Atmospheric modelling at the University of Lisbon
CGUL - Centro de Geofísica

Pedro Miranda, atmospheric modelling
- Miguel Teixeira, post-doc, turbulence (analytical)
- Antonia Valente, post-dic, orographic processes (NH3D)
- Rui Salgado, PhD student, surface processes (MesoNH)
- Pedro Soares, PhD student, PBL clouds (MesoNH)
- João Ferreira, PhD student, upwelling (MM5+HYCOM)> started 2002

Carlos Pires, data assimilation
Carlos Camara, remote sensing
Isabel Trigo, remote sensing
Ricardo Trigo, statistical climatology

Logistics: 16 node cluster (Pentium IV 2GHz, 512Mb, 1 Gigabit); MPI, PBS

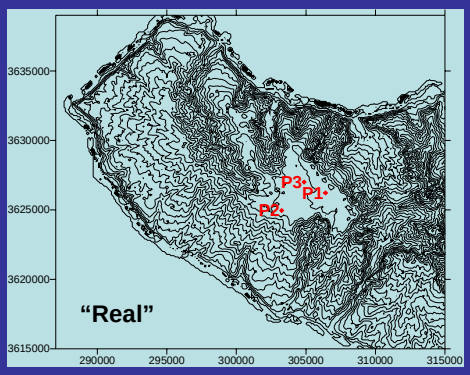
Modelling projects at CGUL

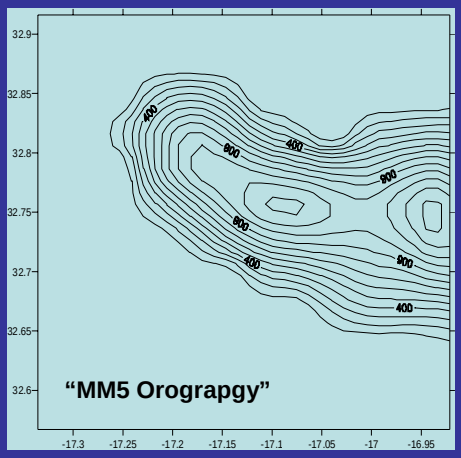
Based on MM5 (still at a preliminary stage)
- Study of the variability of upwelling near SW Iberia
  - Implementation of MM5 (done)
  - Implementation of the ocean model HYCOM (done)
  - Design of a coupling scheme (ongoing)
  - Long runs of both coupled and uncoupled models (results)
- Low-level wind prediction for eolic energy
  - Case study in Madeira (results)

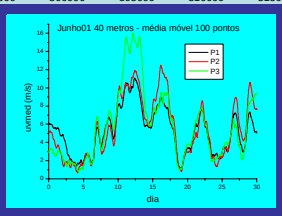
Project submitted (MM5)
- Weather prediction at the Açores: with the Institute of Meteorology

With other models
- Gravity wave drag parameterisation (NH3D), Low level wind
- Cloud parameterization (MesoNH)

