

Testing PACE Terrestrial Ecosystem Productivity Algorithms Using HICO



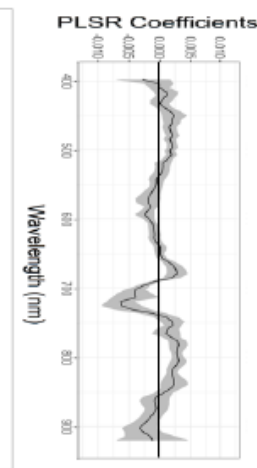
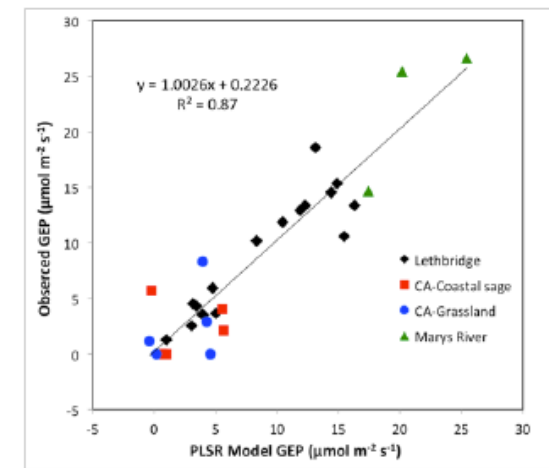
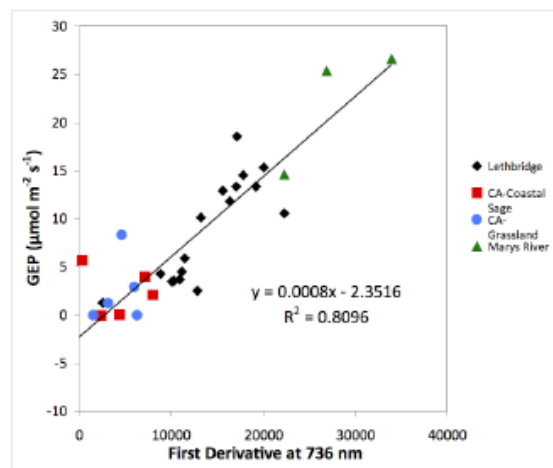
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Used HICO data to test potential PACE terrestrial algorithms for productivity
Require robust algorithms that work across vegetation types due to PACE's large pixels
- most land pixels will likely be mixtures

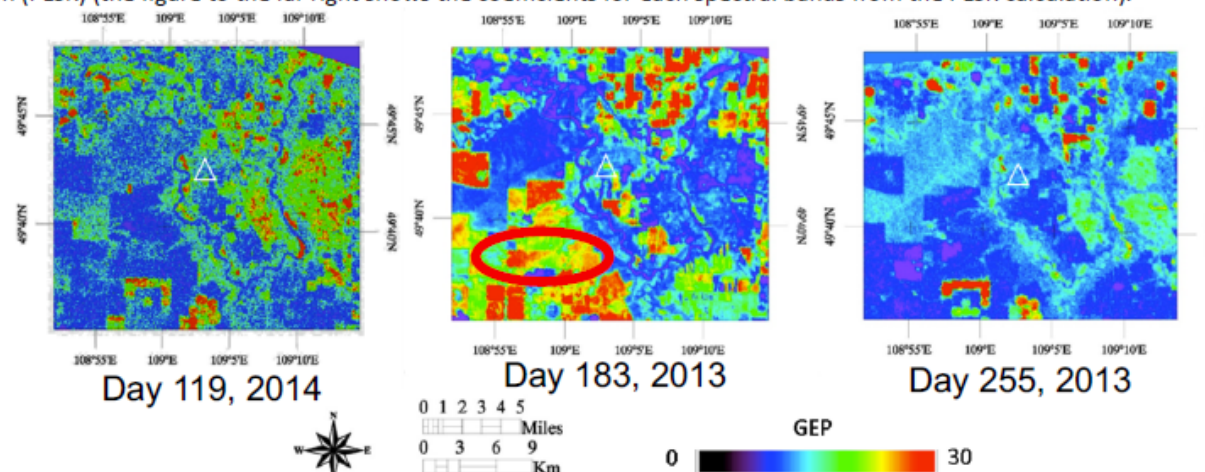
Examined four different sites with flux towers measuring productivity. Sites included grass, shrubs, and forest covers

Multiple approaches were successful
Further studies are required to determine optimal approaches for PACE that describe diverse vegetation types

This work may be advanced by leveraging SBG activities such as the reprocessed imaging spectrometer data by SISTER project (SBG Space-based Imaging Spectroscopy and Thermal Pathfinder)



Two examples of successful approaches to retrieve GEP from HICO reflectances are: left figure uses descriptions of spectral shape, in this case first derivatives of spectral reflectance at 736 nm, and right figure uses statistical approaches such as Partial Least Squares Regression (PLSR) (the figure to the far right shows the coefficients for each spectral bands from the PLSR calculation).



HICO imagery for different times in the growing season for the area near Lethbridge, AB shows seasonally dynamic spatial patterns of GEP. Further, the reflectance-based algorithm describes both between and within field variability in GEP as indicated by the variability in the circled field in the midsummer (center) image. In visible color images this field is uniformly green. The triangle marks the location of the flux tower.

Reference: Huemmrich, et al. (2017) ISS as a Platform for Optical Remote Sensing of Ecosystem Carbon Fluxes: A Case Study Using HICO." IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 10(10) : 4360-4375, DOI 10.1109/JSTARS.2017.2725825