P1.5 INTERNET OPERATIONAL AIR QUALITY FORECASTS OVER THE IBERIAN PENINSUAL

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1. INTRODUCTION

The MM5-CMAQ Modelling system (PSU/NCAR and EPA/Models-3) has been used to provide air quality forecasting information over the Iberian Peninsula in operational model through the INTERNET. The system is set up by building a HTML/CGI software language interface which allows the user to have access immediately to many features and characteristics of CMAQ modeling system. The system allow the user to access to surface and time series pollution data with an on-line GIS which allows the user to locate geographically the information which is interested on. The system has been running since December, 1, 2001 and a high degree of acceptance has been obtained from the user.

2. THE MM5-CMAQ MODELLING SYSTEM

In this contribution we show the implementation of the MM5 Mesoscale Meteorological Model (PSU/NCAR) (Chen F. and J. Dudhia (2001)) and the Community Multiscale Air Quality Model (CMAQ) (Byun, D.W., et al. (1998)) from EPA (USA) (third generation of air quality modelling systems) as a global-through-urban scale nested approach. The implementation of above modeling system is done over two computer and an INTERNET interface built in HTML/CGI.

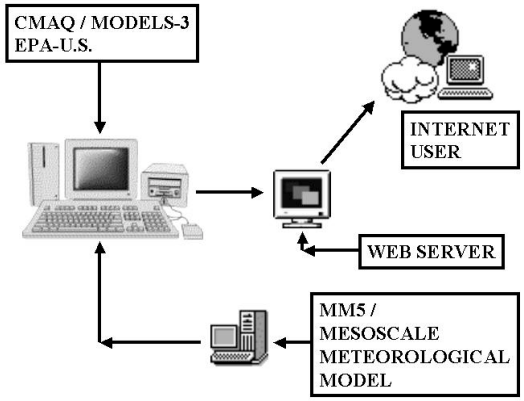

Figure 1.- MM5-CMAQ - WEB scheme.

The MM5 runs in this particular application over a LINUX-RED HAT 7.2 Pentium-II, 400 Mhz and the CMAQ modeling system runs over a COMPAQ-UNIX-XP1000 machine. The web Interface is installed at a AMD-1000 Mhz, LINUX-MANDRAKE 8.0 PC.

3. MODEL DOMAINS AND INPUT DATA SETS

The MM5 is built over a mother domain with 36 x 36 grid cells (81 km spatial resolution) and 23 vertical levels. This makes a domain of 2916 x 2916 km. The nesting MM5 level 1 model domain is built over a 69 x 66 grid cells (27 km spatial resolution) and 23 vertical levels, which makes a model domain of 1863 s 1782 km centered over the Iberian Peninsula. Figure 2 shows a scheme of both model domains. CMAQ model domains are 30 x 30 grid cells for mother domain and 63 x 60 over the nesting level 1 model domain. CMAQ mother domain lower left corner is located at (-1215000 m,-1215000 m) at the reference locations (-3.5W, 40N) and the first and second standard parallels (30N, 60N). The CMAQ nesting level 1 lower left corner is located at (-891000,-810000) with the same reference locations. Figure 2 shows an scheme of the spatial MM5 model domains (CMAQ model domains are not shown but are included into those shown here).

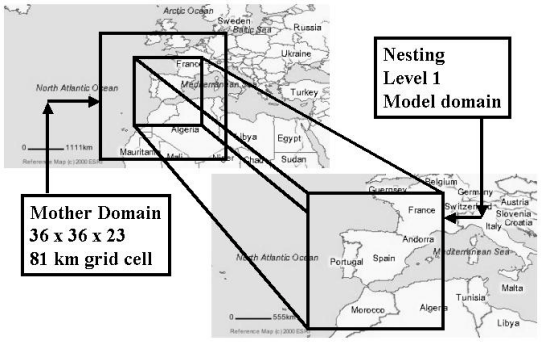

Figure 2.- MM5 model domains.

