

Draft: International Workshop Overview and Agenda

A one-day International Workshop “Integration of WUDAPT with Modeling Systems” will be convened at NCAR’s Foothill Lab (FL2-3107) Boulder, Colorado on Friday, January 13, 2023. Its objective is to elucidate current and emerging outcomes of WUDAPT in meeting the needs of different models that currently function at different scales **AND** to anticipate the needs of future models that will permit multi-scale (global to local) approaches using variable grid resolutions adapted to urban landscapes. Such modeling systems are powerful tools that provide state of science-based approaches to addressing societal needs especially in the context of enhanced risks from increased urbanization and climate change scenarios.

The World Database and Access Portal Tools (WUDAPT) was initiated a decade ago as an international climate community project to support climate research on cities. WUDAPT seeks to overcome the data gap on global urban landscapes using consistent methods to acquire information on land-cover and land-use (LULC) that can be integrated in current and future climate models. While cities are major drivers of climate change (and especially exposed to the consequences), they remain largely absent from global modelling work, due to a scale mismatch between the grid resolution of current weather/climate models and the size and intensity of urban processes. At the same time, there are many models that have been designed for urban scale processes (e.g., air quality and building energy models) that operate in isolation from the larger scale models, which provide background conditions. Ideally, WUDAPT would generate urban data that satisfies different modelling needs (fit-for-purpose) in terms of coverage (variables), accuracy and precision (numerical and spatial). Progress to date by the WUDAPT includes (a) the capabilities to generate LCZ products and their associated UCP lookup tables for UCPs as city specific to regional to global maps suitable for current environmental models capable to performing urban (and intraurban) model applications; and developments of (b) methods that can generate form (e.g., gridded UCP maps) and function (GHG and Building energy models). Understanding data requirements to support emerging modeling systems such as Model Predictions Across Scales (MPAS) are needed.

The Workshop adopts a **Hybrid** format for onsite and remote participation. The Workshop is structured as follows: **First Section** provide overview perspectives of various modeling systems, with emphasis on their urban aspects, their data requirements and implementations into current modeling systems (exemplified by the mesoscale (WRF-Urban) and Global (CESM/UCLM) community systems maintained and supported at NCAR along with the collaborative contributions from WUDAPT towards addressing their urban information requirements. The **Second Section** elucidate specific **current** implementations in LCZ and parallel ongoing methods developmental activities; presenters will introduce and highlight their major aspects of specific topics including identifying their future requirements. The **Third Section** introduce and explore variety of tools/activities for generating modeling inputs data on Energy and GHG and as well as towards supporting urbanization aspects of **Air Quality and emerging modeling systems** such as CMAQ and MPAS. The discussions in **Fourth Section** provide a general opportunity to identify a spectrum of critical science issues and data needs for potential path forward roadmap for both WUDAPT and the Modeling communities for effective information gathering and modeling. ***We ask that all participants bring a laptop or device allowing them to provide chats in the Google Meet window that can help prompt the discussions in the final session and for potential follow-up considerations after the conference. The organizers hope to document the elements of the Workshop as publication to communities of interest.***

Speaker Guidance: As a Workshop rather than a scientific conference, speakers are encouraged to craft their presentations with a very succinct introduction to the theme of their topic, with the majority of time then to key points in their current developments and/or implementations and future needs, thus allowing some time to for some questions/comments.

Workshop Agenda

International Workshop: Integration of WUDAPT with Modeling Systems

Organizers: Jason Ching, Gerald Mills, Fei Chen

Friday, Jan 13, 2023, Foothills Lab, NCAR, Boulder Co.

Hybrid: in-person NCAR FL2-3107; remote using the Google Meet Link:

<https://calendar.google.com/calendar/event?action=TEMPLATE&tmeid=NTZwcnZqYTk3ODhzc2czMDdsZXEwajk2bTggZmVpY2h1bkB1Y2FyLmVkdQ&tmsrc=feichen%40ucar.edu>

All presenters can present their talks using Google Meet or send presentations to Fei Chen (feichen@ucar.edu) and drive them from Fei's computer.

Note:

- **If you attend in person, please come to the NCAR Foothills Lab Building 2 (FL-2). Cenlin He or I will wait between 0800-0820 in front of FL-2 to let you in the building. Fei Chen's cell phone number: 303-579-0821.**
- **if you are in the conference room, use the "Use Companion Mode" to join the Google Meet to avoid echo and audio feedback. You can share your presentation screen under "Companion Mode".**

Time	Topic	Speakers
0800-0830	Breakfast	
0830	Welcome, Introduction, Purpose, Overviews	Moderator: Fei Chen
0845	Overview of NCAR and RAL	William Mahoney, RAL Director, NCAR
0900	MPAS development	Bill Skamarock, NCAR
0915	WRF-Urban Modeling System	Fei Chen (NCAR)
0930	WUDAPT Strategic Overview, Status	Jason Ching (UNC)
0945	Discussion	
	Level 0, Local Climate Zone	Moderator: Gerald Mills
0955	Local Climate Zone (LCZ) Across scales	Gerald Mills (UCD, Ireland)
1010	LCZ to UCLM5 (case study)	Lei Zhao (U. Illinois) and Ning Zhang* (Nanjing U, China)
1030	Coffee Break	
1050	LCZ to WRF-Urban: Implementation, status	Cenlin He (NCAR)
1105	LCZ to WRF-Urban: Sub-grid options	Andrea Zonato (U. Trento, Italy)
1120	Automated LCZ processing	Liping Di (George Mason U)
	Level 1,2. Beyond LCZ	Moderator: Jason Ching (UNC)

1135	UCP developments (DSC..)	Dan Aliaga, Liu He (Purdue University)
1150	UCP tools and WRF simulation,	Michael Wong (HKST, HongKong)
1205	Plans Including trees in urban models	Scott Krayenhoff* (U of Guelph, Canada)
1220	Multiscale modeling	Alberto Martilli (CIEMAT, Spain)
1235	Discussion	
1245	Lunch at FL-2 cafeteria	
	Emerging Multiscale Modeling Systems Future needs	Moderator: Fei Chen
1345	EPA modelling plans	Jon Pleim, Tanya Spero (EPA, RTP)
1400	FastEDDY	Domingo Munoz-Esparza(NCAR)
1415	Urban building energy models	Gerald Mills (UCD)
1430	GHG Emission Approaches and Issues	Kevin Gurney (UNA)
1445	AH Emissions Issues	David Sailor (ASU)
1500	Coffee break	
1515	General Discussion	Moderators: Fei Chen, Jason Ching, Gerald Mills
	<i>Issues, Summary, Path forward, Publish summary Paper?</i>	
1600	Moderators closing remarks	
1615	Workshop Ends Thanks and Safe Travels!	

*Remote