Air Quality: Worldwide Analysis and Forecasting of Atmospheric Composition for Health (AQ-WATCH): High-resolution air quality multi-model forecast system for focus regions in Asia and the Americas

AQ-WATCH (Air Quality: Worldwide Analysis and Forecasting of Atmospheric Composition for Health) is an international consortium, which co-develops and co-produces tailored products and services derived from space and in situ observational data for improving air quality forecasts and attribution. For this purpose, AQ-WATCH develops a supply chain leading to the generation of seven innovative downstream products and services for providing air quality information. These prototypes are based on existing space and in situ observations of air quality and tailored to the identified needs of international users. The project allows for the first time small and medium enterprises (SMEs) to integrate a very large number of datasets associated with earth's observations with advanced predictive models. These innovative products and services are aimed at improving public health and optimizing service provided by the energy sector in different regions of the world. The consortium supporting the project includes knowledge institutes, applied science organizations and business-oriented partners, and covers the required expertise to define the optimal functionalities of the products and services, and bring them to the market. The project also creates opportunities for new environmental technologies and upscales the portfolio of SMEs and reinforce their ethical and social responsibility in support of the world-wide effort to improve air quality.

The Environmental Modeling Group of Max Planck Institute for Meteorology is responsible for setting up a high-resolution air quality multi-model forecast system for the focus regions in Asia and the Americas in the AQ-WATCH project. Air quality forecast models provided by the AQ-WATCH partners have been set up for the three focus regions, namely Colorado Northern Front Range in the USA, Beijing Urban Area and BTH (Beijing-Tianjin-Hebei) region in China, and the region around Santiago de Chile, based on the templates of Copernicus European and MarcoPolo-Panda Asian ensembles, but with much higher resolution and reliance on regional emission and observational information. The models are established over the focus regions using the best-available input meteorological and emission data taken from Copernicus repositories and other national archives and refined with local information wherever available. Each forecast model is then evaluated using local observational datasets and with the needs of the prime users.

In the multi-model forecast system, model outputs in each of the target regions will be coordinated and harmonised to provide an ensembled air quality forecast. Operational evaluation of the modelled results using local observational datasets provided by the corresponding local partners will also be performed in the forecast system. The Environmental Modeling Group of MPI-M will collect the modelled and observational data near real-time from the corresponding modelling teams and local monitoring networks. These data will then be structured, formatted and manipulated through post-processing tools to provide modelled and evaluated results that can blend in the AQ-WATCH User Interface Platform in an optimal way to effectively display the results of the forecast system