Progress on GDP for Ozonesondes

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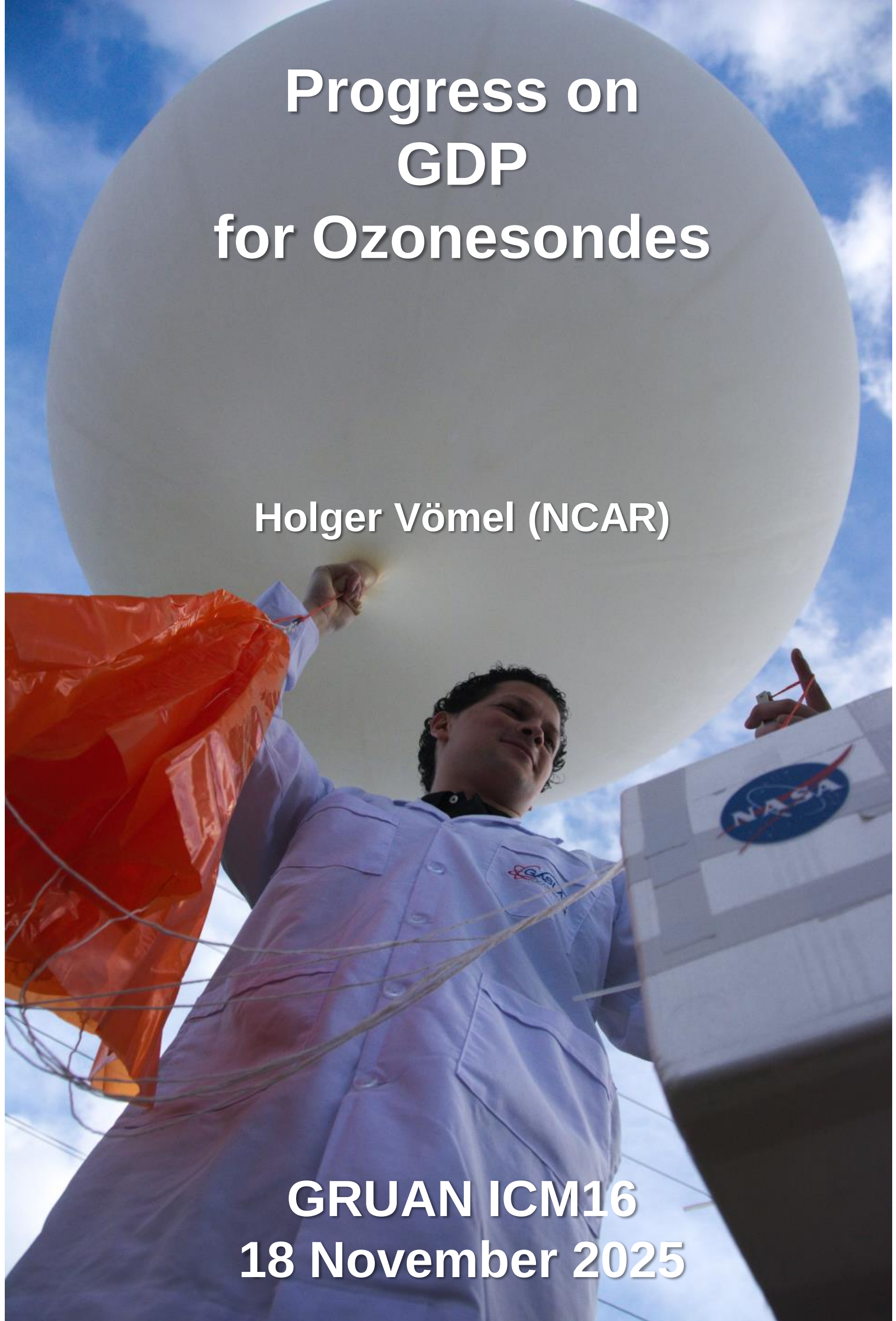

