Jaime Caballer Revenga
Postdoc
Geography 1
Postal address:
Øster Voldgade 10
1350
København K
Email: jar@ign.ku.dk
Phone: +4535330252

Short presentation

I am currently working as a PhD fellow at the University of Copenhagen, funded by the MSCA/H2020 program. My PhD project lies at the intersection between physical geography (micrometeorology and ecophysiology), near-field remote sensing (UAV-based) and computer science. I conduct my fieldwork at two ICOS ecosystem sites to compare our C stock estimates with ecosystem-level NEE. In terms of skills, I am particularly interested in applying DL frameworks to point cloud data understanding, and time series analysis (nowcasting) applied to flux measurements. My goal is to contribute to the development of methods to accurately map biomass and C stocks from mobile platforms.

Employment

Postdoc

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1 Nov 2023 → nu

PhD fellow

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1 Jun 2020 → 31 May 2023

Guest Researcher

Geography 1

København K

1 Oct 2023 → 31 Oct 2023

The aim behind this research project is developing new methods to allow precise carbon stock (C) assessments in croplands and forest areas of Northern Europe by utilizing state-of-the-art remote sensing instrumentation and deep learning methods. It follows the assumption, that today there is apparent room for enhancement of environmental research outcomes via the application of the latest technology -e.g. Unmanned Aerial Vehicles (UAV), Light Detection and Ranging (LiDAR) sensors-, as well as data crunching methods –deep learning (DL) architectures-. Today, it is mandatory to exploit the possibilities of the available tools to acquire the most accurate data to push current research beyond. This necessity has not yet been met, although the demand for more accurate information on terrestrial carbon storage is increasingly compelling. In coming years, the current environmental threats to forest areas and croplands will likely worsen globally (aridification of soils, intensified soil use). Likewise, in the European context, besides climate change, diverse human pressures let foresee this scenario: progressive land take for artificial infrastructure, massive soil loss, or forest degradation, are the most apparent examples. As for climate change, the uncertainty of environmental feedback mechanisms is yet unboundedly high, with direct implications to the soil-atmosphere flux balance as well as to the agro-food system. Recent technology paves the way for introducing a new scientific area that lies at the intersection of environmental and computer science. A relevant option for acquiring better estimates of C stocks in the European vegetation cover is the application of UAV LiDAR for data acquisition and processing with DL models. Once accurate estimations will be at hand, not only better local estimates of C-stocks will be possible but also derived regional scale analyses. This will substantially enrich the further research on C-cycling and soil-atmosphere interactions and greenhouse gas emissions (GHG).

Key words: UAV-LiDAR, above-ground biomass, regression analysis, terrestrial ecosystem analysis.