



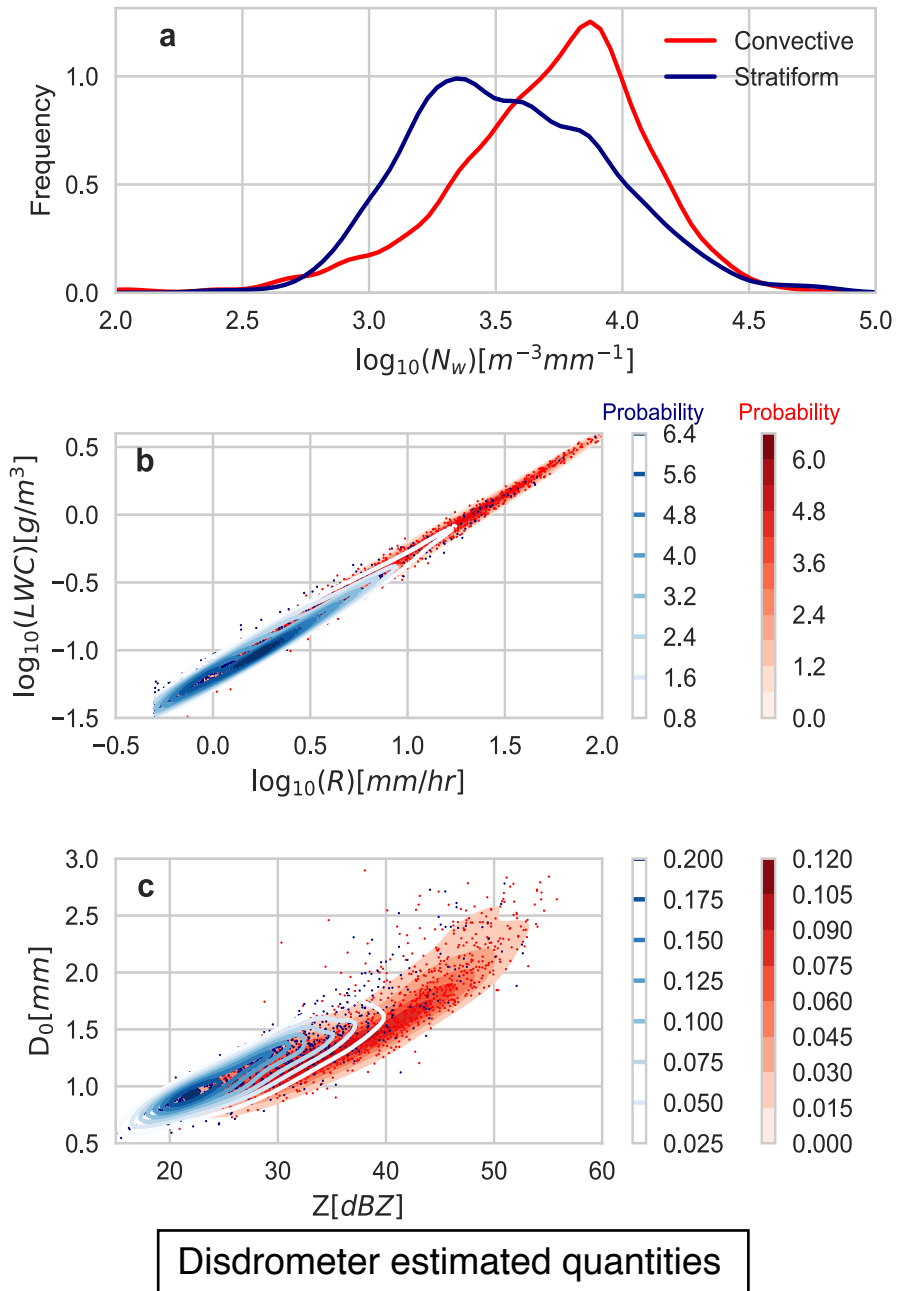
The Green Ocean: Precipitation Insights from the GoAmazon2014/5 Experiment

Die Wang, Scott E. Giangrande, Mary Jane Bartholomew, Joseph Hardin, Zhe Feng, Ryan Thalman, and Luiz A. T. Machado

