An overview of outdoor low-cost gas-phase air quality sensor deployments: current efforts, trends, and limitations

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Table S1: Quasi-Permanent Sensor Networks Reviewed and Selected Characteristics

Sensor Network	Organization Type	Affiliation	Location	Pollutants	Calibration Method(s)
BEACO2N	Research Institution or University	The University of California, Berkeley	USA, UK, Oceania	CO_2, CO, NO_2, O_3, PM	co-location with reference instrument
AirU	Company born out of university	TELLUS (born out of Univ. Utah NSF grant)	USA	CO, NO_2, PM	co-location with reference instrument, lab/chamber
Ribbit	Non-profit	Ribbit Network 501(c) non-profit	USA, UK, Europe	CO_2	co-location with reference instrument
MKE Fresh Air Collective	Non-profit	MKE Fresh Air Collective	USA	VOC, O_3, PM	defer to sensor manufacturer
Love my Air Denver	Government	Denver Department of Public Health & Environment	USA	PM, O_3, CO, NO, NO_2, H_2S, SO_2	co-location with reference instrument
Love my Air Wisconsin	Non-profit	Children's Health Alliance of Wisconsin	USA	PM	not reported
Clarity	Company	Clarity Movement Co.	global	NO_2, O_3, PM	co-location with reference instrument
PurpleAir	Company	PurpleAir, Inc.	global	PM, VOC	varies by end user
AirNow	Government	US Environmental Protection Agency	USA	O_3, PM	defer to sensor manufacturer
AirVisual Outdoor	Company	IQAir	global	PM, CO_2	not reported
RIVM Measuring Together	Government	Dutch National Institute for Public Health and the Environment	Netherlands	PM, NO_2, NH_3	co-location with reference instrument
SMARTCITIZEN	Company born out of university	Smart Citizen (born out of Institute for Advanced Architecture of Catalonia)	global	CO_2, VOC, PM	co-location with reference instrument

Table S2: Campaign Sensor Networks Reviewed and Selected Characteristics

Sensor Network	Organization Type	Location	Pollutants	Calibration Method(s)
Y-Pods	Research Institution or University	USA, Mongolia	CO2, CO, CH4, NO2, O3	co-location with reference instrument
INSTEP	Research Institution or University	USA	CO2, CO, CH4, HCHO, NO2, O3	co-location with reference instrument
MODULAIR	Company	global	CO, CO2, NO, NO2, O3, PM	co-location with reference instrument
Kunak Air	Company	Ethiopia, Germany, India, Belgium, Spain	SO2, NO, NO2, O3, CO, PM	co-location with reference instrument
Ellona WT1	Company	France, Canada, Estonia, italy	VOC, H2S, NH3, NO2, CO2, CH4, PM	varies by end user
SNAQ boxes	Research Institution or University	UK, Nigeria, China, Portugal	CO, NO, NO2, CO2, VOC, PM	co-location with reference instrument
AQMesh	Company	UK, Portugal, Nicaragua	NO, NO2, O3, CO	co-location with reference instrument
Envirowatch E-MOTEs	Research Institution or University	UK	CO, NO, NO2	co-location with reference instrument
MAS (mini air system)	Research Institution or University	China	CO, NO2, PM	co-location with reference instrument
Trafficsensnet project	Research Institution or University	Czech Republic	CO, NO2, SO2, VOC, PM	co-location with reference instrument
KOALA	Research Institution or University	Australia, China, Sri Lanka, Vietnam, Fiji	PM, CO	co-location with reference instrument
ekoNET	Company	Serbia	CO, CO2, NO, NO2, O3, PM	co-location with reference instrument
RAMP (Real-time Affordable Multi-Pollutant)	Research Institution or University	USA, Puerto Rico, Africa, Canada	CO, CO2, NO2, O3	co-location with reference instrument
RES-NOVAE	Government	Italy	CO, CO2, NO2, O3, SO2, PM	co-location with reference instrument
AirQino	Research Institution or University	Italy	CO, CO2, NO2	co-location with reference instrument
Village Green Project	Government	USA	PM, O3, NO2, VOC	co-location with reference instrument
CO in Nigeria	Research Institution or University	Nigeria	CO	not reported
Nairobi Sensors	Research Institution or University	Nairobi	PM, NO, NO2, SO2	defer to sensor manufacturer
ARISense	Research Institution or University, Company	Malawi, USA	CO, NO, NO2, O3, PM	co-location with reference instrument
SNUCO2M	Research Institution or University	South Korea	CO2	co-location with reference instrument
CarboSense	Research Institution or University	Switzerland	CO2	co-location with reference instrument
Israel CanarIT	Research Institution or University	Israel	O3, NO2, VOC, PM	co-location with reference instrument
VIEW (Volunteer Internet-based Environment Watch)	Research Institution or University	Pakistan	O3, CO, SO2	not reported
O3 in New Zealand	Research Institution or University	New Zealand, Canada	O3	co-location with reference instrument
CAPTOR Box	Research Institution or University	Spain, Italy, Austria	CO, CO2, O3, NO, NO2	co-location with reference instrument
Beijing Sensors	Research Institution or University	China	O3, CO, NO2, SO2	co-location with reference instrument
NO2 in Tokyo	Research Institution or University	Japan	NO2	lab calibration
Beijing Sensors (2)	Research Institution or University	China	O3, NO, NO2, CO2, PM	co-location with reference instrument
CO in Taiwan	Research Institution or University	Taiiwan	CO	co-location with reference instrument
MPAQS (MultiPollutant Air Quality Sensor)	Research Institution or University	India	SO2, NO2, O3, CO, PM	co-location with reference instrument
India IoT Sensors	Research Institution or University	India	CO, PM	not specified
SATVAM	Research Institution or University	India	O3, NO2	co-location with reference instrument
Prana Air	Company	India	CO, CO2, SO2, NO2, O3, H2S, PM	not reported
Oizum	Company	India, France	PM, CO, VOC, CO2	not reported, varies by end user
CO in Brazil	Research Institution or University	Brazil	CO	lab calibration
VOCs in Argentina	Research Institution or University	Argentina	VOC	not specified
Peru Sensors	Research Institution or University	Peru	CO, NO2, SO2, H2S, O3, PM, CO2, O2	co-location with reference instrument
Bettair	Company	Spain	CO, CO2, NO, NO2, O3, SO2, H2S, PM	co-location with reference instrument
Airly	Company	global	CO, NO2, O3, PM, SO2	lab calibration, co-location with reference instrument
NASUS	Government	Italy	NO2, CO, SO2, H2S	lab calibration, co-location with reference instrument
ECN Airbox	Research Institution or University	Portugal	NO2, PM, O3	co-location with reference instrument
PAS	Research Institution or University	China	NO, NO2, O3	co-location with reference instrument
CairBox	Company	France	H2S, CH3SH	co-location with reference instrument
Cuba Sensors	Research Institution or University	Cuba	NO2, SO2, O3, CO, PM	lab calibration, co-location with reference instrument
Nigeria Sensors	Research Institution or University	Nigeria	NO, NO2, CO, CO2, O3, PM	defer to sensor manufacturer
Morocco IoT Sensors	Research Institution or University	Morocco	CO2, NO2	not specified
Ecuador IoT Sensors	Research Institution or University	Ecuador	CO, CO2, PM	not specified
MGMS (Multi-gas monitoring stations)	Research Institution or University	Qatar	O3, NO2, H2S, CO, SO2, NO, PM	not specified