

OOKA LAB.

Energy and atmospheric environment control for future urban planning

Department of Human and Social Systems

<http://venus.iis.u-tokyo.ac.jp>

Urban Energy Engineering

Department of Architecture,
Faculty of Engineering

Prediction of Urban Atmospheric Environment

Predicting systems for urban thermal and atmospheric environment have been developed to create sustainable urban space, focusing on flow and dispersion field in multiple scales from human-ambient to urban/regional.

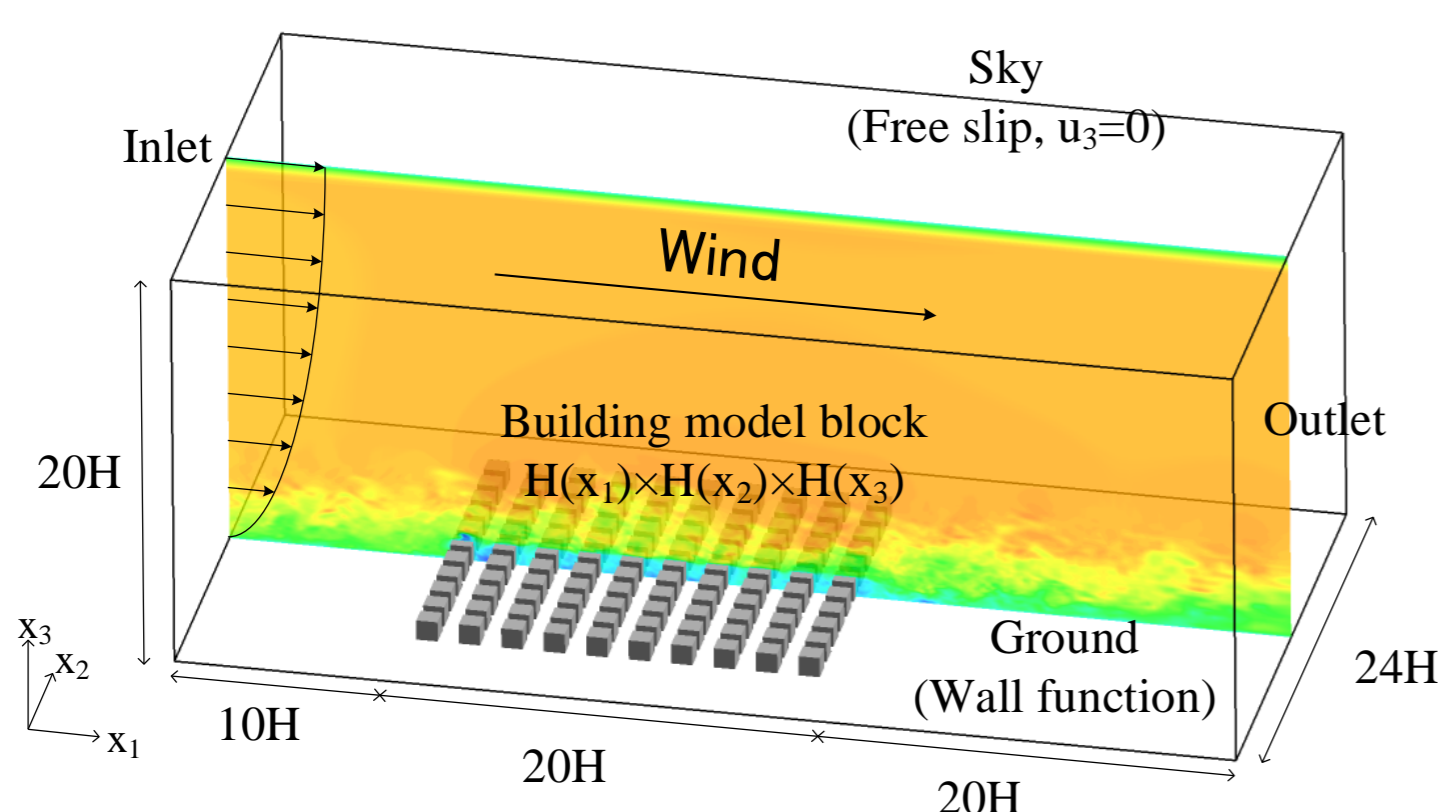