Wang et al., 2018, ACPD: <https://doi.org/10.5194/acp-2018-101>



- Development of precipitation products (part of the **CMDV** model evaluation activities)
- **Disdrometer** measures the raindrop size distribution (DSD)
- The processing is performed using **PyDSD** code (Hardin, 2014)
 - Hydrological quantities: **R**, **LWC**, **D₀**, gamma/exponential-fit **DSD** etc
 - Radar quantities: **Z**, **Z_{DR}**, **K_{DP}**, **A** for S-, C-, and X-band
 - <https://github.com/josephardinee/PyDSD/>
- ARM Value Added Product (**VAP**), under development
 - Poster **158** (B1) Zhou et al. (Wed. 3:30-5:00)



Precipitation Insights from the GoAmazon2014/5 Experiment

One motivation: To summarize the **precipitation properties** using a reconfigured **Radar Wind Profiler (RWP)** coupled with a **disdrometer (Parsivel)** for model evaluation.

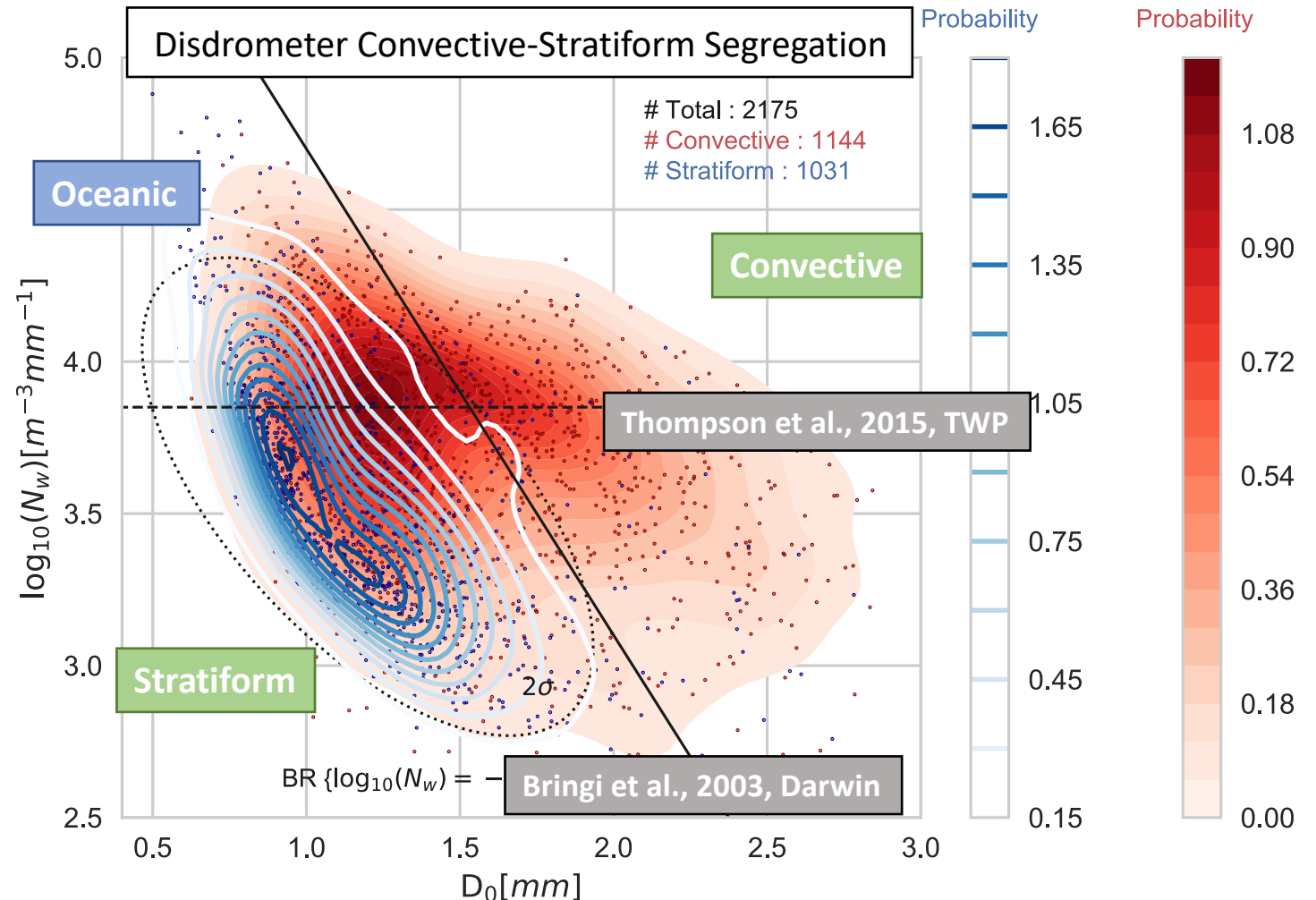
One science question:

'When is the 'Green Ocean' blue ?'

