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COP31 TÜRKİYE ANTALYA

Personal $PM_{2.5}$ Exposure and Campus Decision Support

Portable low-cost sensors, exposure modelling and a public campus app

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12.7 µg/m³
mean $PM_{2.5}$, 1 May – 12 Oct 2026 (154 complete days)

16.5 → 9.4 µg/m³
dawn peak (06:00) vs late-afternoon low (18:00)

0.80
personal / rooftop ratio over 12 field sessions (provisional)

1 Why personal exposure, and how we measure it

People who share the same outdoor air can inhale very different amounts of $PM_{2.5}$.

Fixed stations describe the regional background, not the rooms, paths and hours where people spend their day. We measure where people are, model the dose they inhale, and return the results to the campus.

1 **MEASURE** Rooftop PurpleAir PA-II every 2 min (US EPA-corrected) + Atmotube PRO wearables

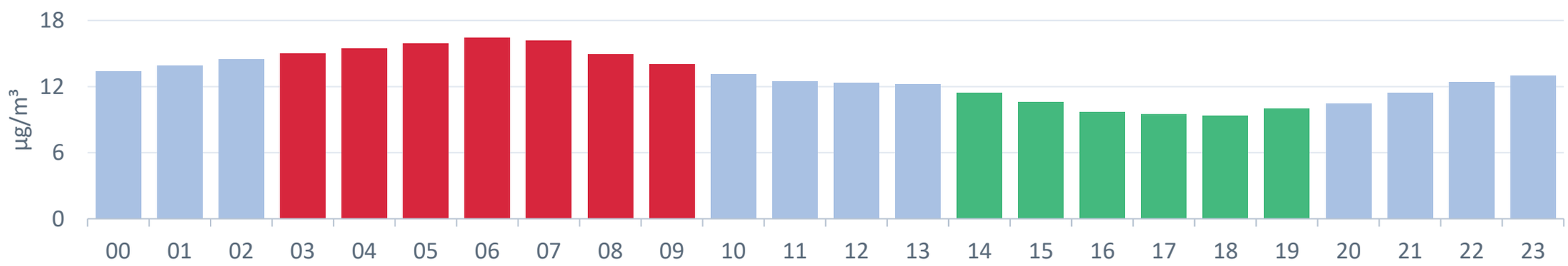
2 **MODEL** C = P(hour) × R(building) × F(indoor); D = C × IR × t; ML forecast in development

3 **DECIDE** Public app, personal exposure assistant, campus scenarios

2 When and where: measured findings

MEASURED

Hourly mean $PM_{2.5}$ by hour of day (local time) ■ 03–09 h: highest ■ 14–19 h: lowest



PurpleAir PA-II rooftop, US EPA-corrected (Barkjohn et al., 2021); 1 May – 12 Oct 2026; n = 3,751 h. 54.8% of the worst 5% of hours fall at 03:00–09:59.

42 of 154 days
daily mean above the WHO 24-hour guideline of 15 µg/m³

33.3–41.8 µg/m³
daily means during the 8–12 October 2026 episode

0.65
personal/rooftop ratio inside the Chem. & Env. Eng. building: about two-thirds of outdoor (provisional)

Limitations: one rooftop low-cost sensor analysed (indoor sensor added 20 Oct); field data from four spring days, 87.8% of points in one building; wearable/rooftop ratios provisional until co-location.

3 What changes the inhaled dose: modelled scenarios

MODELLED

−38%
$PM_{2.5}$ inhaled in a 1-hour walk at 16:00–19:00 instead of 06:00–09:00 (14.1 vs 22.9 µg)

36.5 vs 16.2
µg inhaled: 2 h in busy outdoor spots vs 8 h mostly indoors (illustrative; 2.3× in the app model, ≈1.2–1.5× with measured ratios)

Model C = P × R × F with U.S. EPA (2011) breathing rates; modelled doses, not measurements of a person.

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Next (planned): wearable co-location, seasonal campaigns, ML forecast

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