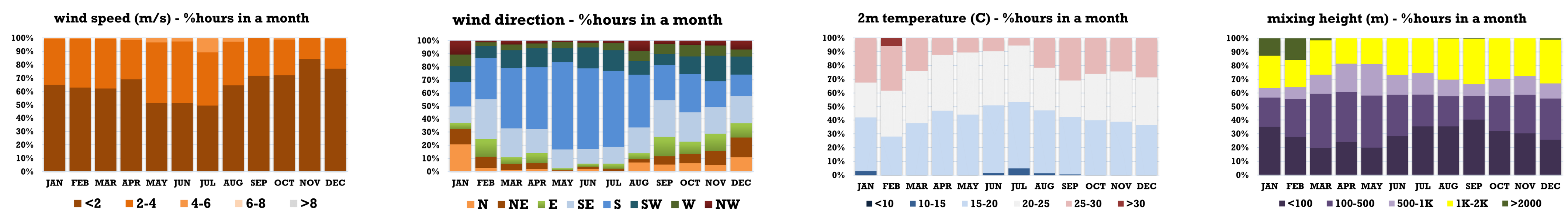
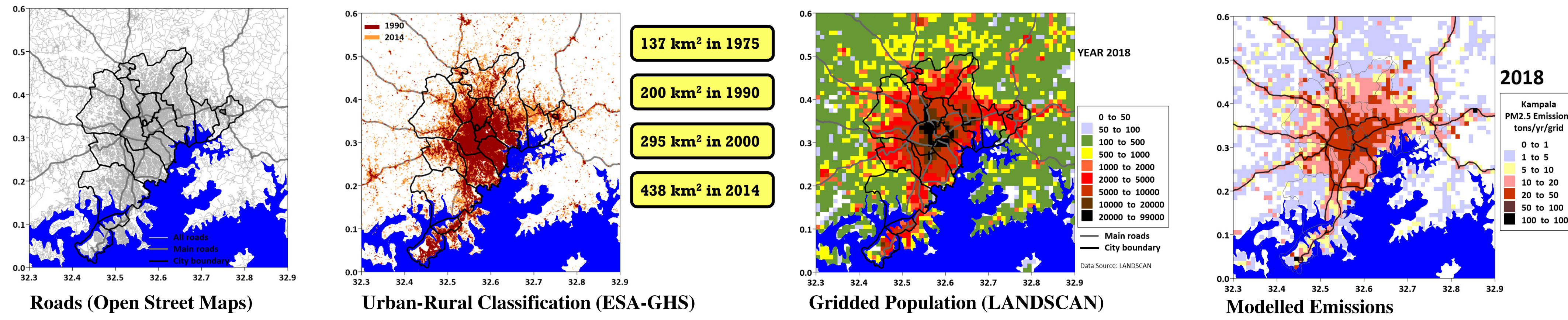


High Resolution (1-km) Emissions and Pollution Modelling to Evaluate Air Quality (PM_{2.5}) in Addis Ababa (Ethiopia) and Kampala (Uganda)