The Amazon experiences a **wide range** of convective clouds.

- Most disdrometer studies only present continental/maritime continental cloud regime analyses.

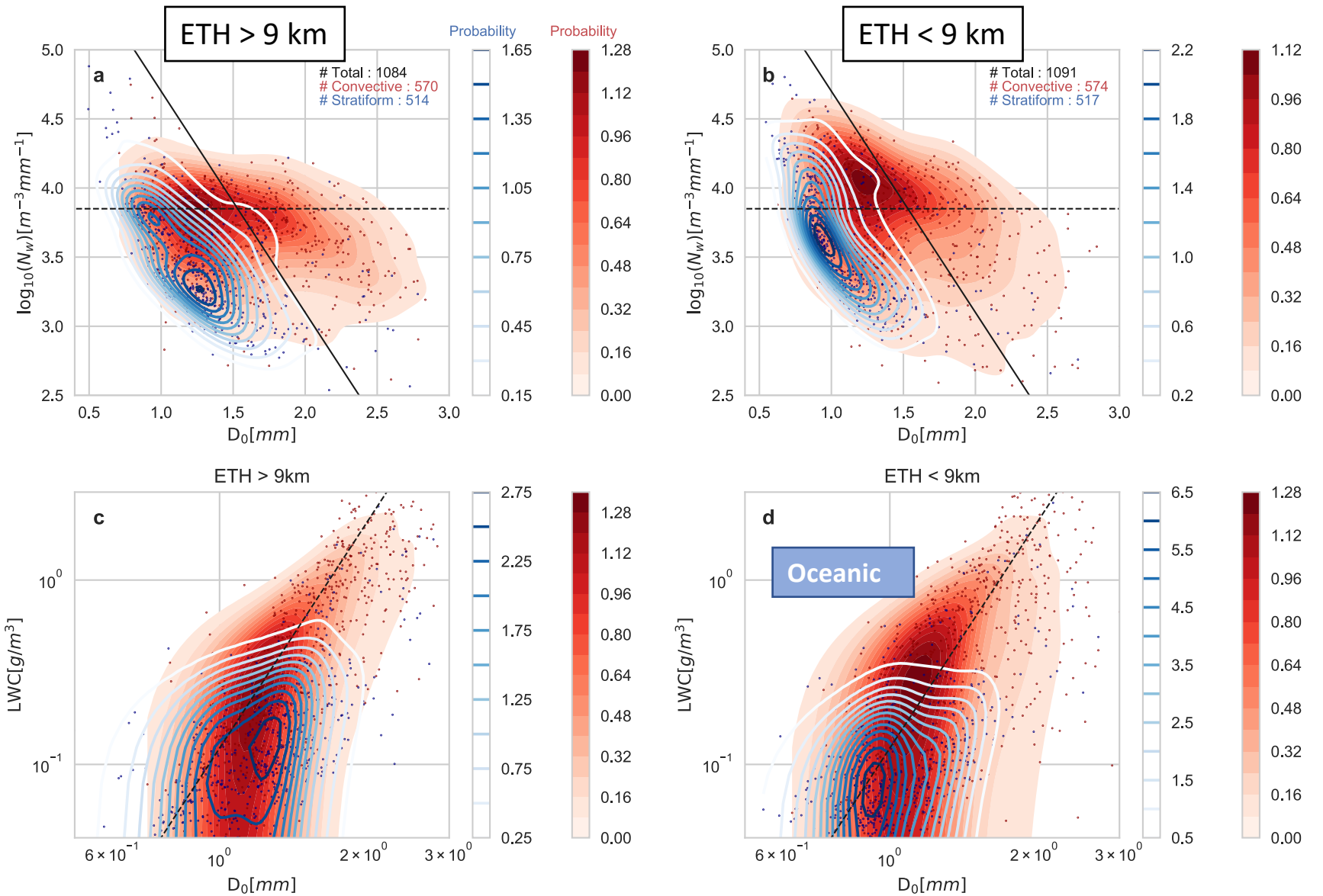
Do Amazon clean/polluted regimes promote oceanic to continental precipitation characteristics ?



