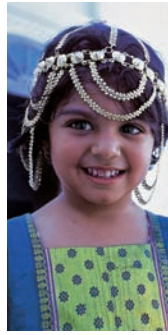


The Qatar Air Quality Modeling Project

A joint initiative between Qatar Petroleum and TOTAL to foster sustainable development in Qatar

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Qatar is experiencing an impressive economical growth, bringing prosperity and high living standards to its population, citizens and residents alike. This development has a very solid industrial basis, and the country is also becoming a reference in health care, financial services, science and education. In this context the protection of air quality is an essential challenge.

As a major industrial player, Qatar Petroleum is developing with TOTAL a state of the art air quality modeling platform. This platform will represent the current status of photochemical pollution in Qatar (Surface Ozone). Also it will assist in understanding the possible evolution of photochemical pollution in future years and will support the development of optimum pollution control policies.

A complex and evolving challenge

- Very rapid economical growth in Qatar
- Significant increase in ozone precursor emissions: Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs)
- Ozone standards frequently exceeded
- Complexity of ozone photochemical production
- Long range atmospheric transport of precursors and ozone



The need to fully understand how pollutant emissions impact air quality

- An advanced photochemical model is developed to assess the contribution of NOx and VOCs emission sources to ozone levels in Qatar
- This project comes in support for Qatar sustainable economic development: it will provide a tool to facilitate the development of major industrial projects while preserving air quality and human health.



A joint QP TOTAL initiative

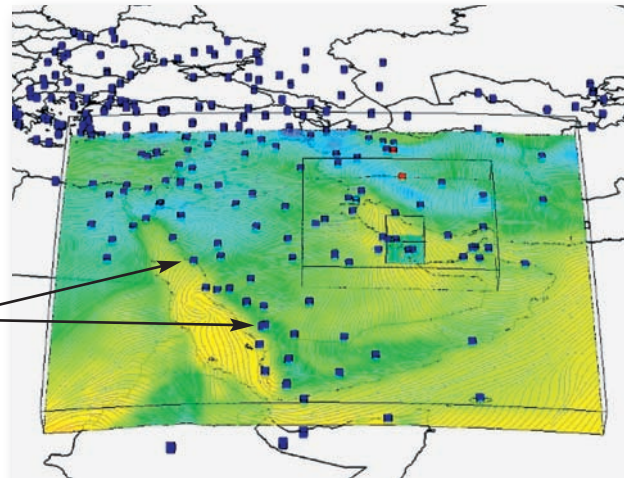
- The Qatar Air Quality Modeling project was officially approved in December 2005. At the end of phase one of the project the photochemical model has been installed, operated and validated.



Air Quality Modeling Platform

High resolution meteorological modeling

- Regional scale approach
- State of the art meteorological model (MM5)
- Three levels of nesting
- Down to 3 km resolution over Qatar
- Assimilation of surface and upper air meteorological data from international stations

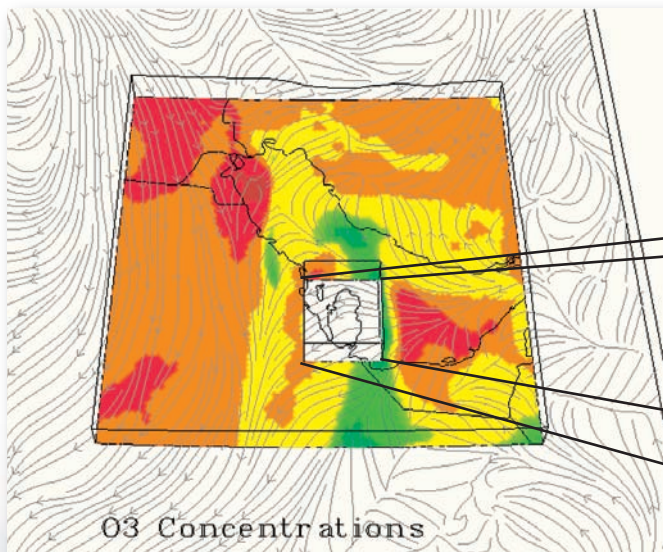
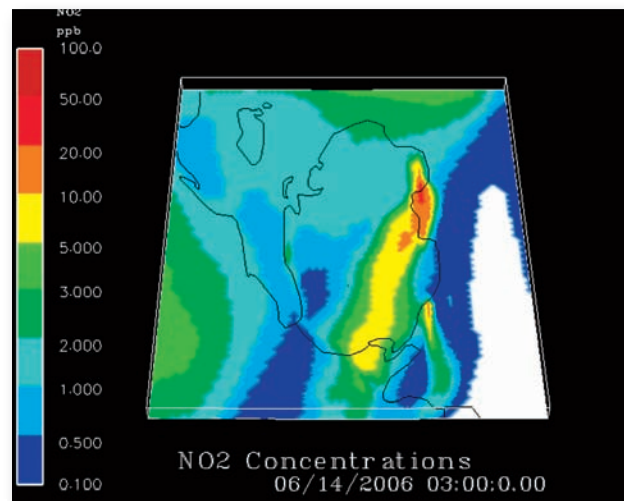