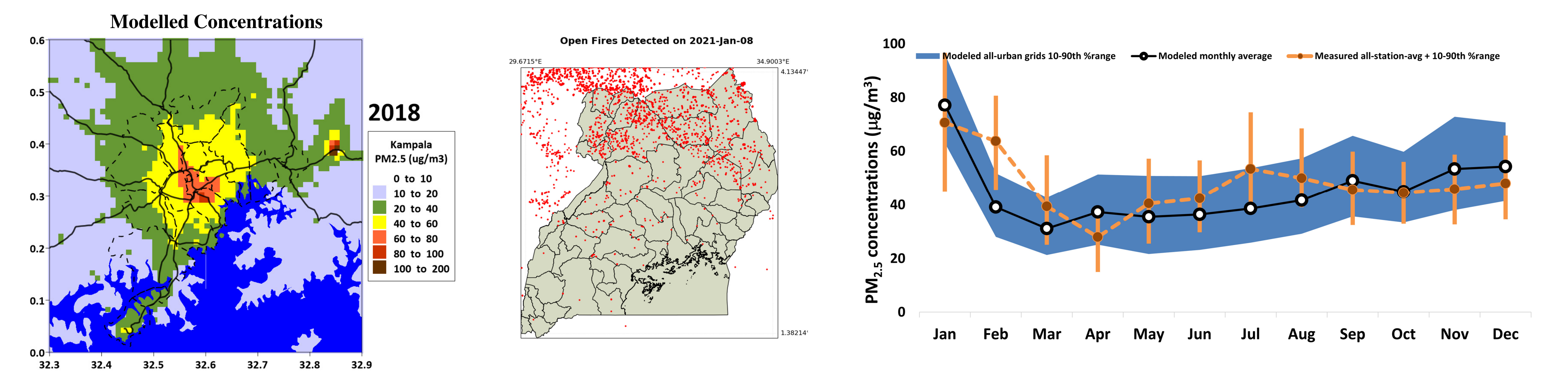
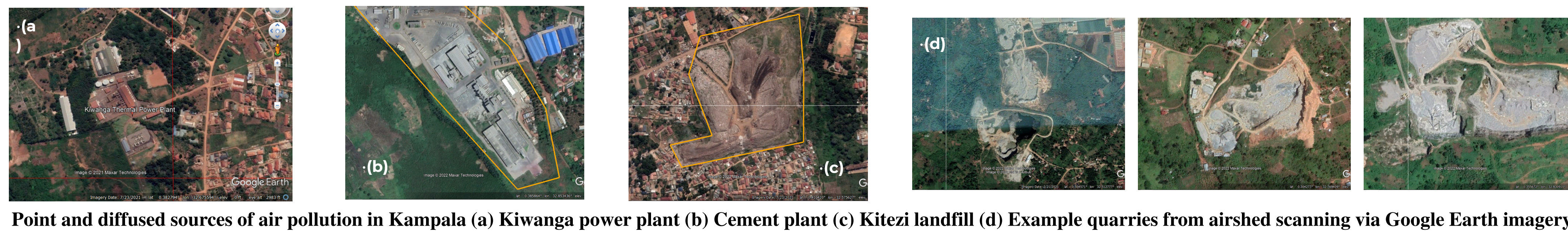


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 1. UrbanEmissions.Info, New Delhi, India and 2. The World Bank, Washington DC USA

Greater Kampala Airshed: 60 x 60 grids @ 0.01° resolution



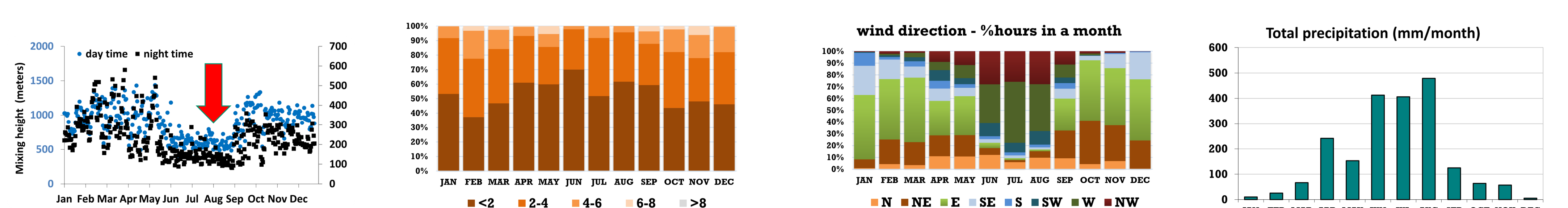
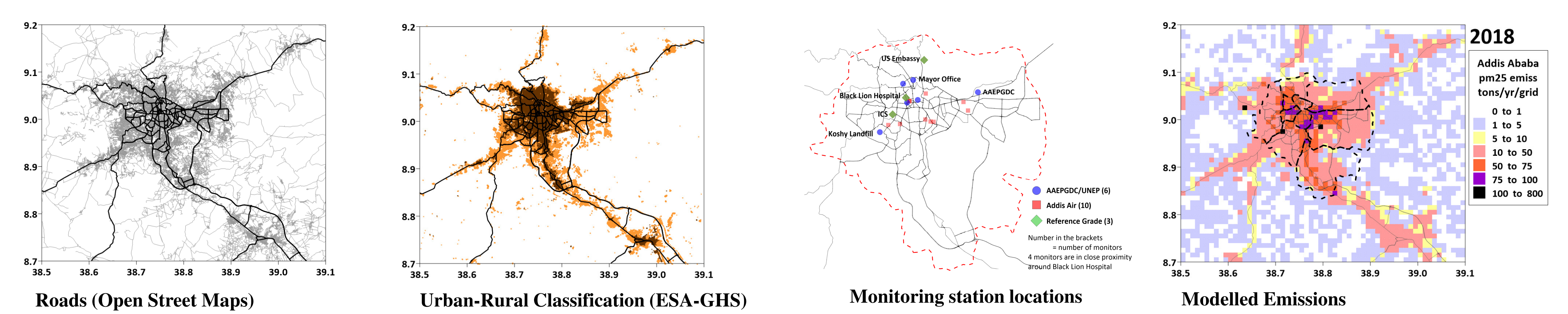
Meteorological data processed model grid resolution using NCEP reanalysis fields and WRF model