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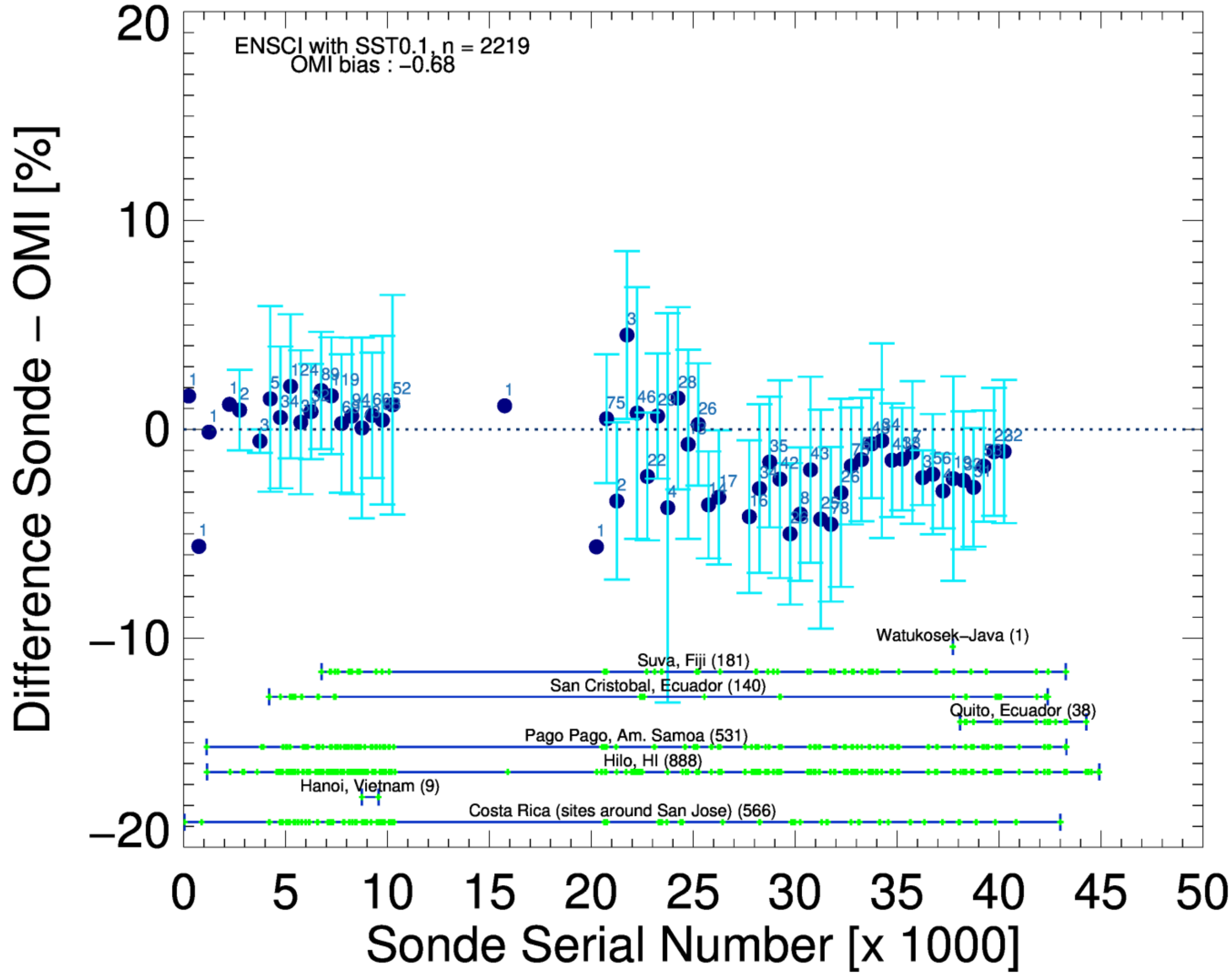
Total ozone difference (ECC – OMI)



Stauffer et al. (2022): An examination of the recent stability of ozonesonde global network data. Earth and Space Science, 9, e2022EA002459. https://doi.org/10.1029/2022EA002459.

