



UNIVERSITY OF MALTA

THE USE OF THE REGIONAL CLIMATE MODEL PRECIS OVER THE CENTRAL MEDITERRANEAN AREA

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1. INTRODUCTION

- Malta signed the UNFCCC in 1994 as non-Annex I country and ratified the Kyoto Protocol in 2001
- As non-Annex I country, Malta is required by UNFCCC (Articles 12) to submit national communications at regular intervals
- Department of Physics entrusted with preparing First National Communication (submitted June 2004)
- Project financed by GEF through UNDP
- Phase II: Technology Needs Assessment - Mitigation & Adaptation, CC Programme
- Second National Communication project started June 2007; Projected completion January 2009
- A collaborative project between the Government of Malta, Malta Environment and Planning Authority and the Department of Physics, University of Malta

2. MAIN TASKS

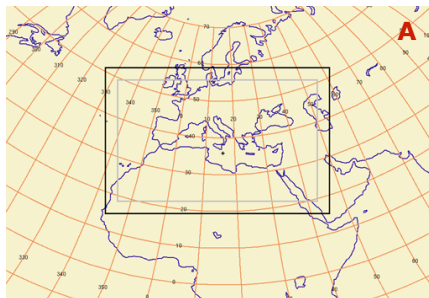
- Updating of the GHG emissions inventory (2004-2006)
- Re-analysis of potential measures to abate GHG emissions, including projections of emissions to 2025
- Re-assessment of potential impacts of climate change on vulnerable areas and proposal of adaptation measures

3. REGIONAL CLIMATE MODELLING

- Design and implementation of adaptation measures relies on impact studies
- Assessment of impacts requires climate analysis and prediction
- This is the principal motivator for climate modelling, especially on the regional scale
- Department of Physics has obtained support to embark on RCM research and seeks collaboration with other groups interested in performing climate experiments focusing on the Mediterranean basin

4. PRECIS MODEL

- PRECIS** – Providing REgional CLimates for Impacts Studies was developed at the Hadley Centre at the UK Met Office
- This regional climate model (RCM) downscales dynamically the large scale projections of a GCM and resolves features at typical horizontal scales of 50 and 25 km
- This approach is suitable for complex mountain topographies and coastlines and allows better representation of small islands and peninsulae



6. PLANNED INITIAL EXPERIMENTS

PAST CLIMATE

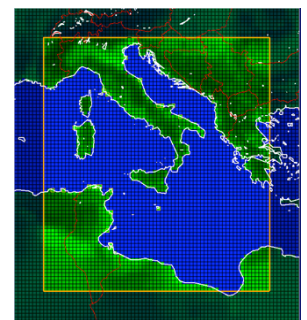
- PRECIS model will be first run over Domain A, driven by the:
 - HadAM3P GCM (1960-1990) for a baseline simulation
 - ERA40 Reanalysis Data (1957-2001)
 - NCEP-R2 Data (1979-2006)

FUTURE CLIMATE

- PRECIS model will be first run over Domain A, driven by the:
 - HadAM3P:A2 (2070-2100)
 - HadAM3P:B2 (2070-2100)
 - HadCM3Q0:A1B (1949-2099)
 - ECHAM4:SRES A2 (1960-2100)
 - ECHAM4:SRES B2 (1960-2100)

- A. Domain Name : Mediterranean Basin
 Domain Location : (Lon5,Lat46 – Lon25,Lat45)
 (Lon6,Lat31 – Lon22,Lat30)
 Spatial Resolution : 50 km x 50 km grid cells
- B. Domain Name : Central Mediterranean Area
 Domain Location : (Lon332,Lat49 – Lon56,Lat50)
 (Lon348,Lat18 – Lon42,Lat19)
 Spatial Resolution : 25 km x 25 km grid cells

In the higher resolution domain the coastal regions/small islands can be checked and the land mask adjusted accordingly



7. FUTURE WORK

- Run PRECIS model using ensembles of boundary conditions for:
 - A Baseline scenario (1960-1991)
 - An SRES A2 scenario (2070-2101)
- Validate PRECIS model over the Mediterranean basin using the data from the initial experiments
- Run the PRECIS model over Domain B, the Central Mediterranean Area at a spatial resolution of 25 km
 - Scientific contribution of the experiments with the PRECIS model:
 - To discuss with possible partners further multi-model ensemble work
 - Evaluate the annual mean changes of evaporation, precipitation, water deficit and gain of heat flux in future climate scenarios
 - Investigate the sensitivity of the Mediterranean Thermohaline Circulation (MTHC) to global warming at 25 km resolution
 - Use high resolution simulations to study intense wind events
 - Study the influence of the Mediterranean SST on climate variability in the North African region