



The ICOS Ecosystem Station of Real Bosco di Capodimonte

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Urban green areas (UGAs) are essential for improving environmental quality and human well-being in densely populated regions. Yet continuous, integrated observations of ecosystem–atmosphere exchanges in urban vegetation environments remain limited, often relying on short or fragmented datasets. To address this gap, we present the ICOS ecosystem station established within the Real Bosco di Capodimonte, a 125-hectare urban forest in Naples, Italy. The station functions as a comprehensive climatic–environmental observatory measuring carbon, water, and energy fluxes, alongside air pollutants relevant to both vegetation and public health. This research infrastructure provides a unique opportunity to improve understanding of how Mediterranean urban forests operate under combined biotic and abiotic stressors. The resulting dataset supports investigations into ecosystem services, urban microclimate regulation, pollution mitigation, and forest resilience, offering guidance for evidence-based urban planning and environmental policy. A preliminary analysis of monthly diurnal cycles of net ecosystem exchange (NEE) and latent heat flux (LE) highlights strong seasonal modulation of canopy–atmosphere exchanges. NEE transitions from weak winter fluxes—characterized by shallow daytime minima and uniform nighttime respiration—to pronounced summertime carbon uptake driven by higher radiation. Several research activities and collaboration are currently going on mainly with the Department of Environmental Resources Engineering of the SUNY University Syracuse (USA) and the Laboratory of Remote Sensing Science, Institute of Chinese Academy of Sciences of China to upscale the ecosystem service provided by the urban vegetation using modeling and satellite approach.