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APPLICATION OF THE WRF-CHEM MESOESCALA MODEL IN THE SIMULATION OF AIR QUALITY IN THE URBAN REGION OF LA PAZ

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INTRODUCTION

In the study of air quality, the most frequent atmospheric conditions are usually considered within a particular location, certain pollution events are usually related to meteorological phenomena that alter the climatology of the region; this is more evident when the extension of these pollution events presents the influence of geographical position and regional topography.

That is why meteorological conditions are a factor of interest at present, which led many of the development groups of the various numerical models, representing the atmospheric dynamics, to have taken the decision to include the influence of the conditions of the meteorological time on atmospheric chemistry as well as the inverse relationship between atmospheric chemistry on atmospheric dynamics.

The numerical models of prediction of atmospheric dynamics employ advanced discretization and integration techniques for the numerical solution of the differential equations system proposed, in addition to the implementation of scale reduction techniques that allow an improvement in spatial resolution without this meaning a increase in the requirements in the calculation.

The different air quality studies carried out in the city of La Paz, the emission sources, the study of chemical kinetics of pollutants and tropospheric ozone in high altitude conditions, the quantification of anthropogenic emissions and the monitoring of pollutants of interest , are the bases for the advancement in these technologies for the forecasting and evaluation of air pollution conditions.

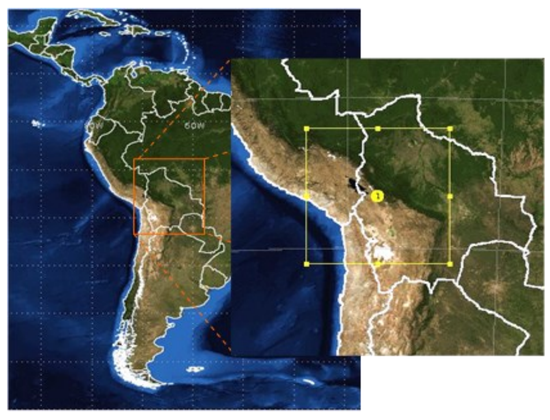
METHODOLOGY

IMPLEMENTACION DEL MODELO WRF
- Instalación y compilacion del codigo fuente del sistema ARW - WRF.
- Obtencion de los datos meteorologicos globales requeridos para iniciar las simulaciones.

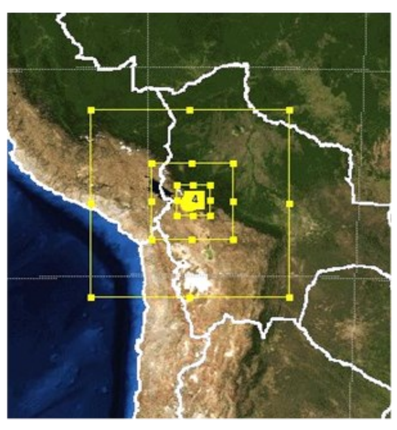
CALIBRACION DEL MODELO WRF
- Simulacion de eventos pasados en periodos de corto plazo.
- Comparacion de los resultados de simulacion contra los datos de observacion historicos.

VALIDACION DEL MODELO WRF
- Simulacion de eventos futuros en periodos de corto plazo.
- Comparacion de los resultados de la simulacion con datos de observacion presentes. (calibracion del modelo)

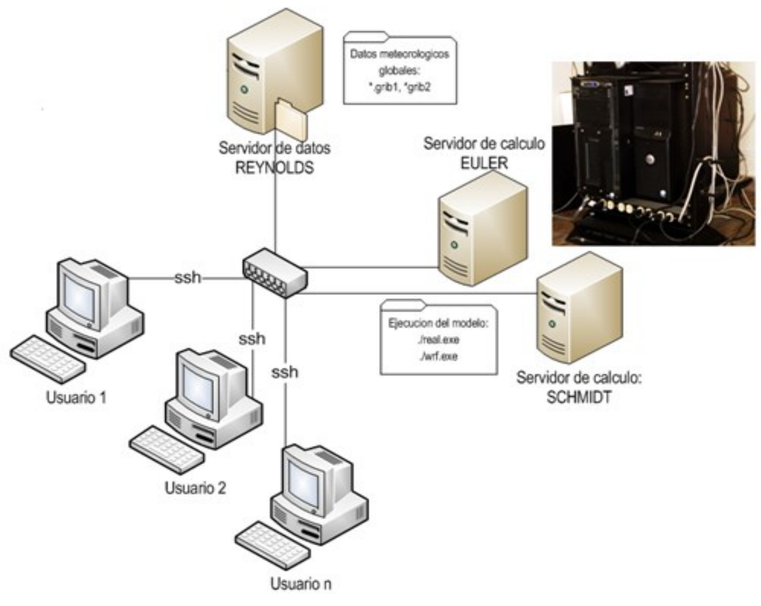
APLICACION A LA CALIDAD DEL AIRE
- Modo de operacion del modelo acoplado WRF - Chem