The Amazon 'Green Ocean': **When** do we observe oceanic characteristics?

Echo-Top Height Breakdowns

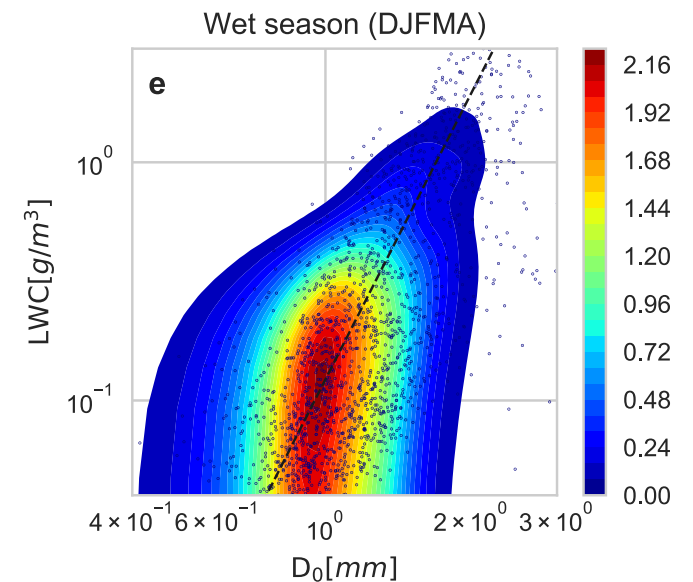
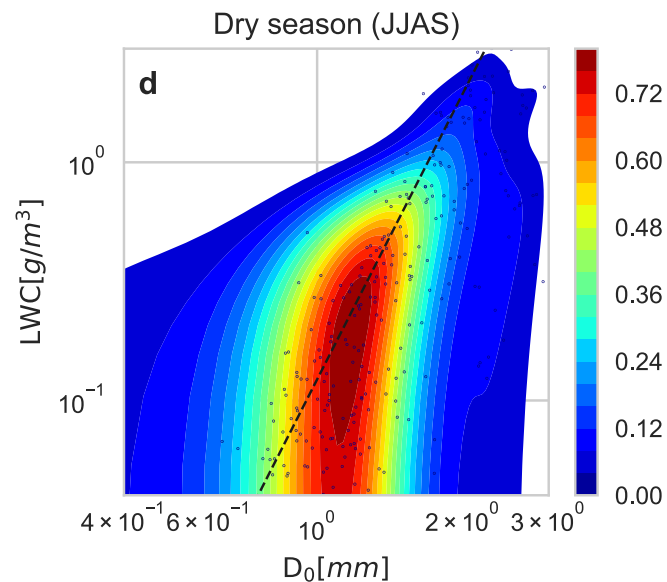
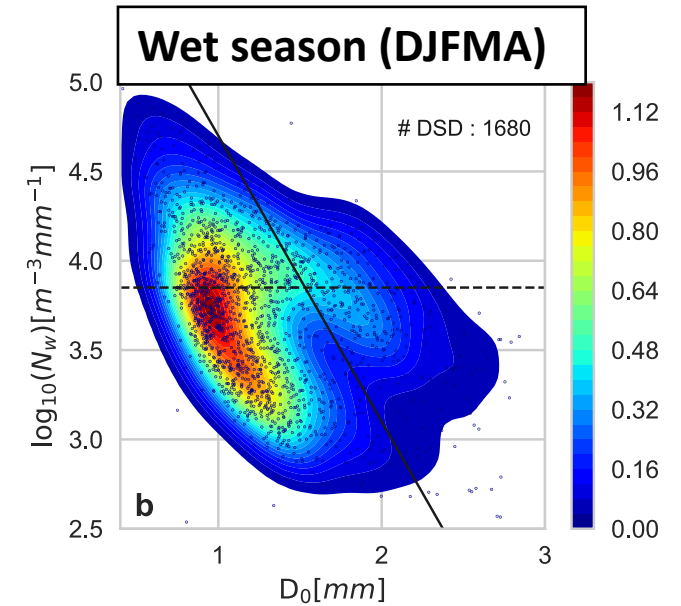
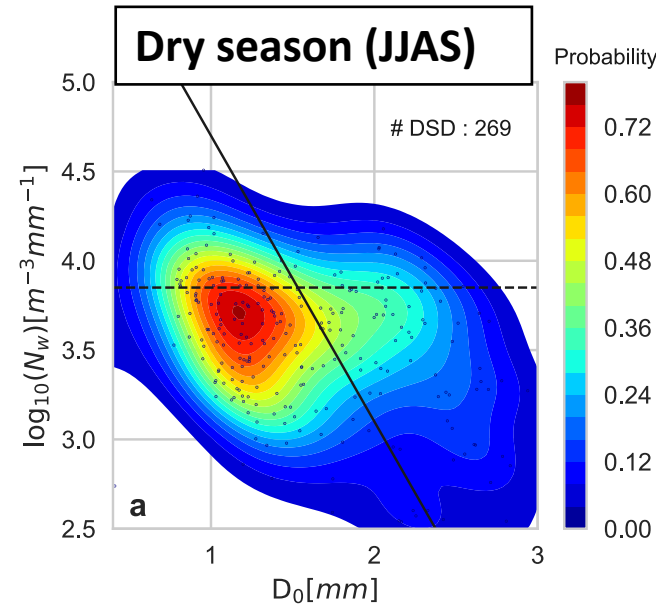
- **Deeper** convective and stratiform DSDs show more frequent DSD having **larger median drop sizes**
- **Shallower** clouds tend to be **more oceanic** looking