Traceability in ozone sonde

- Ozone sondes are prepared following standard operating procedures
- No quantitative ground check → Trends depend on manufacturing stability
- No tool to evaluate bias prior to launch

Goals of Ozonesonde GDP

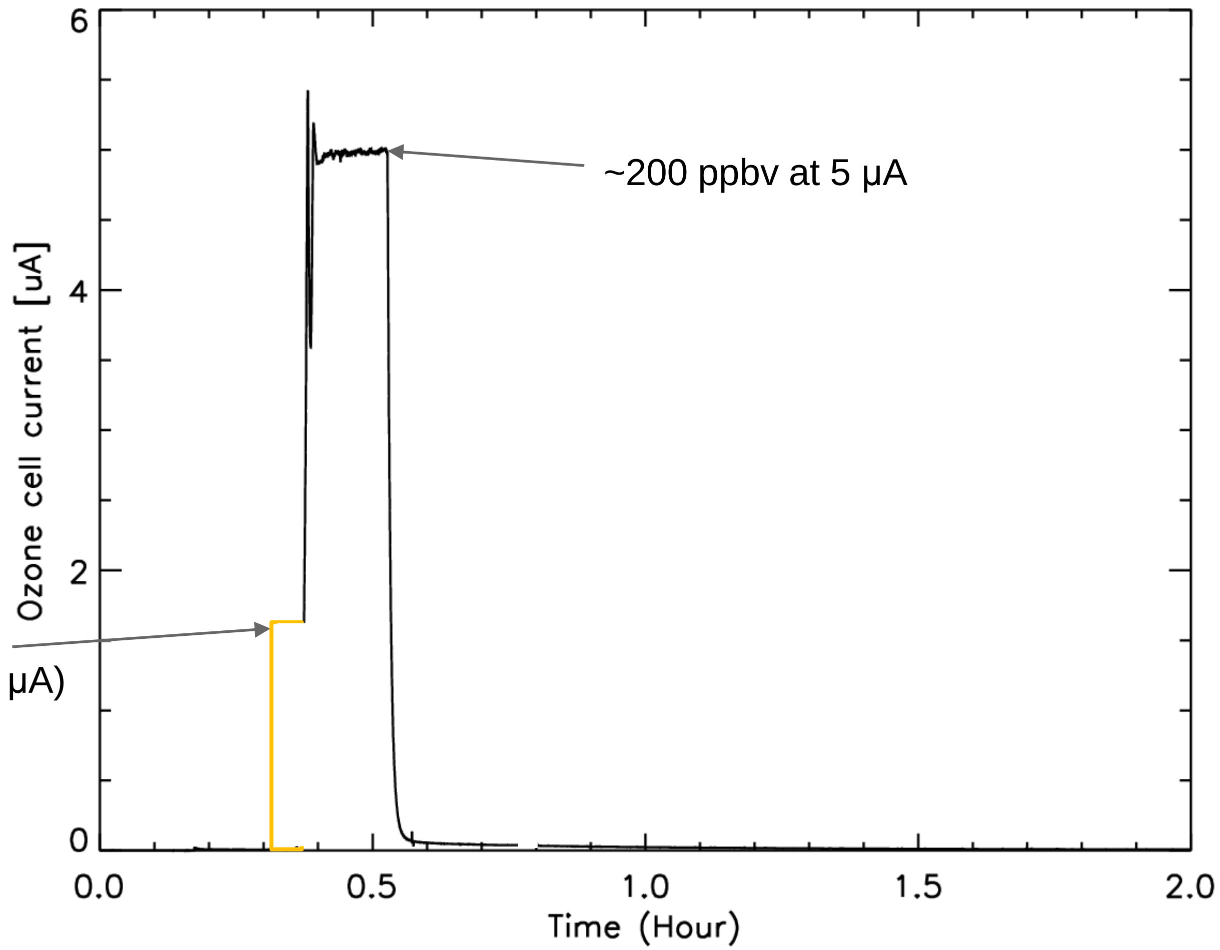
- Establish traceability, become less dependent on manufacturer

- Remove/minimize known systematic biases, which are ignored in standard processing (remain consistent with GAW 268)

- GRUAN ECC product will become anchor observation for all other stations
  → Identify potential issues early

