Assessing Climate Forcing Using Remote Sensing and Ground-based Measurements: Examples from Land Use Change and GHG Emissions

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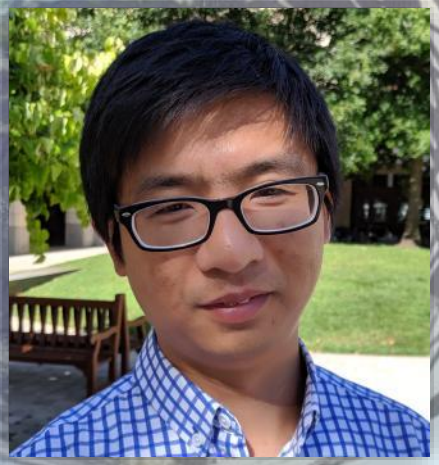

Human activities are continuing to affect the Earth's climate system by changing greenhouse gas (GHG) emissions and land surface properties. Satellite observations with broad spatial coverage combined with long-term *in situ* measurements, not only provide direct evidence of climate change, but also valuable information on assessing climate forcing through empirically based or data-driven approaches. These direct observations as well as derived products can also be used to diagnose and benchmark Earth System Models for better understanding the climate system. Changes in GHG emissions and land use are among the two major forcings of climate change. This talk will discuss two examples that synthesize remote sensing and ground-based measurements for assessing such climate forcings. The first one will be focusing on albedo changes caused by urbanization; by applying an empirically based approach to MODIS observations, various geospatial data, and projections of future urban expansions, a positive radiative forcing is estimated for both past (2001-2018) and future urbanization (2018-2050/2100). The second case will focus on methane emission from rice cultivation in Monsoon Asia aiming to improve the estimate of total emissions. Data from more than 20 Eddy Covariance sites that measured methane (CH_4) emissions in paddy-rice were standardized, gap-filled, and synthesized, and a machine learning model was trained to upscale CH_4 emissions in paddy-rice from MODIS and other geospatial datasets. The upscaled gridded CH_4 emissions products not only reveal hotspots of CH_4 emissions due to rice cultivation, but also provide an independent estimate of regional total emissions. Results of both studies can help inform and benchmark Earth System Models and can help constraining global CH_4 budgets.

28 June 2021

9:00 a.m.

Zoom Link: Here
Meeting ID: 992 4969 9833
Passcode: 983837

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