The Amazon 'Green Ocean': **When** do We observe oceanic behaviors?

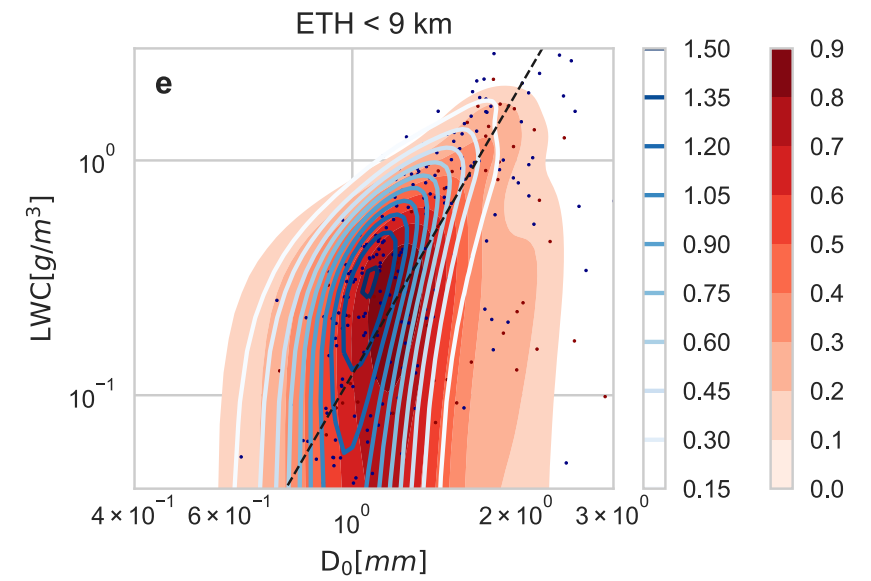
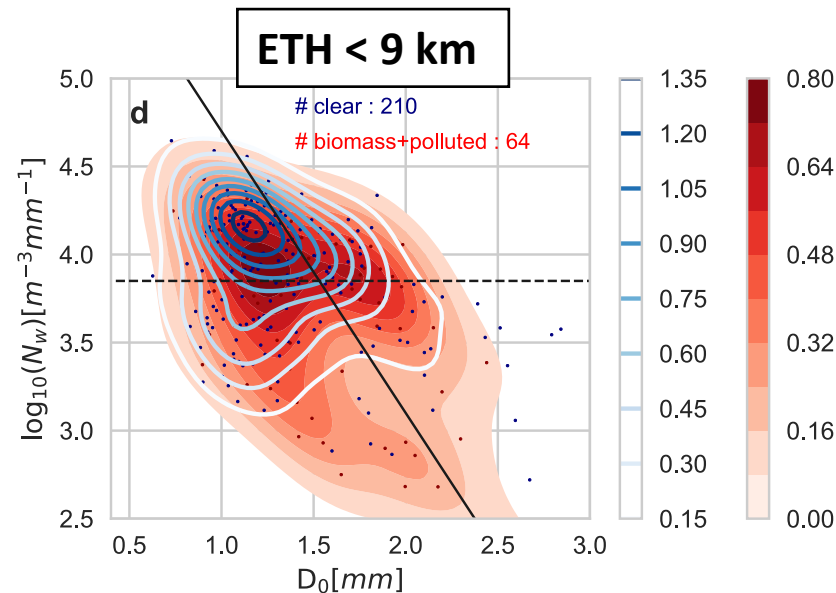
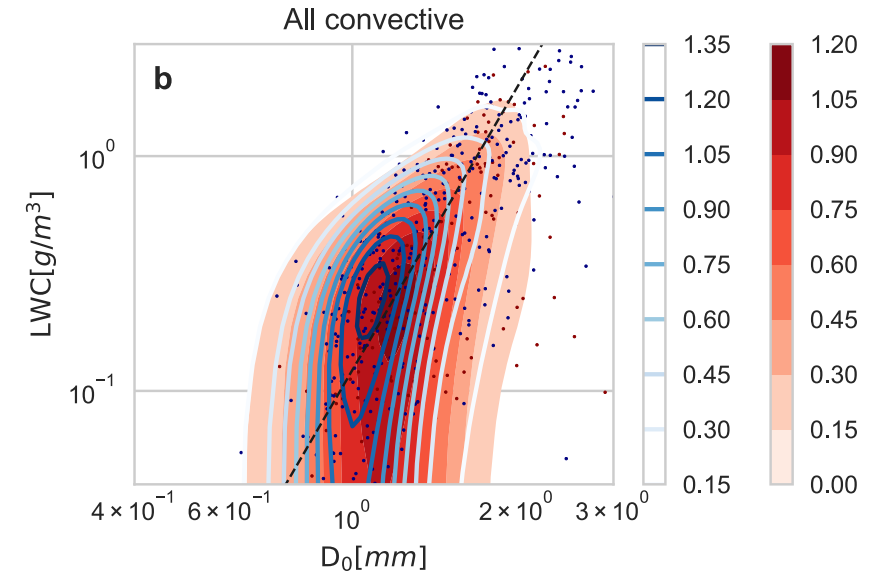
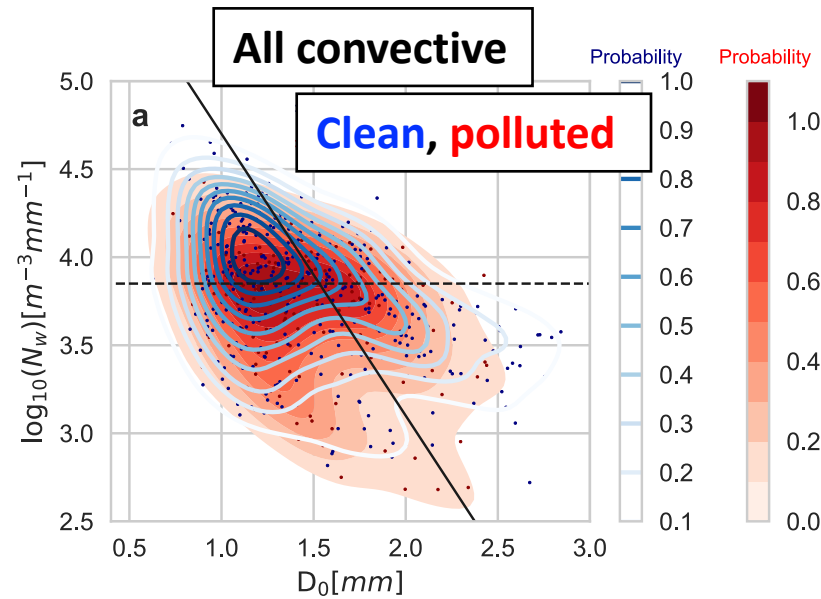
Seasonal Breakdowns