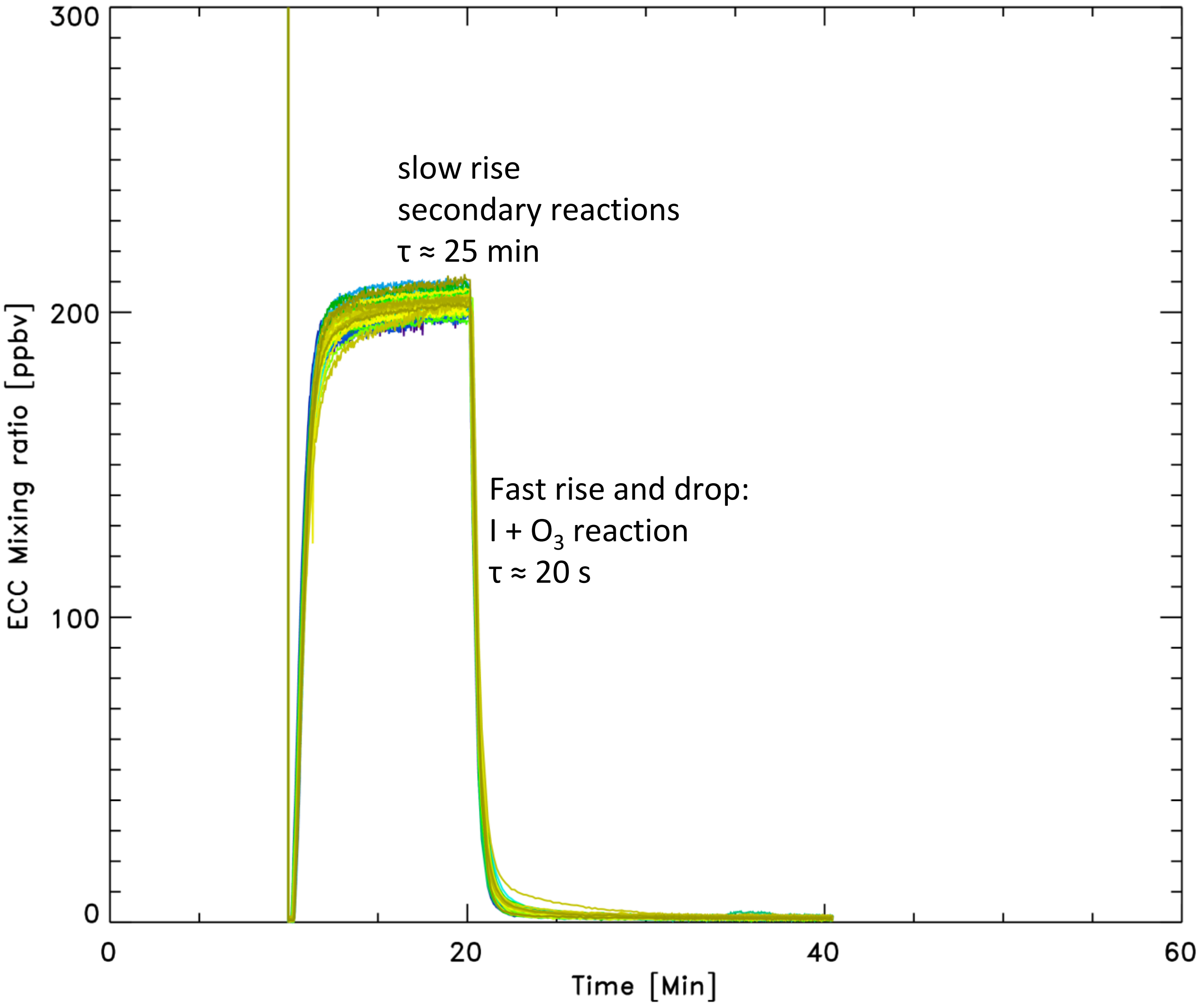
- Make sure that GRUAN stations provide homogeneous data set, despite heterogeneous instrumentation → Centralized processing