Study Highlights:

- Thanks to AirQo for providing the sensor monitoring data for the Greater Kampala region. Monitoring needs to currently met only via low-cost sensors with limited calibration. More reference grade monitors covering all the criteria pollutants is a must
- Study established 1-km resolution emissions inventory and conducted chemical transport modelling using WRF-CAMx system to establish source contributions. Inventory was established using open databases, census and national reports, and literature review.
- Model was able to replicate the measured trends qualitatively and quantitatively
- Vehicle exhaust, residential, resuspended dust, and industrial emissions dominate local contributions
- Jan-Feb highs from the boundary can be directly attributed to Northern fires and prevalent winds from that direction (secondary organic contribution from CAM-Chem was the highest along the Northern boundary)

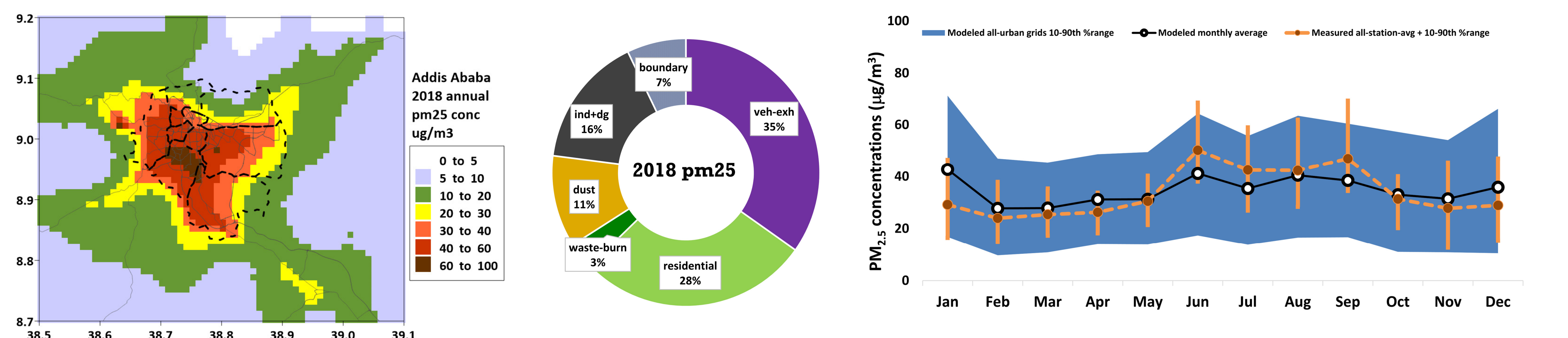
Greater Addis Ababa Airshed: 60 x 50 grids @ 0.01° resolution



Meteorological data processed model grid resolution using NCEP reanalysis fields and WRF model

