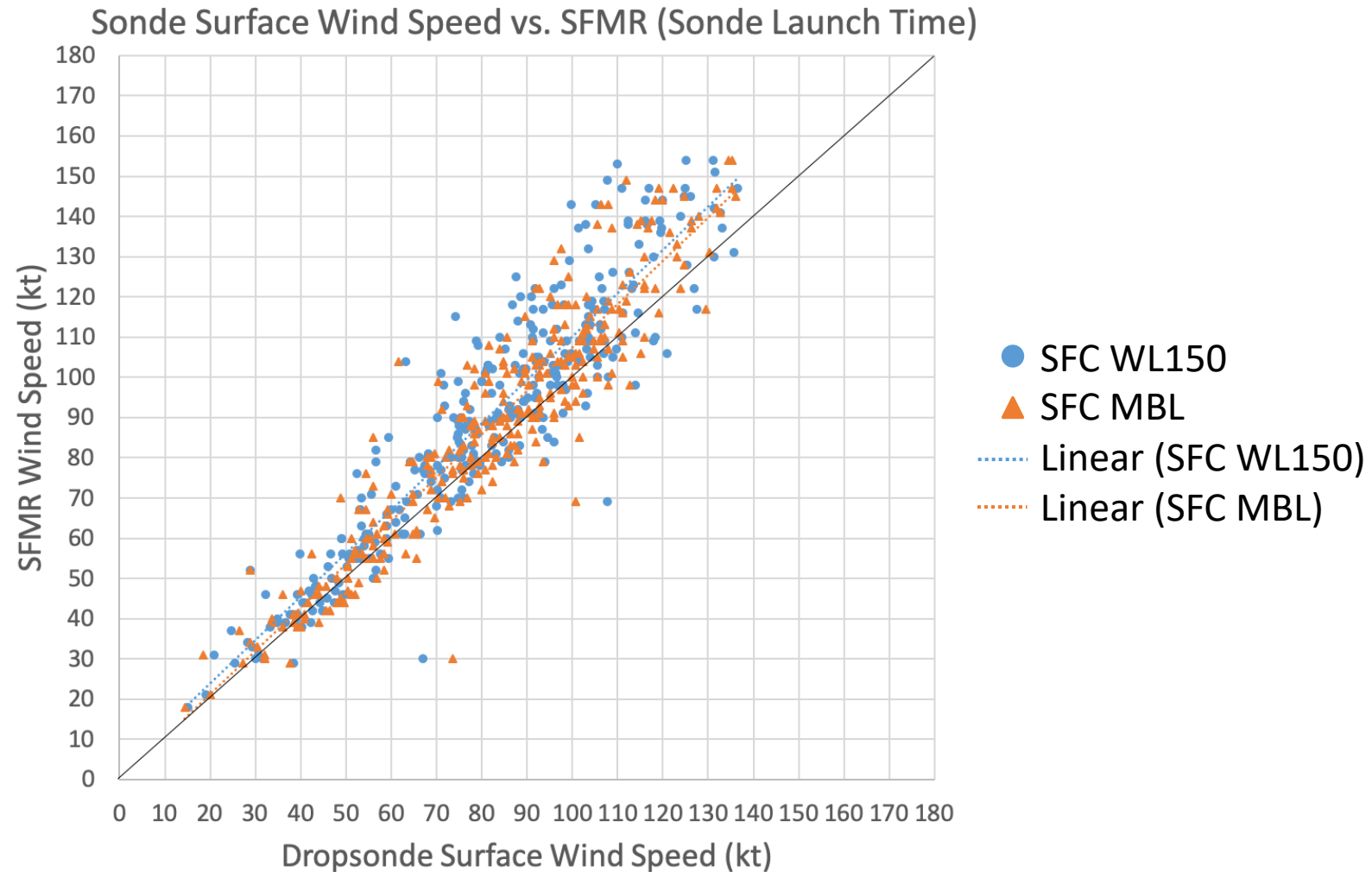


SFMR & Dropsondes vs Flight Level



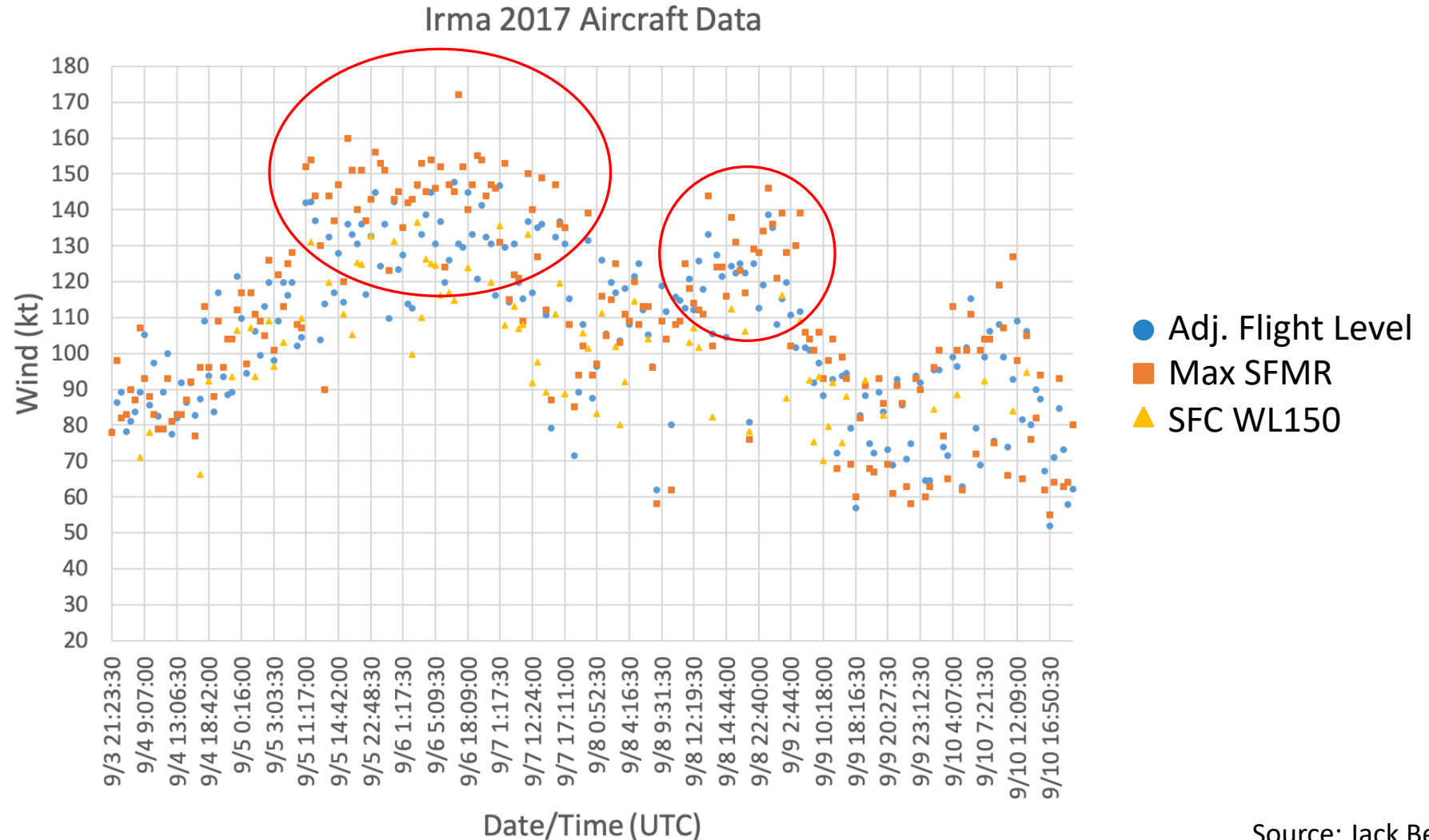
Source: Jack Beven, NHC

SFMR vs Dropsonde



Source: Jack Beven, NHC

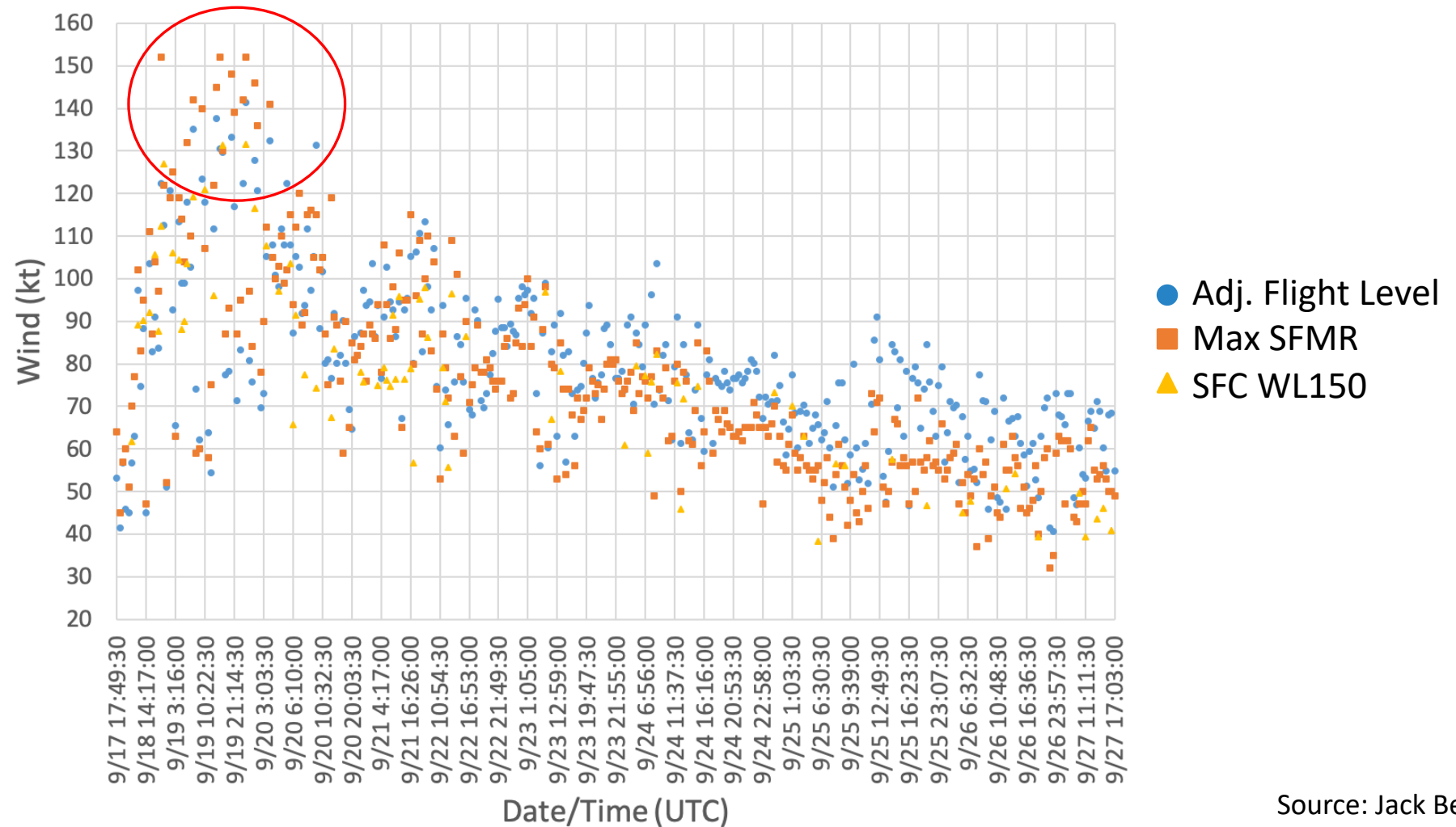
Hurricane Irma