■ Wind velocity observation with a Doppler lidar

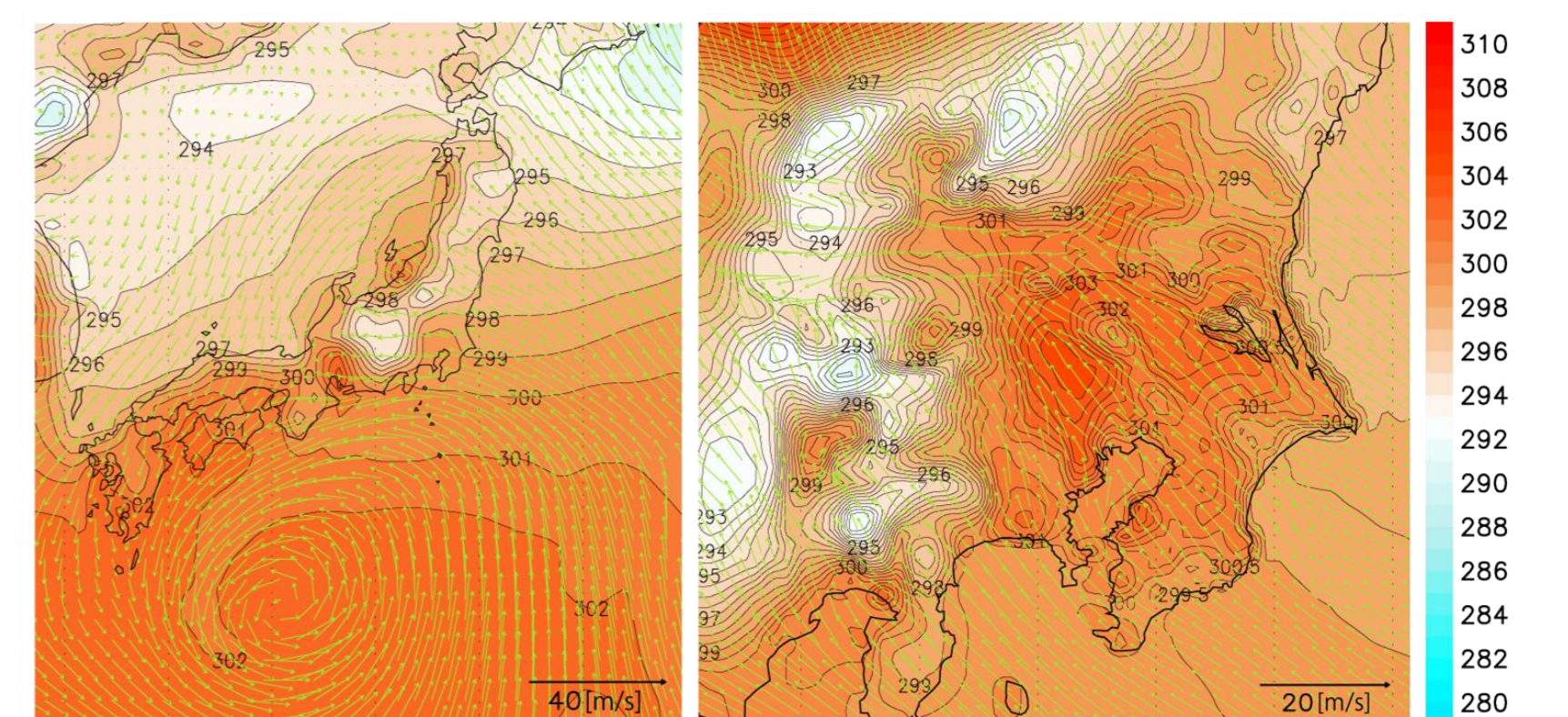
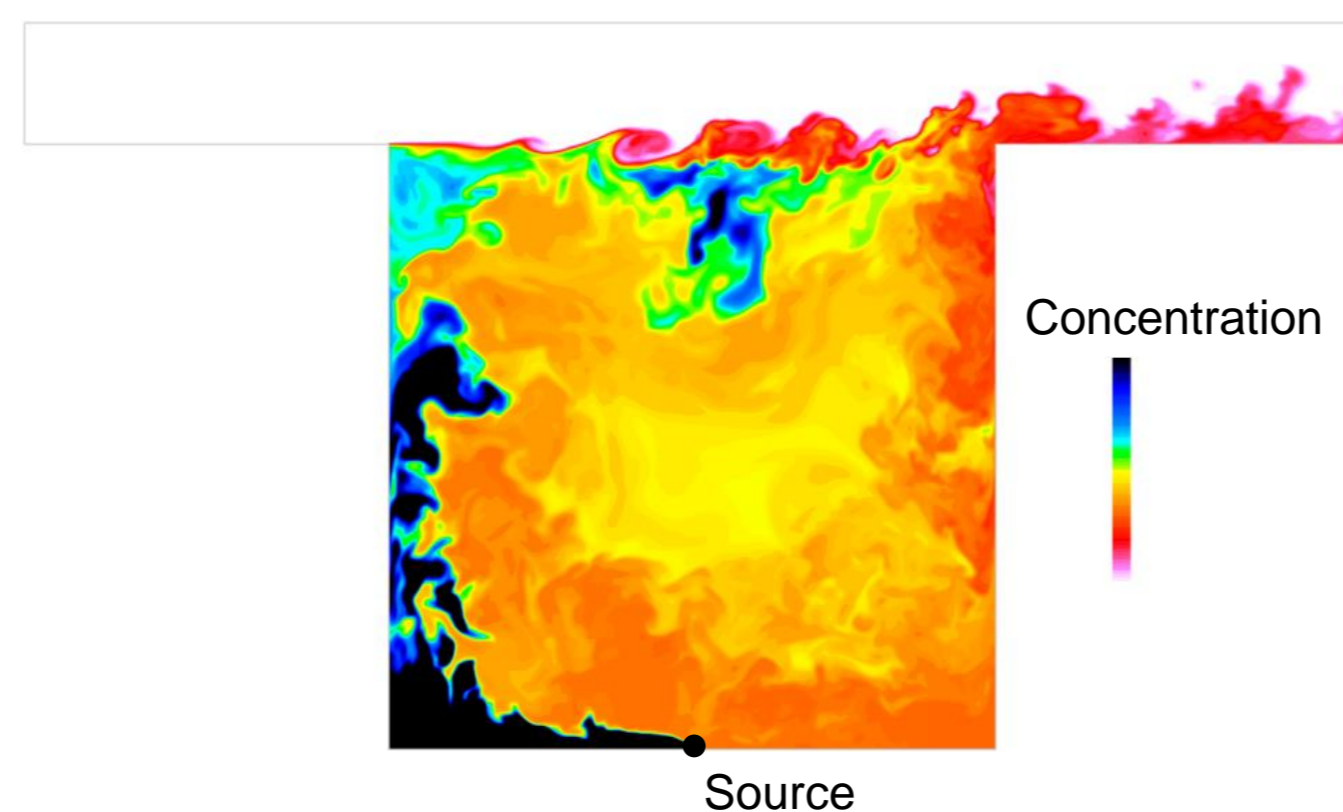
■ Estimation of heat fluxes using Scintillometer

■ High-resolution measurement of urban thermal environment with mobile measurement

