National Aeronautics and Space Administration

Forecasting and Risk Communication

Air Pollution in Your City

Forecasted air pollution values for $PM_{2.5}$, NO_2, O_3, and SO_2 are available for your city up to 5 days in advance.

A health-based air quality index is also available to help with local risk communication.

These values can be specifically tailored to your city by sharing local air pollution and daily health data.

The Global Modeling and Assimilation Research Office (GMAO) at NASA can provide city-level estimates of outdoor air pollution for every city in the world, even for areas without existing air quality monitors. This information is publicly available and provided free of charge.

FORECASTING AIR POLLUTION IN YOUR CITY

Air pollution estimates are made using satellite data, information about global emissions, advanced weather forecasting, state-of-the art chemical modeling, and machine learning to tailor the results to individual cities. The most important aspect of this information is that it can provide predictions of air pollution values for the next five days. These forecasts can help residents in your city know beforehand when severe pollution episodes will occur; help individuals make plans regarding their outdoor activities; and provide information to improve local air quality management decisions.

COMMUNICATION OF HEALTH RISKS

In addition to providing estimates of outdoor concentrations of multiple air pollutants ($PM_{2.5}$, NO_2, O_3 and SO_2) a health-based air quality index has also been created that can easily communicate the combined risks of multiple air pollutants on a day-to-day basis. These easy-to-understand values are particularly useful for individuals that are sensitive to outdoor air pollution such as people with asthma and other respiratory diseases.

TAILORING THE DATA TO YOUR CITY

Air pollution and risk communication index values can be further tailored to the specific conditions in your city if you provide additional local data to the NASA and NYU project team. Sharing data is not required to access the forecasted pollution values and health-based air quality index. However, it can help improve the usefulness of the forecasts for your city. Three examples are provided on the next page to illustrate how sharing data helped to improve the specificity of air pollution and risk communication information for individual cities.

CONTACT

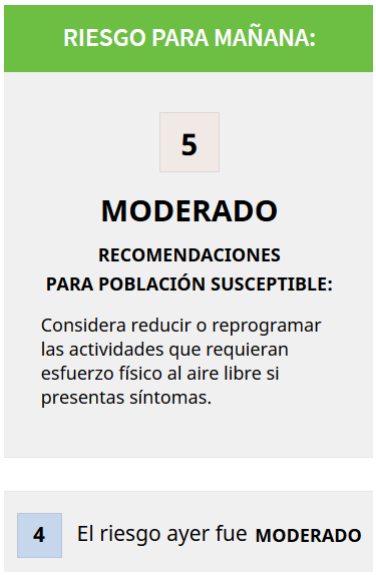
Please contact Bryan Duncan (bryan.n.duncan@nasa.gov) and Kevin Cromar (kevin.cromar@nyu.edu) to learn more about accessing forecasted air pollution and health-based air quality index values. They can also help you learn how this information can be specifically tailored to the local conditions in your city.

NYU Marron Institute of Urban Management

CASE STUDY #1:

Mexico City shares daily health data with project team to validate health-based air quality index values

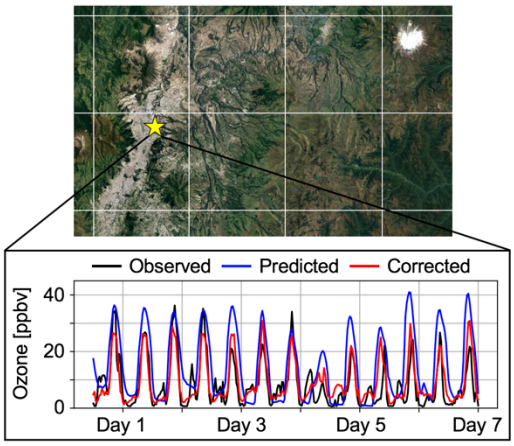
The city government of Mexico City provided project team members with daily health statistics for emergency department visits and hospital admissions in order to validate a health-based air quality index. As a result of sharing these data, the project team was able to confirm that the index values are associated with respiratory health risks in both children and adults and could be effectively used as a risk communication tool. The health-based air quality index is now available to the public and continuing efforts by the Mexico City ministries of health and environment are being made to promote the use of their new air quality index.



CASE STUDY #2:

Quito provides local air monitoring data to down-scale pollution estimates using machine learning

The city of Quito provided the project team with local air monitoring data from monitors within the city. Using these data, the project team was able to apply machine learning and artificial intelligence methods to down-scale the pollution estimates from city-level spatial resolution to neighborhood-level resolution. The figure shows the improved estimates at an air monitoring location in Quito.



CASE STUDY #3:

Rio shares emissions inventory data to improve local air quality forecasts

The city of Rio de Janeiro provided the project team with local emission inventory data from its transportation sector. Even though these data only represented a small percentage of the total pollution emissions in the city, the incorporation of these data into the model helped improve forecasted pollution levels. The Rio city government also shared local air quality monitoring data to help improve the forecasts (similar to the Quito example above).