Complete emissions inventory

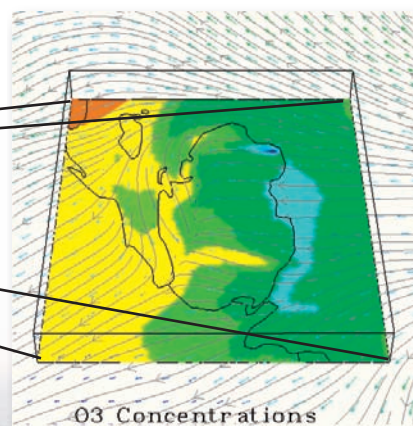
- International nomenclature of sources (SNAP)
- Point, line and area sources
- Industry, Traffic, Tertiary
- Detailed stack description
- VOC speciation
- Qatar scale and Gulf scale

Photochemical modeling

- State of the art photochemical model: CHIMERE
- Three levels of nesting
- Extended validation
- 3D results
- Detailed ozone (O₃) and nitrogen oxides (NO/NO₂) concentration maps



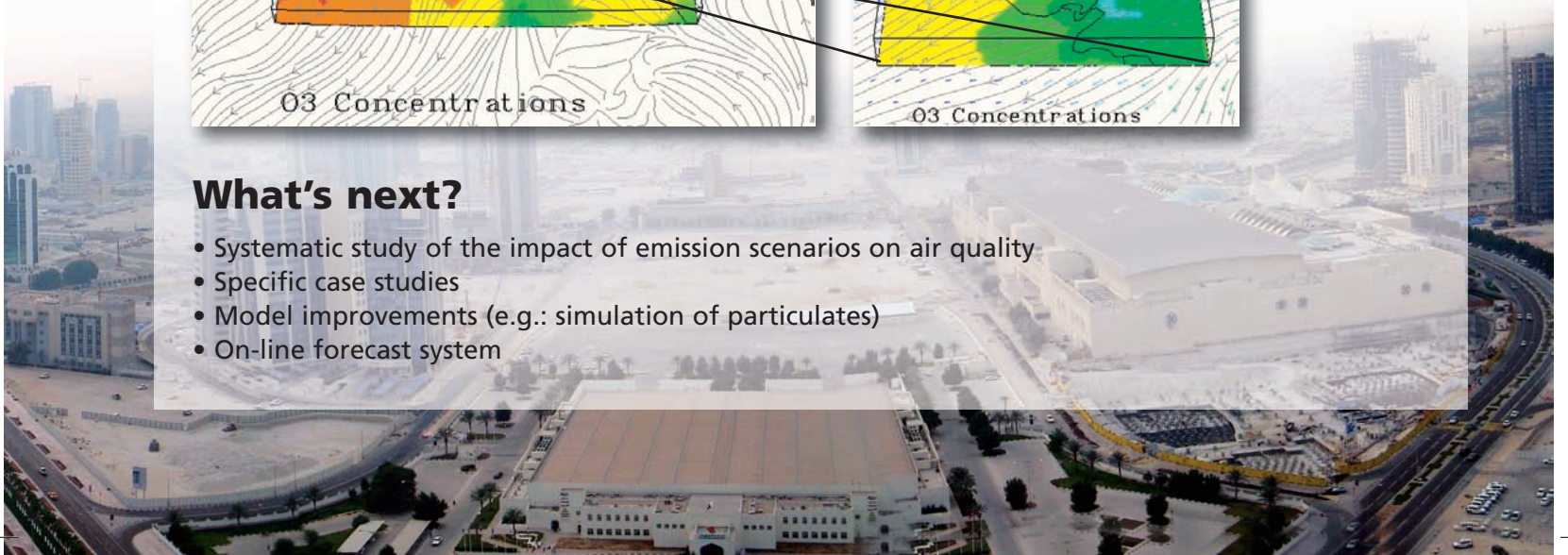
The boundary conditions of the Qatar scale model are set by the regional scale model.



All maps shown for illustration purposes, not to be considered as definitive results.

What's next?

- Systematic study of the impact of emission scenarios on air quality
- Specific case studies
- Model improvements (e.g.: simulation of particulates)
- On-line forecast system



The Qatar Air Quality Modeling Project

Proponents

**Qatar
Petroleum**



TOTAL



**ARIA
Technologies**



Contributors

QATARGAS

RASGAS

Laffan Environmental Association

QAFAC

Q-CHEM

QASCO

QAFCO

QAPCO

QVC

QP Refinery

QP-Marine Department

Urban Planning Department

Planning Council

Qatar Civil aviation authority / Meteorology department

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