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Product Spotlight

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Air Quality Forecast

Hyperlocal visualization, modeling and actionable insights to empower city decision-makers

As urbanization grows and cities become more complex, managing air pollution has become a significant challenge. City agencies and other decision-makers need accurate, highly localized air quality data — but weather conditions, urban landscapes and other factors make measurements a moving target. Now there's a better way to see exact air quality conditions, determine pollution locations and movement, and provide timely information to all stakeholders.

Vaisala Air Quality Forecast, part of our Xweather family of subscription based products, empowers community leaders to improve air quality and protect citizens. This end-to-end solution combines modern dispersion modeling techniques, data fusion algorithms and statistical approaches. Coupled with the regional chemical transport model, local air monitoring network, and multiple meteorological data sources, the result is a comprehensive, exceptionally accurate picture of local air quality conditions — now and over the next three days. In addition, when paired with the Vaisala AQT530 compact air quality sensor, it delivers even more enhanced accuracy and localization.

High-resolution forecasting and map visualizations illustrate pollution hot spots and peak times to support air quality monitoring and management. The hourly air quality index (AQI) and the most critical air pollutants (NO_2, SO_2, O_3, CO, $PM_{2.5}$ and PM_{10}) are shown for any chosen location, in both graphical form and as a dynamic map. This is a powerful asset for issuing warnings of poor air quality episodes and hot spots to vulnerable groups, enhancing quality of life.

Steps to decrease air pollution and protect citizens don't have to be a guessing game, because the data provides insights on which emission mitigation measures work best. The solution also supports United Nations Sustainability Development Goals and the European Union Ambient Air Quality Directive.

Key benefits

Mitigate the harmful effects of air pollution

Decision-makers are empowered to take actions to decrease air pollution: Modeling dispersion of emissions from vehicles, factories and other urban activities visualizes their effects on the environment. Get insights on which emission mitigation actions work best, and improve long-term human health through smart city infrastructure planning such as future playgrounds, recreation areas and hospitals.

Gain immediate insight with hyperlocal visualization

High-resolution GIS data shows the local environment down to 15m resolution, including a detailed description of the urban landscape, street canyons, vegetation and ground elevation. Continuous calibration eliminates the need for emission inventories.

Take effective steps to protect the public

Use for traffic management, mitigating traffic-related emissions when needed. Modeling dispersion of emissions from factories and production facilities visualizes their effects on the environment. The forecast is a powerful tool for public communication including air pollution alerts for vulnerable groups.

Rely on comprehensive, accurate datasets

Get exceptional accuracy with thorough coverage: Features include modern data fusion of different datasets and information sources (geographical and topographical data, city infrastructure, emission source inventories, observation data) along with weather and dispersion modeling techniques, data fusion algorithms and statistical approaches.

Work with future-proof technology

Team up with the weather and environmental measurement experts. Our in-house team of scientists and a long-term development roadmap ensures new features, future reliability and continuous improvement. Vaisala solutions are grounded in 85+ years of expertise and backed by dependable 24/7 service around the globe.

Applications

- Distribute air quality information to different stakeholders
- Disseminate air quality information and issue alerts to the public
- Launch and improve air quality monitoring and management programs
- Integrate with intelligent traffic management / smart city solutions
- Determine which air quality reduction actions are the most effective
- Plan city infrastructure to maximize public health and well-being
- Increase local efforts to support sustainability development goals and the European Union Ambient Air Quality Directive

Key features

Uses an advanced numerical model based on 20 years of scientific research

Measures the top sources of air pollution: NO_2, SO_2, O_3, CO, $PM_{2.5}$ and PM_{10}

Leverages modern data fusion to combine multiple datasets and information sources (geographical and topographical data, city infrastructure, emission source catalogues, observation data)

Incorporates weather conditions, street canyons and topography when defining air quality conditions

Provides near real-time information on urban air quality with a resolution down to 15m for hourly concentrations of top pollutants

Integrates with either existing reference station data or local Vaisala observation technology

Why Vaisala?

With the right access to the right information, people become more aware, active and committed. They gain a deeper connection to their environment and new ways of thinking about business and community.

Vaisala is driven by passion, relentless curiosity and the desire to create a better world, as reflected by our guiding principles for urban weather and environment:

1. **Exceptional products grounded in science and innovation** — Vaisala's scientific leadership and innovation in inventing unrivaled weather and environment products have reflected the spirit of our company for 85 years.
2. **Insight every day** — The combined power of our weather and environmental solutions provide dependable intelligence people can confidently act on; enabling businesses and communities to make better decisions.
3. **Champions for smarter, safer, more sustainable urban communities** — Vaisala empowers businesses and community leaders; helping them to fulfill their operational missions for their cities.
4. **Inspired solutions rooted in the Finnish way** — Finland has boldly demonstrated that a culture of resilience and a connection to nature can create new ways of smarter, sustainable living.

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