Prototyping Multi-Source Land Imaging Canopy Chlorophyll for the Assessment of Vegetation Function and Productivity – Evaluation of High Resolution Commercial Data

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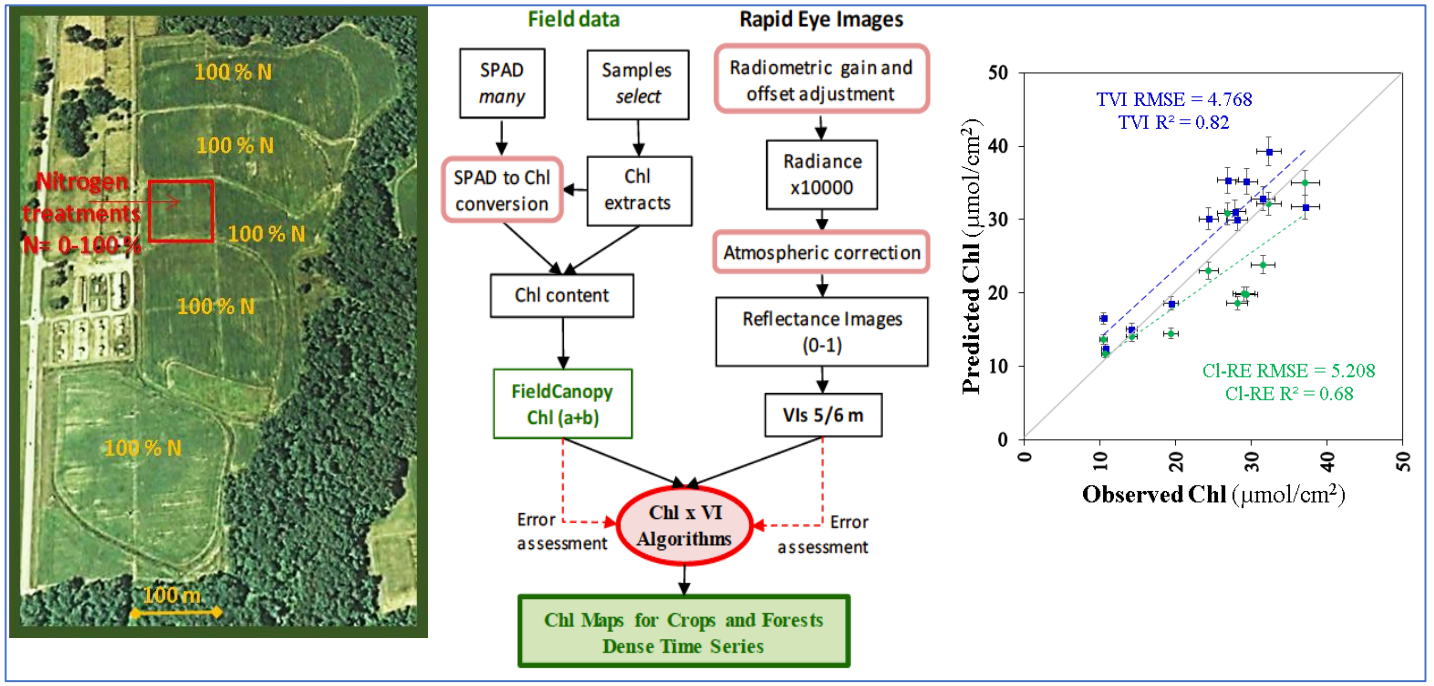
Purpose: Global monitoring of vegetation

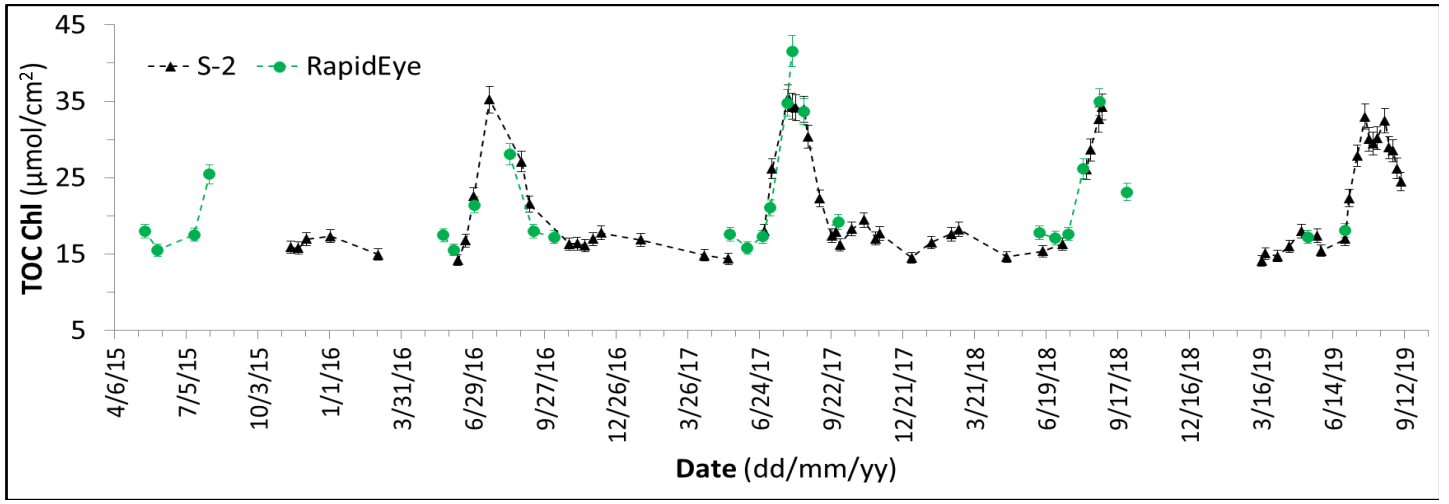
Study Objective: Evaluate the possibility of using high temporal and spatial resolution commercial imagery for estimating Top of Canopy chlorophyll content (TOC Chl)

Imagery: RapidEye, Sentinel-2

Findings: Commercial imagery enabled the generation of multi-temporal maps of canopy chlorophyll at a resolution that exceeds Global Climate Observing System Land Essential Climate Variables resolution requirements by a factor of 10. The study demonstrated that high-resolution commercial imagery can serve as a valuable tool for: 1) upscaling leaf to canopy chlorophyll content, and 2) for assessing the spatial variability in TOC Chlorophyll content at an accuracy comparable to field observations.



The primary study area in Beltsville, MD is comprised of corn plots under a range of N levels (left). Processing workflow for deriving canopy chlorophyll, using Rapid Eye (center). Rapid Eye predicted TOC Chlorophyll estimates vs. field observations, based on Cl-RE and TVI indices (right).



Time series of TOC Chlorophyll based on the Cl-RE index, using both Rapid Eye and S-2 data, capturing the range in leaf chlorophyll during the 2015-2019 period at OPE3/USDA field location, Beltsville, MD.