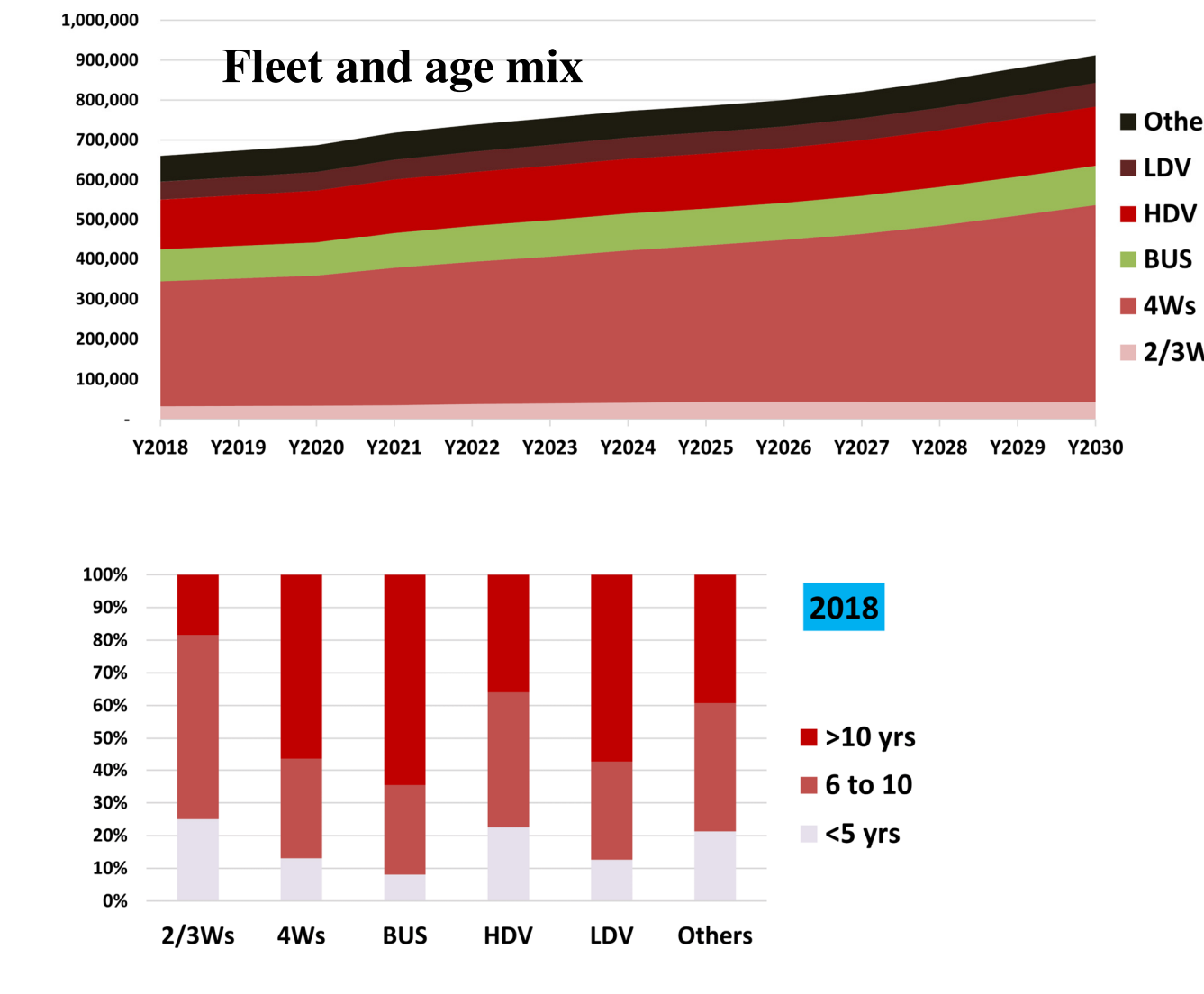


Point and diffused sources of air pollution in Addis Airshed from airshed scanning via Google Earth imagery



Study Highlights:

- Thanks to AddisAir for providing the sensor monitoring data for the Greater Addis Ababa region. While the reference-grade monitoring data sample is larger than Kampala, more monitors covering all the criteria pollutants is a must
- Study established 1-km resolution emissions inventory and conducted chemical transport modelling using WRF-CAMx system to establish source contributions. Inventory was established using open databases, census and national reports, and literature review. Model was able to replicate the measured trends qualitatively and quantitatively
- Most of the energy needs are met via biomass burning. Vehicle exhaust from aged-second-hand vehicles, residential cooking and heating, resuspended dust, and industrial emissions dominate local contributions.
- Boundary contributions is limited (under 10%) across all the months
- Peak in J-J-A concentrations against the precipitation patterns is attributed to sudden change in the wind patterns and drop in the surface temperature, coupled with lower mixing heights



Data resources and methodologies utilized for this analysis are documented @ <https://www.urbanemissions.info>, along with applications from India conducted under the Air pollution knowledge Assessments (APnA) city program