- **Dry season** demonstrates the more **isolated** and **intense** convective precipitation characteristics.
- **More oceanic** characteristics during the **wet** season (more widespread or shallow convections)
- **Pollution** becomes much higher in the **dry** season

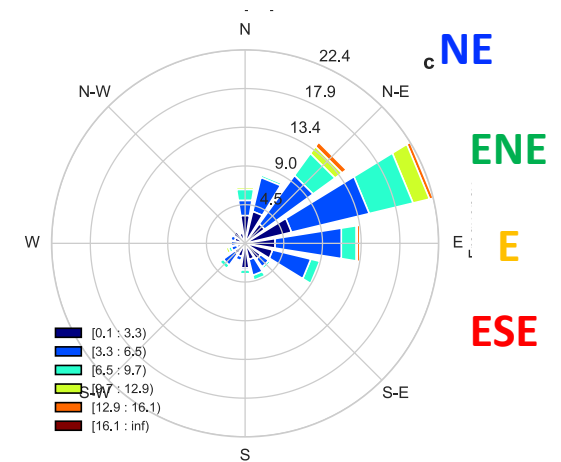
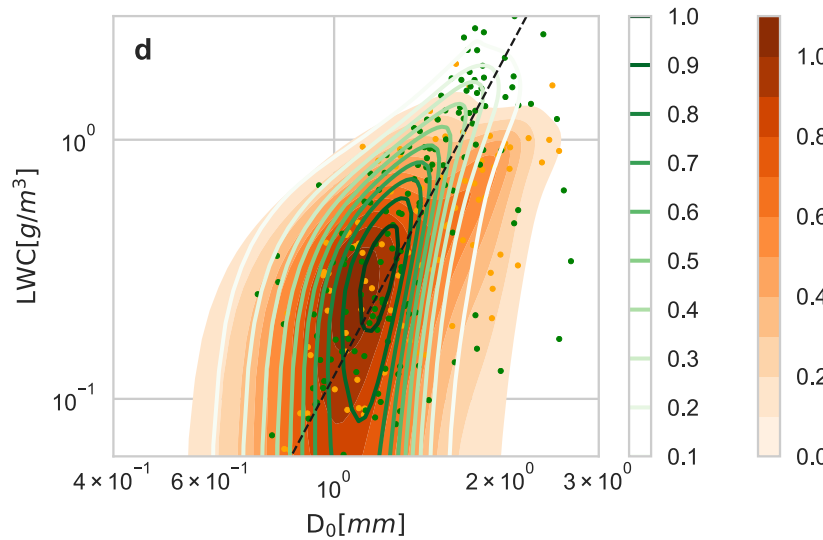
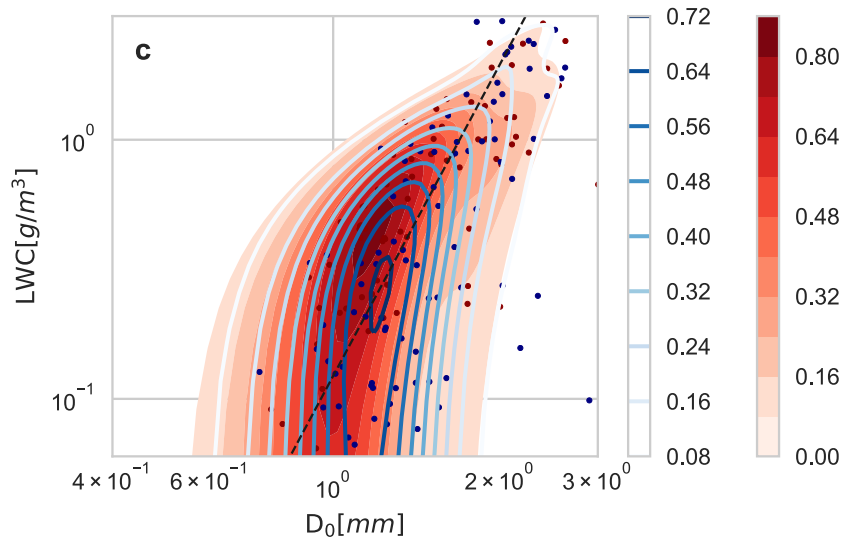
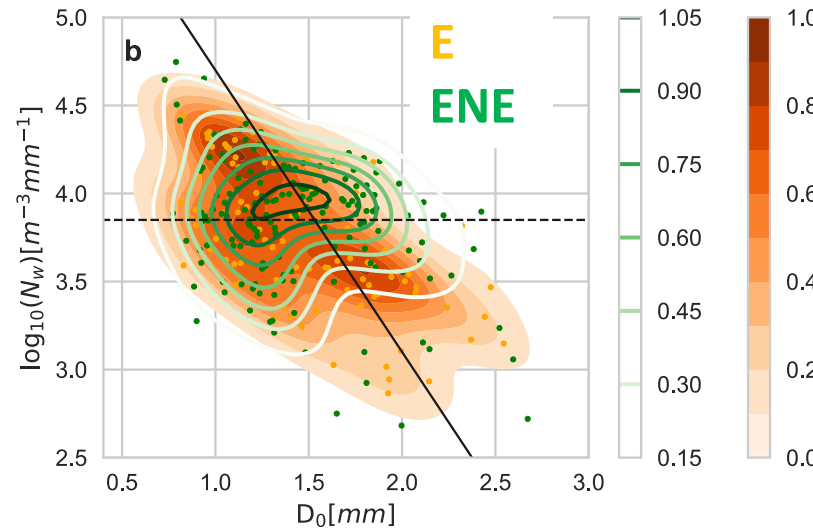
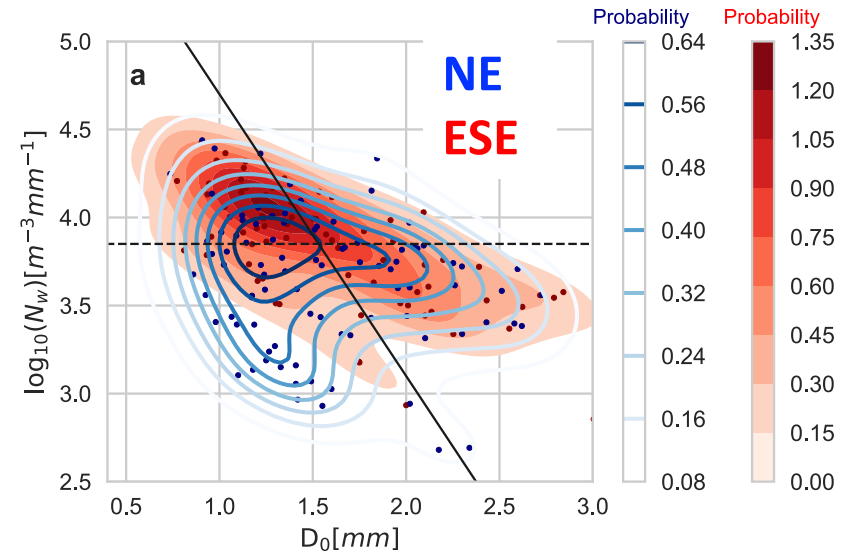