Source: Jack Beven, NHC

Hurricane Maria

Maria 2017 Aircraft Data

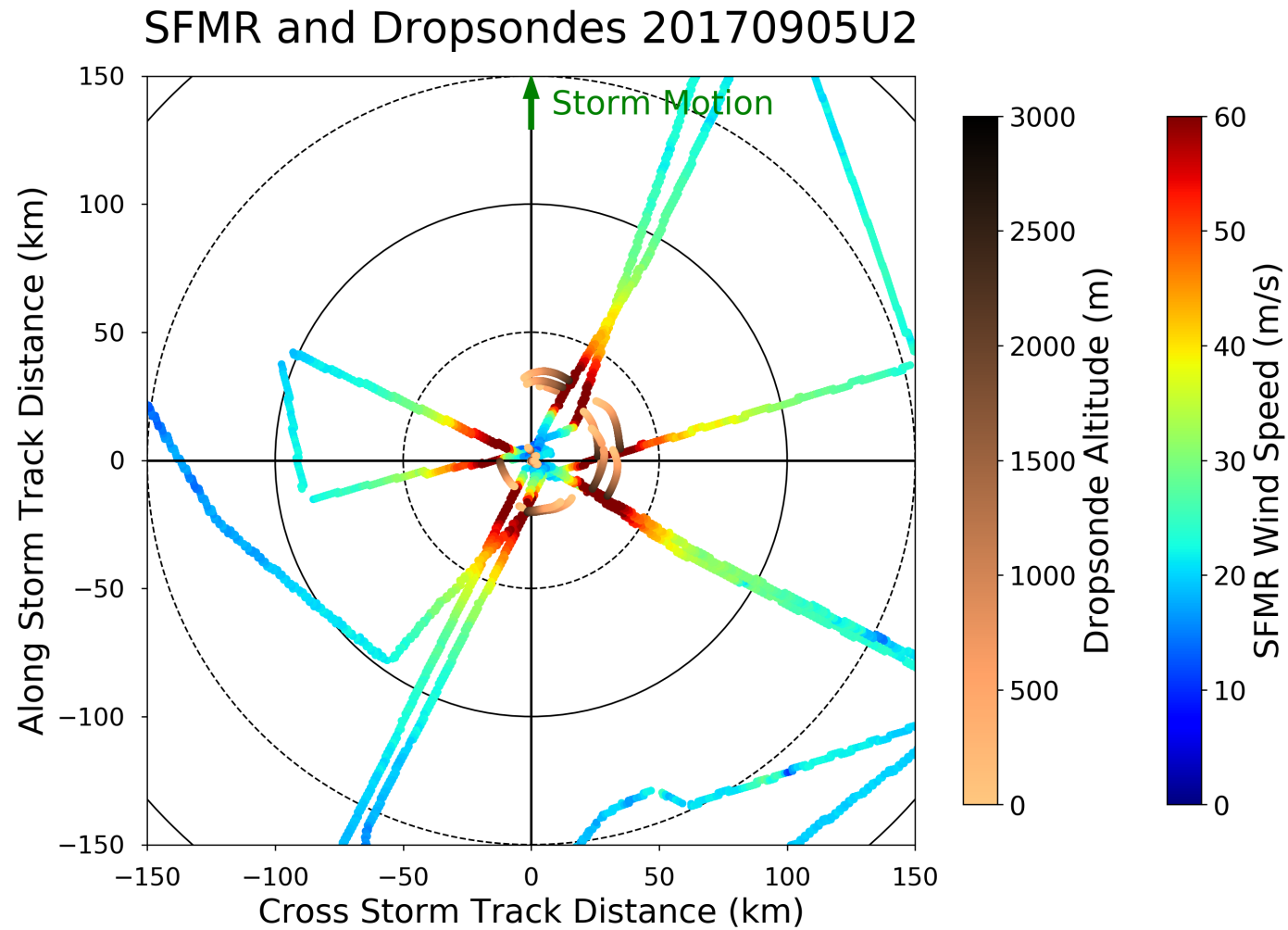


Source: Jack Beven, NHC

Possible Explanations

- Misalignment of wavenumber-1 asymmetry in major hurricanes
- Presence of mesovortices in inner core
- Dropsonde drift in eyewall
- Lack of high-wind dropsondes (≥ 100 kts) for algorithm development

Dropsonde Drift



Future Work for Algorithm Update

- Improve use of dropsondes
 - Reprocess eyewall dropsondes
 - Re-evaluate surface wind speed calculation (WL150 Reduction)
 - Collocation process with SFMR
- Use Tail Doppler Radar (TDR) data to investigate structure
 - Higher spatial grid spacing products
- Improve SFMR radiative transfer model
 - Atmospheric and rain emissivity
 - Salinity
 - Smooth surface model