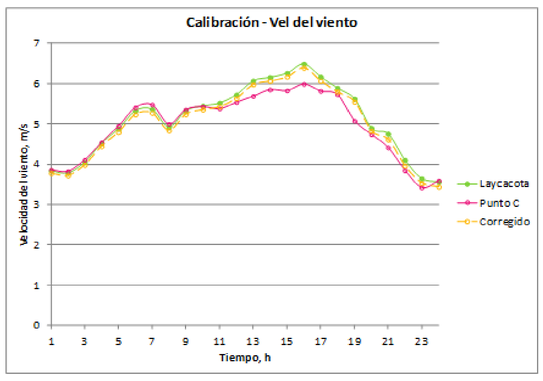
Selección del dominio de modelización.

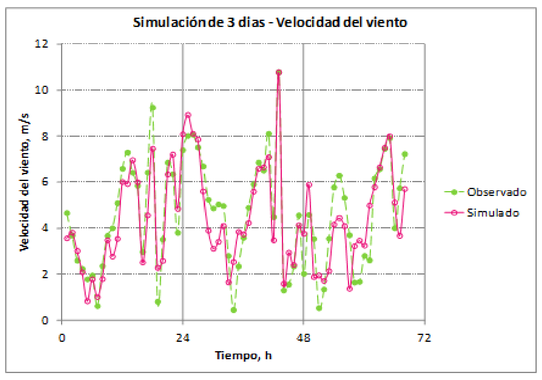


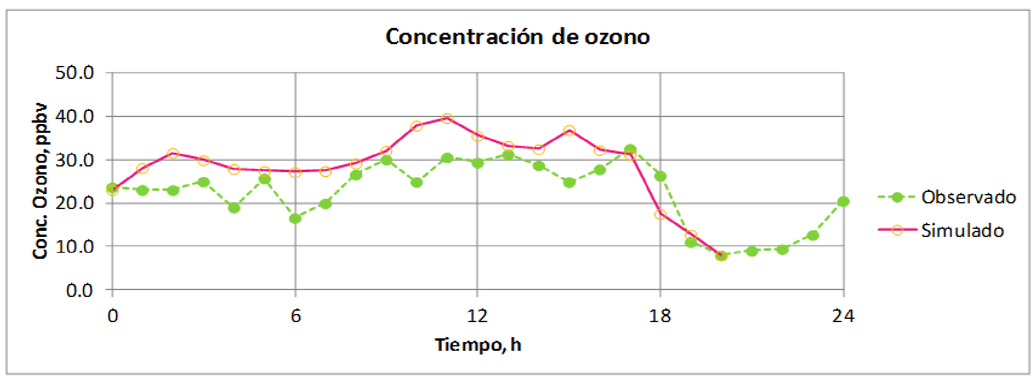
Generación del dominio padre y los dominios anidados centrados en la ciudad de La Paz, con resoluciones espaciales de 10m, 5m, 2m y 30s de grado.