Manufacturer independent ground check

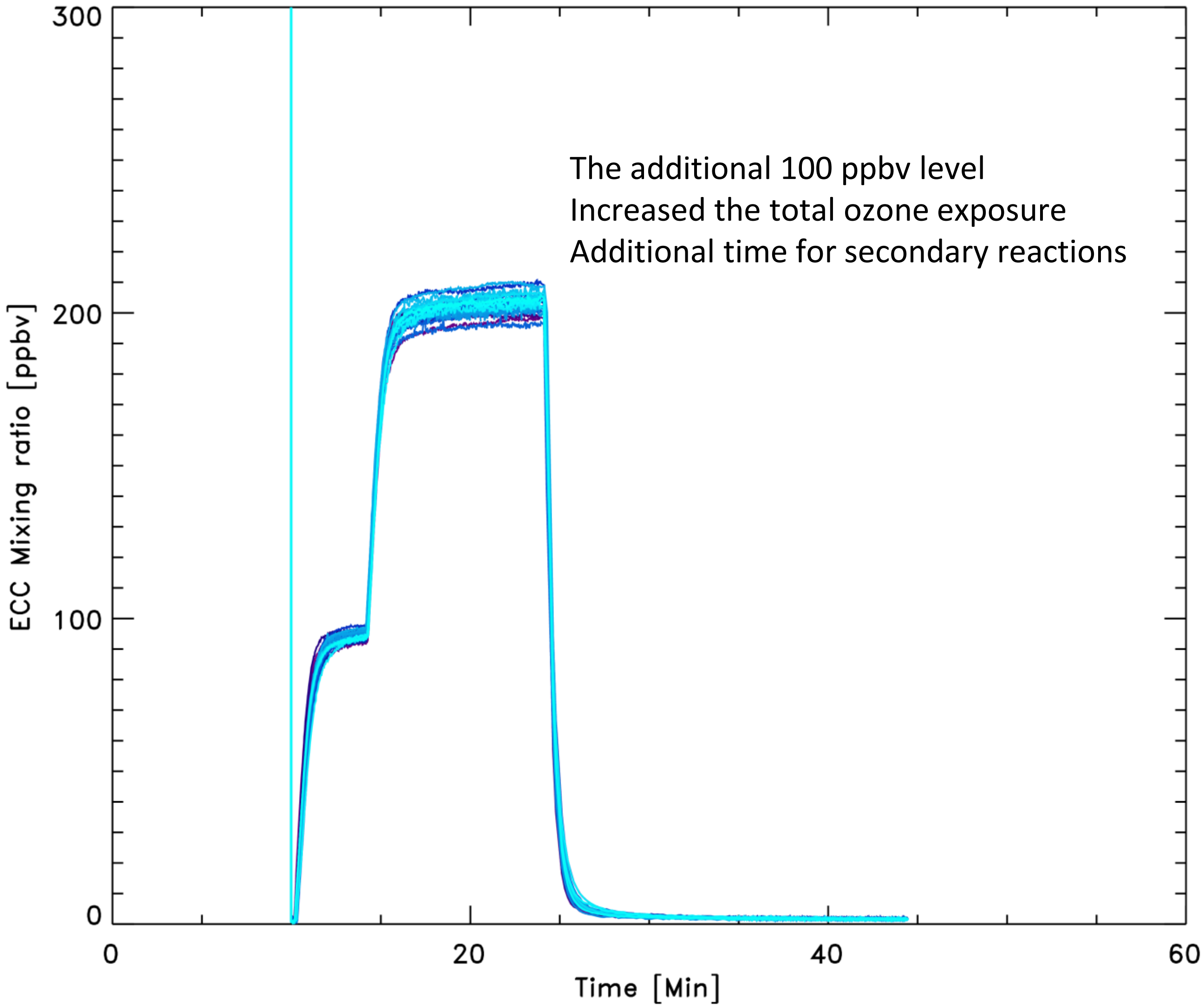


100 ppbv level (~2.5 µA) prior to 5 µA

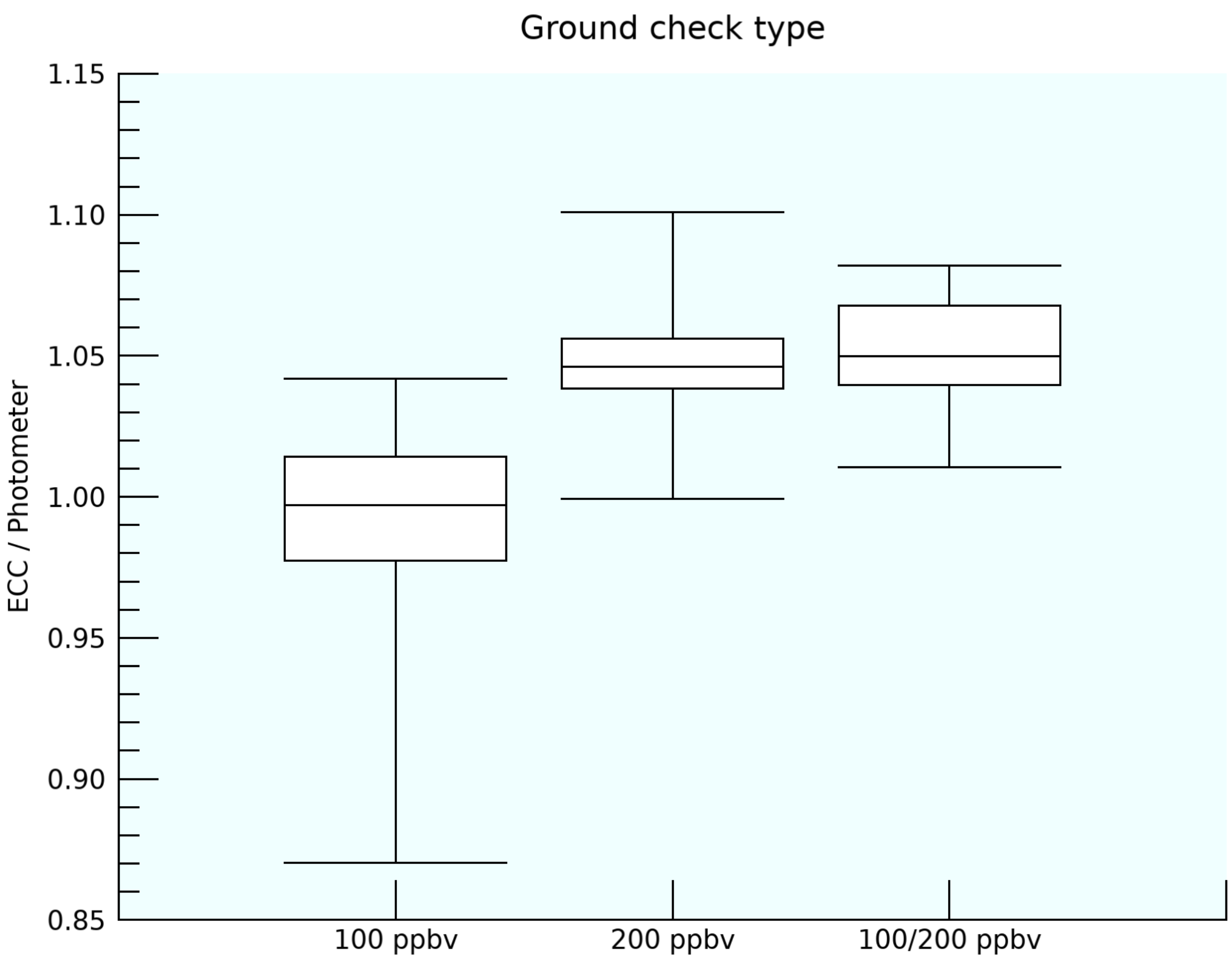
Quantitative ground check at Payerne



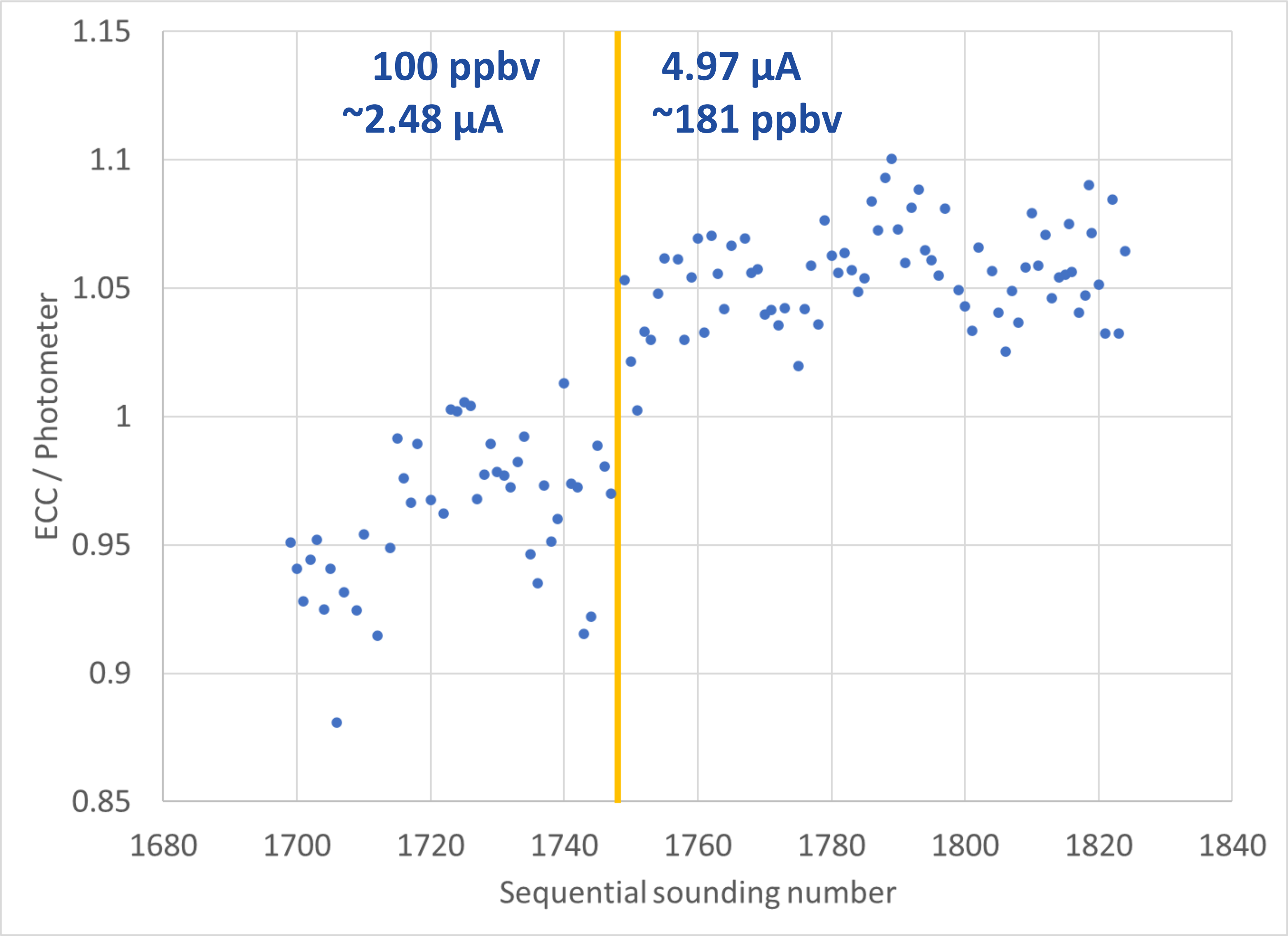
Quantitative ground check at Payerne



Change at 5 μA due to added 100 ppbv level



Ground check comparison at Lauder



Lessons learned

- Ground check is very sensitive to variations in procedures due to secondary reactions and operator variability

- Ground check requires automation of sonde preparation
  1. Electronic recording of ECC signals during ground check
     - Automatic determination of IB0
     - ECC current at end of 5 μA
     - Response time
     - IB1
  2. Electronic flow rate measurement
  3. Exposure to well defined ozone amount (Calibrated ozone source)
     - Computer controlled ozone levels
  4. Parallel zero air and defined ozone amounts with electronically switched air flows -> Eliminates ozone generator ramp up and ramp down.

- Open data sharing of ground check data is essential for network

Next steps

- Build/improve electronic data recording of ground check
  - NOAA
  - Lauder
  - Need other stations that take on leadership role
- Electronic flow rate measurement
- Calibrated ozone signal
  - Payerne
  - Need other stations that take on leadership role
- Parallel flows of zero air and defined ozone
  - To be done
- Centralized processing
  - To be done