The Amazon 'Green Ocean': Role of **Pollution** on Oceanic Signatures?

- Shallower clouds under the cleaner condition tends to be much more oceanic.
- It is **not conclusive** whether the lesser oceanic DSDs were the consequence of the aerosol conditions, or the shift in the environmental conditions that tracked the change in aerosol.



The Amazon 'Green Ocean': An **Alternate** Explanation



- A much **larger separation** between the oceanic and non-oceanic cases based on wind directions
- The **NE** direction is the **least** oceanic. (favoring deeper convective clouds)
- **Other directions** tend to be much **more oceanic**, which associated with the shallow organized systems
- **Larger-scale forcing** is the driving factor for oceanic precipitation

Summary

- Disdrometer processed using the open-source **PyDSD** code. (Hardin, 2014)
- ARM value added product (**VAP**) has been developed. Coming soon!. (Zhou et al.)
- Tropical and **oceanic** precipitation behaviors found mostly under **Wet** season and **shallower** clouds.
- It is not conclusive that **aerosol condition** was driving factor the presence of an oceanic character.
- the oceanic DSDs tended to be those associated with these **shallow**, but **widespread** convective events initiated or enhanced by **sea-breeze** influences. (require future investigation)

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Poster 98 (B2) Wed. 5:00-6:30

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Thank You !