HIGH FREQUENCY NITROGEN MONITORING WITH GREEN EYES "NULAB"

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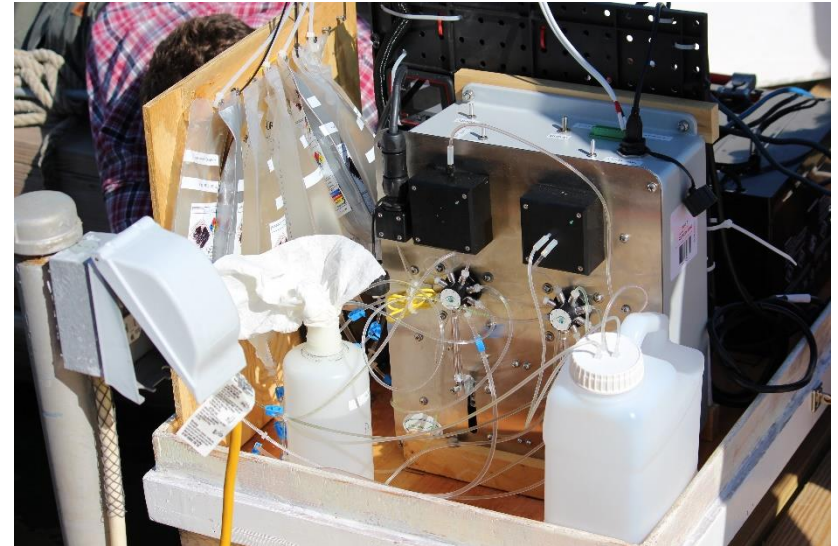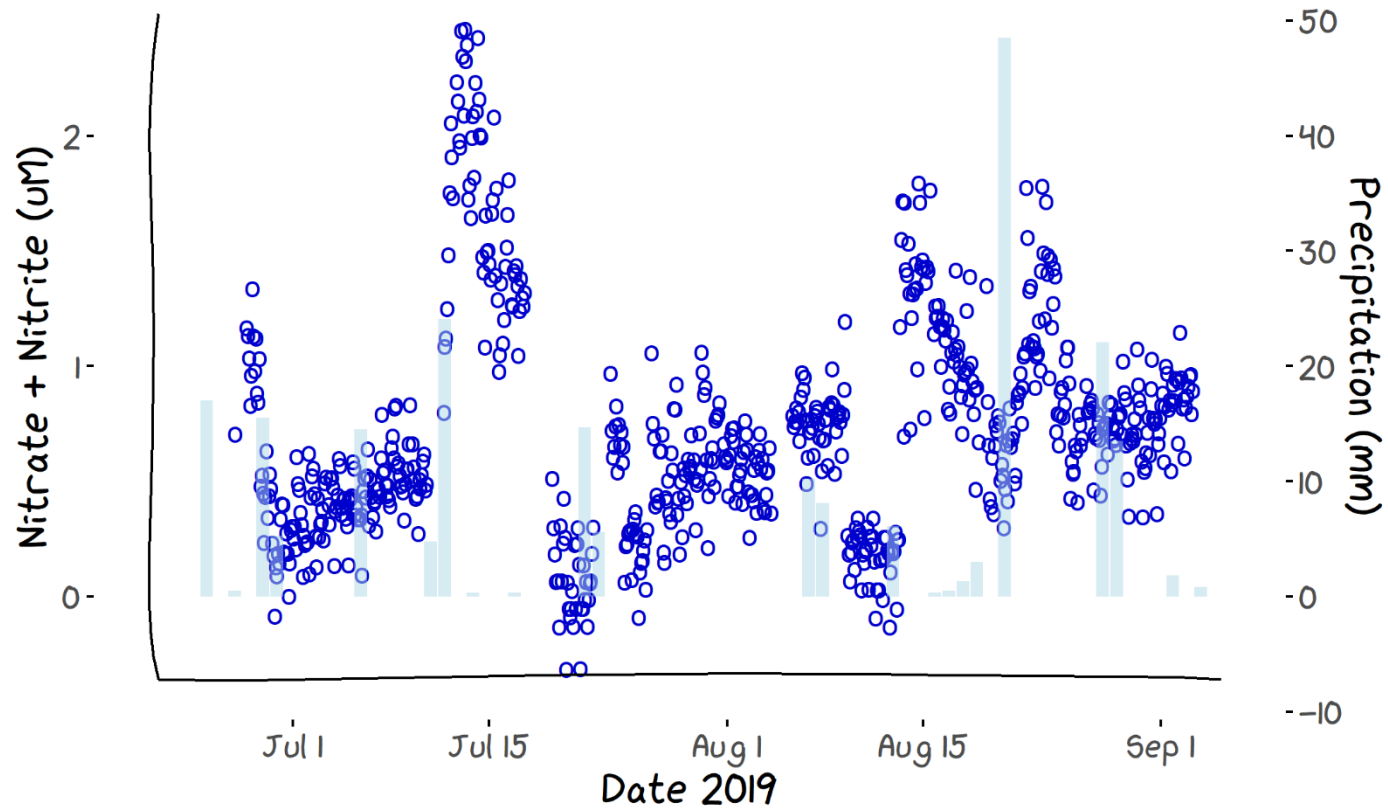
High Frequency Monitoring 2019