■ PIV measurement of air flow around building



■ High-resolution analysis of urban air flow and pollutant dispersion using LES
(Left: Air flow within urban block model, Right: Pollutant dispersion within urban canyon)



■ Numerical estimation of local climate using WRF
(left: Typhoon No. 10, 2006; right: Heat island effect)

Systems for Realizing Zero Energy Building



■ 21KOMCEE at Komaba campus



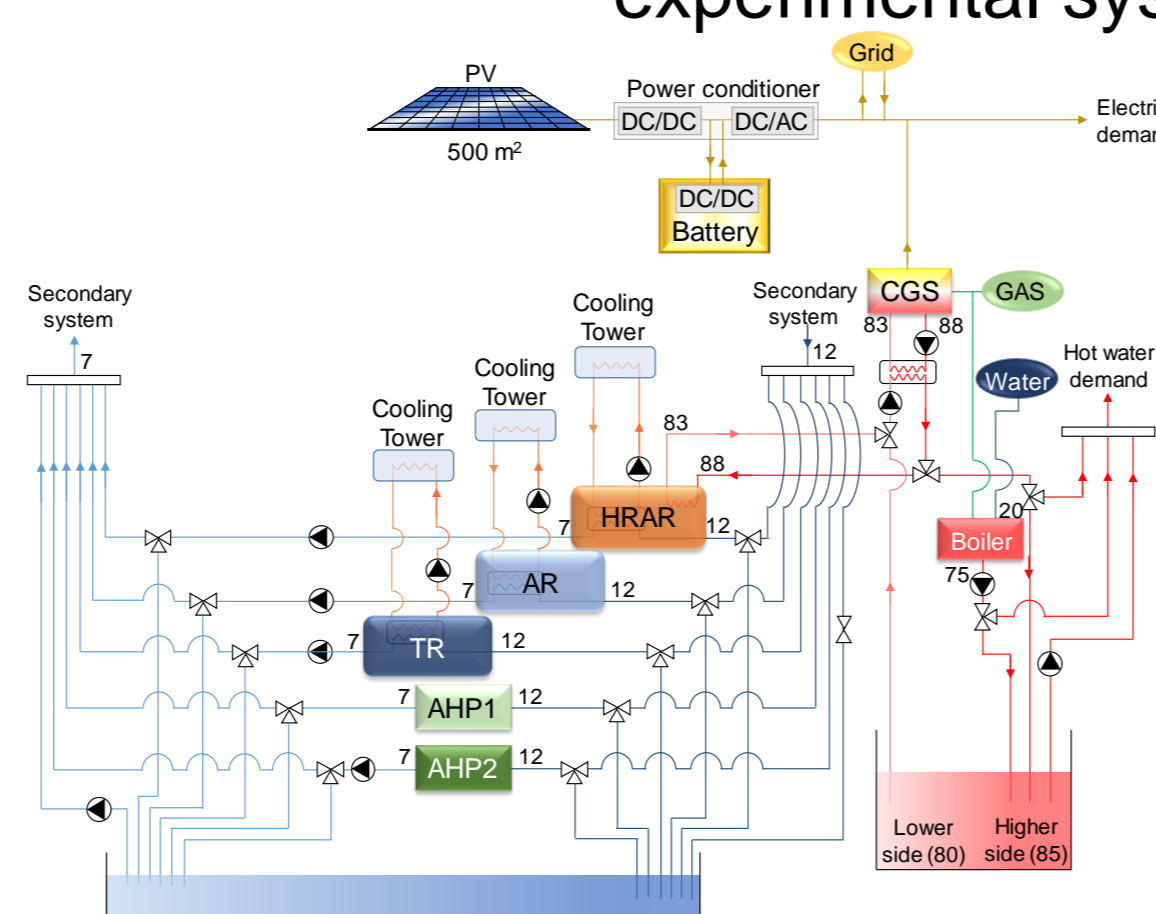
■ Thermal response test experimental system