The system runs over the PC-II-400 and the COMPAQ-XP1000 (MM5 and CMAQ respectively) by using EMIMO model to provide the respective emission input data sets. EMIMO model (San José et

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al. 1998) is a TOP-DOWN emission model based on the information provided by GEIA, DCW, UK National Emission Inventory, EMEP and EDGAR global emission inventories. A multiple linear regression is used to calculate the different values for higher spatial resolutions. The temporal dissociation is made based on data provided by IER (Univ. Stuttgart) emission datasets.

The USGS landuse data is taken for providing landuse information to CMAQ modeling system. The MM5 model is initiated by using MRF (191 km) data which is automatically downloaded from the NCAR web site. MM5 mother and nesting level 1 (two way) model runs for 120 hours over the PC-LINUX-II-400Mhz in 7 CPU hours. The CMAQ modeling system runs over the COMPAQ-true64-UNIX in 23 CPU hours. With this configuration, the MM5-CMAQ generates an updating in the INTERNET every 48 hours allowing the user to have access alternatively to 3-2 forecasting days.

4. WEB INTERFACE

The so-defined system is developed to provide exhaustive information from the output of the CMAQ modeling system. In order to locate geographically the information the web interface is equipped with vector files (roads, railroads and political boundaries) obtained from the DCW (Digital Chart of the World) in E00 format. This information is visualized (together with the pollution concentration output from CMAQ) by using the GRADS visualization software. A set of scripts have been developed in order to generate a GIF image from the PS format generated by GRADS (PS to PPM and from PPM to GIF). Figure 3 shows an example of the CMAQ ozone concentrations over the Iberian Peninsula and a zooming domain (from the web interface).

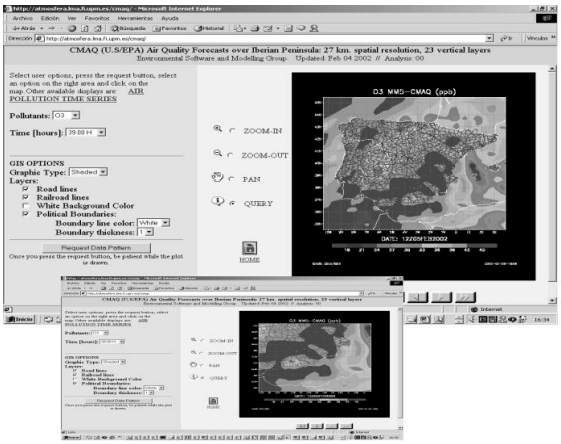

Figure 3.- CMAQ ozone concentrations, February, 5, 2002, 12GMT.

The web interface has also the capability to provide pollutant time series selected by the INTERNET user. At the actual stage of development the user can have access to O3, SO2, NO, NO2 and TOL. The user can select the time duration of the time series and the pollutant. Figure 4 shows an example of ozone concentration for the period 4-8, February, 2002 at (38N, -3,17E) geographical location. The geographical location can be selected by clicking over the map also.

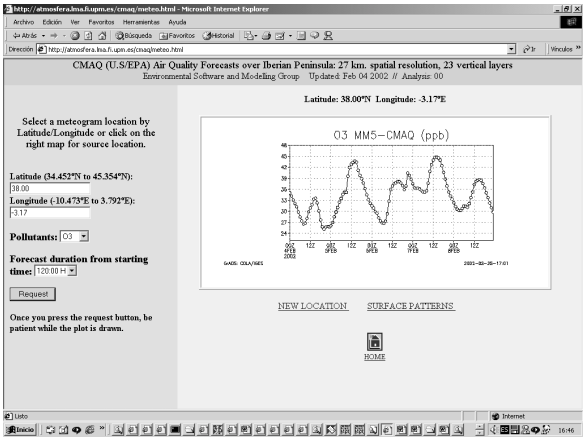

Figure 4.- Internet web interface showing the ozone time series for the Feb., 4-8, 2002 period at (38N,-3,17E) geographical location

The system has been tested for academic use since December, 1, 2001 and the results are excellent. It expected to allow full access in the near future.

4. REFERENCES

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