UMAINE LOBO Buoy
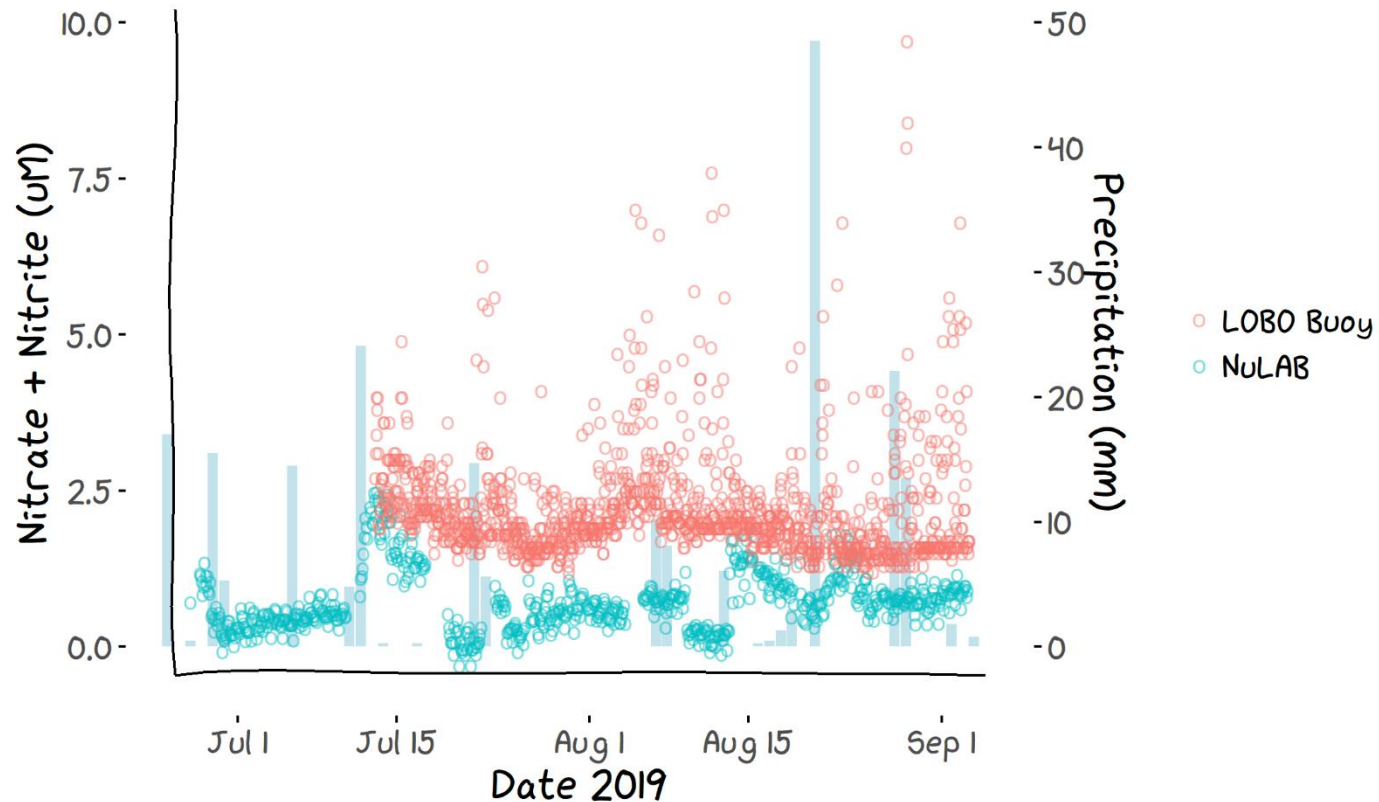
CBEP NuLAB

PRELIMINARY DATA

System Configuration

- Wet chemistry robot
  - Ammonium
  - Nitrate + Nitrite
- Support system
  - Liquid reagents, liquid waste
  - Solar panel and Batteries
  - Submersible pump
  - Cell phone modem
  - Water tight enclosure
- Remotely accessible

Nitrate+ Nitrite Data

Comparison to UMAINE Buoy

Different sensor technology — SUNA
Different location (by EEWTF)
Similar pattern with rainfall

Sources

- Data analysis using R
  - R Core Team (2019). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.
- Graphic style based on the web comic xkcd by Randall Munroe
  - https://xkcd.com
- Tools for graphics:
  - ggplot2 library
    - H. Wickham. (2016) ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag New York.
    - Available in many places online, including as part of the "tidyverse" of tools for modern data analysis workflows with R
    - https://www.tidyverse.org/
  - xkcd library
    - Emilio Torres-Manzanera (2018). xkcd: Plotting ggplot2 Graphics in an XKCD Style. R package version 0.0.6. https://CRAN.R-project.org/package=xkcd
  - xkcd fonts
    - Several versions available online. The xkcd R library suggests
    - http://simonsoftware.se/other/xkcd.ttf
    - Two slightly different xkcd fonts, including the xkcd Script font are available here:
    - https://github.com/ipython/xkcd-font