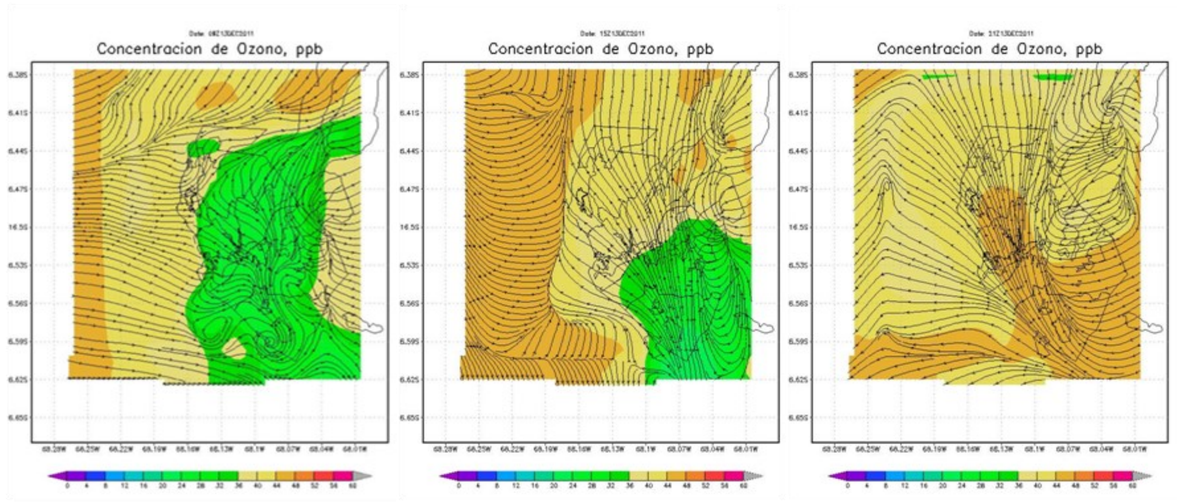


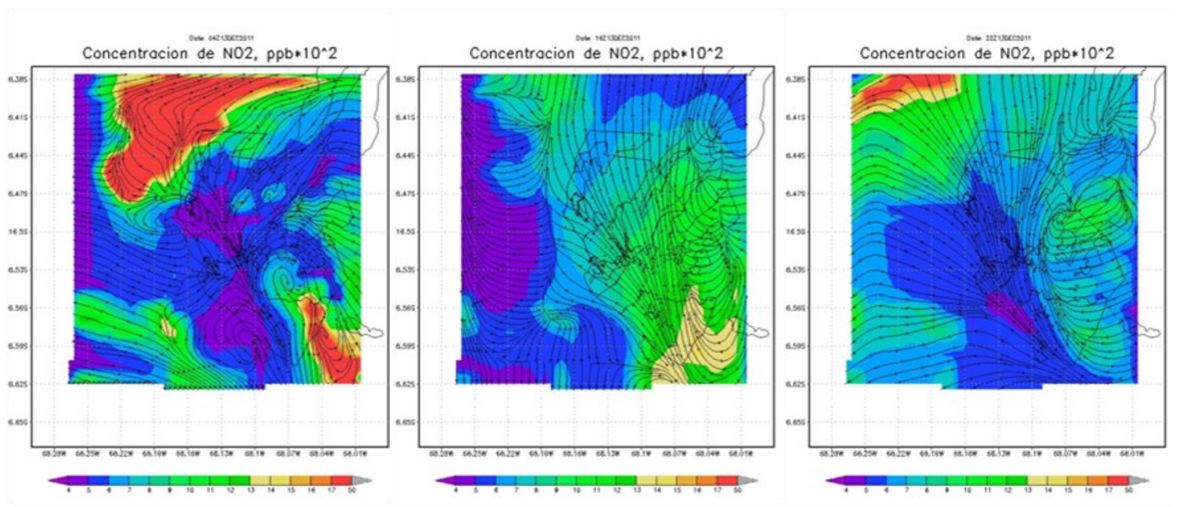
RESULTS











CONCLUSIONS

The CMSN has achieved the successful implementation of a High Performance Calculation (HPC) system in addition to the implementation of the WRF model for the study of meteorology and WRF-Chem for the analysis of air quality. The activities developed for the implementation serve as the basis for the implementation of other similar tools. With regard to the results of the meteorological variables, it can be highlighted that the model represents the diurnal cycle of the wind intensity and the environmental temperature for the period of 3 days.

In the simulations carried out with WRF / Chem, these same operating conditions are taken into consideration. For the study carried out, the RADM2 mechanism was used to solve the atmospheric chemistry involved, however other available mechanisms are equally valid if the information is available. necessary or if appropriate parameterization is possible.

BIBLIOGRAFY

Mesoscale & Microscale Meteorology Division; National Center for Atmopheric Research. Enero 2011. Weather Research & Forecasting, ARW Modeling System User's Guide. Enero 2011.

NCAR. National Center for Atmopspheric Research. *NCAR.* [En línea] http://www.mmm.ucar.edu/wrf/users/download.html.

Peckham, Steven E., y otros. 2006. *WRF/Chem v2.2 User's Guide.* 2006.

Peckham, Steven E., y otros. 2009. *WRF/Chem version 3.1. User's Guide.* 2009.