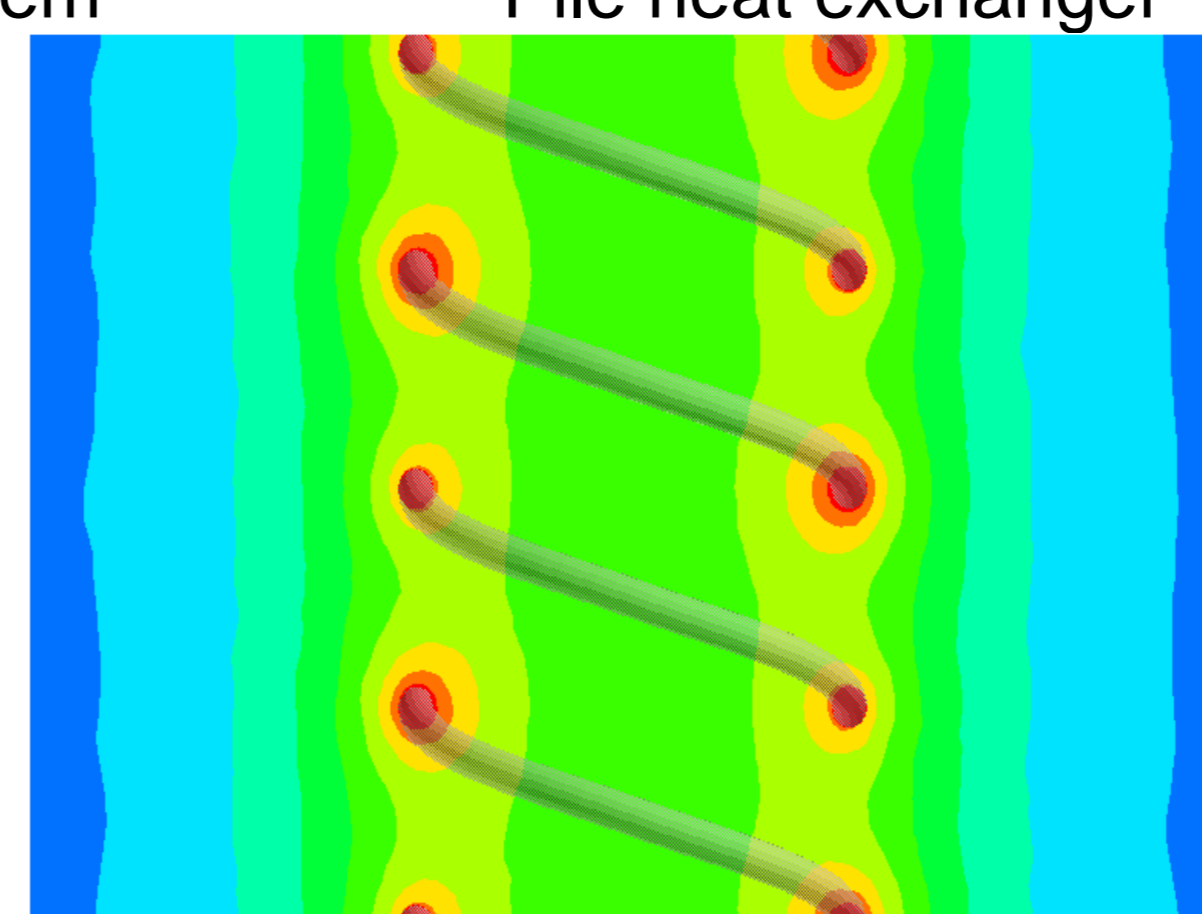
■ HVAC system using Pile heat exchanger



■ MMHP experimental system



■ Optimization of thermal and electrical grid



■ Thermal analysis of spiral ground heat exchanger

In order to realize Zero Energy Building (ZEB), improving the efficiency of heat source system is important and has been developed to reduce energy consumption. In detail, air conditioning system with renewable energy sources and optimizing operation of heat source system have mainly been studied.