Wind energy in Madeira Is

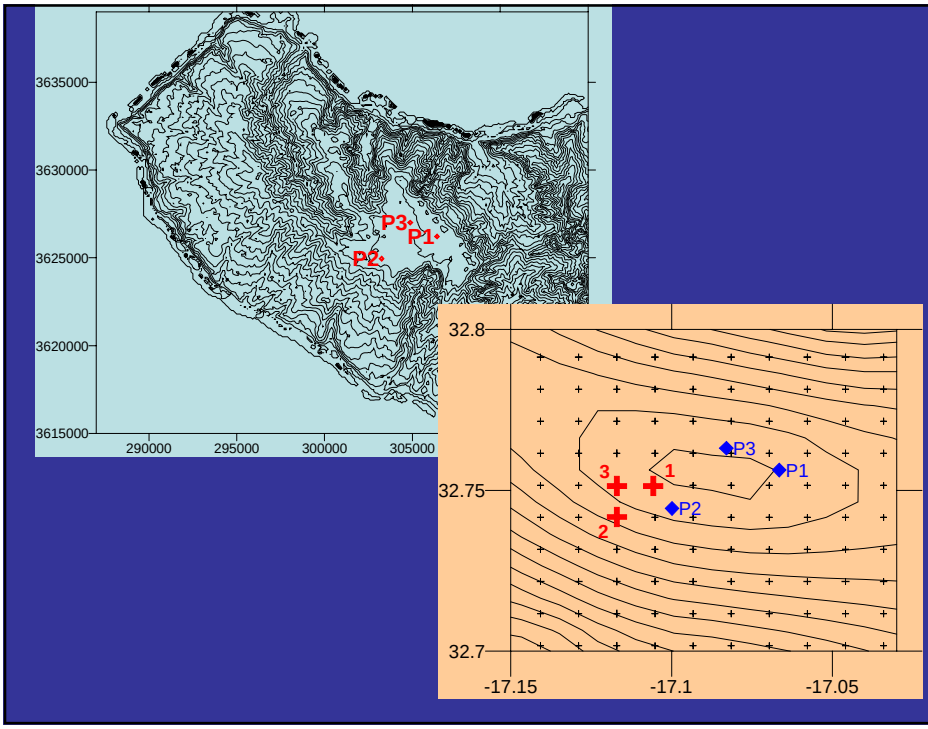




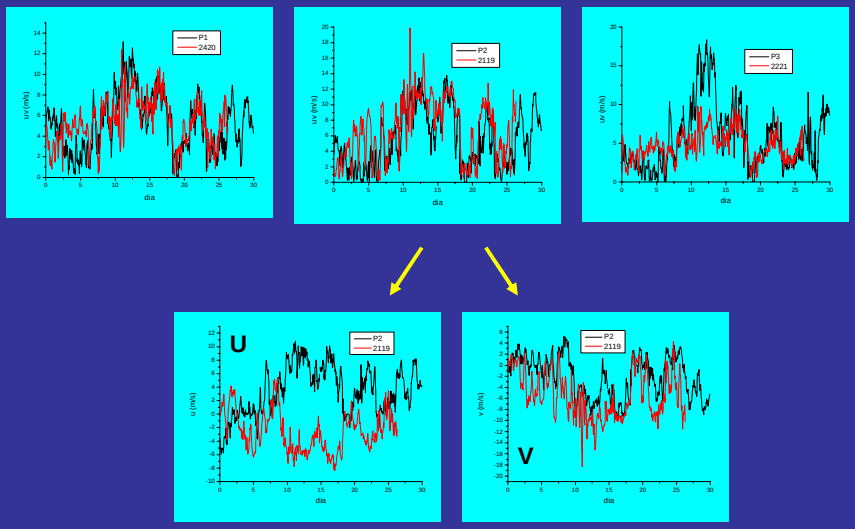


1 year obs
June 2001

Slow large-scale oscillation (predictable?)
What scales are important?
Effects: stratification, heat flux, rugosity?

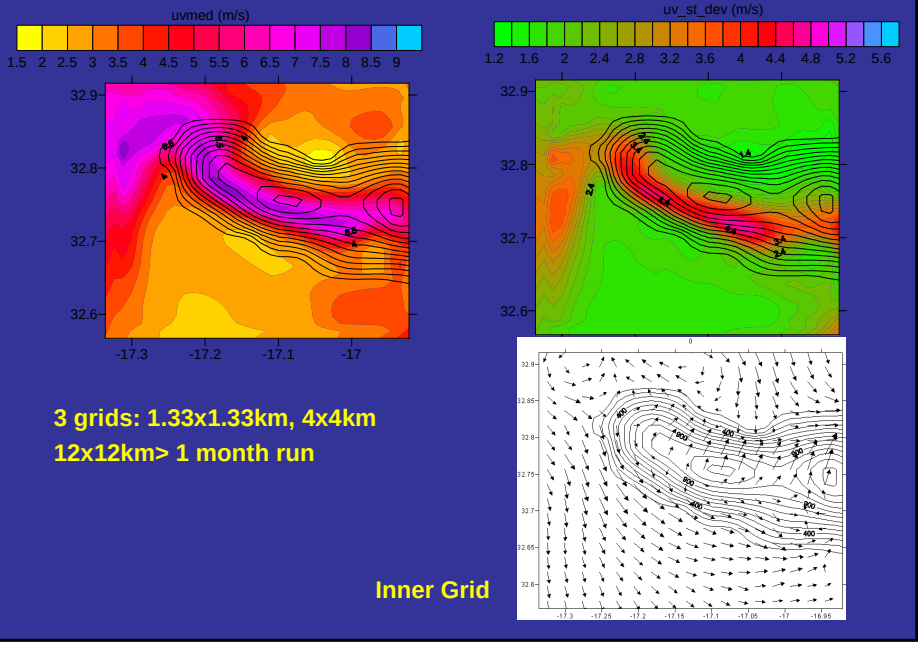


Observations vs MM5 results



There is a problem with the shape of orography. But there is a potential for prediction

Monthly mean values

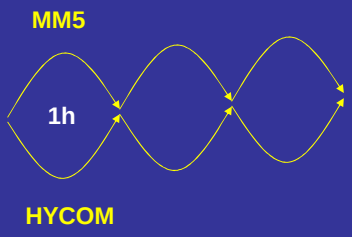


3 grids: 1.33x1.33km, 4x4km
12x12km> 1 month run

Inner Grid

Upwelling

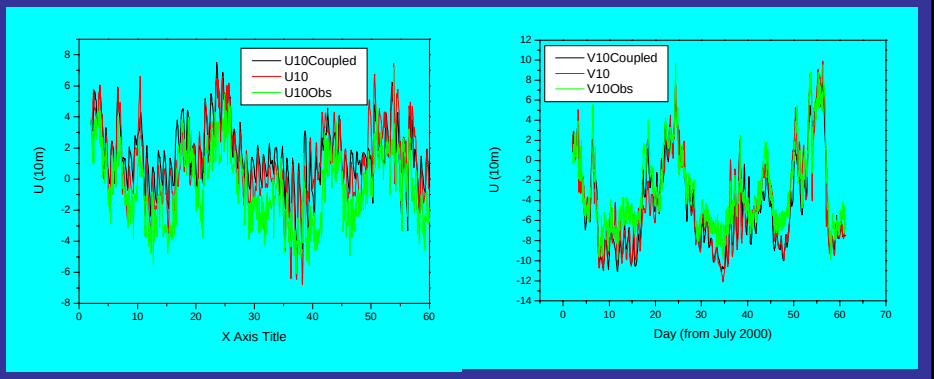
Simple coupling



- Reproduce observed variability
- Simulate climate change scenarios

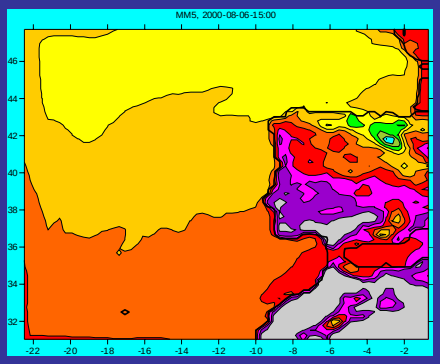
Problems: boundary conditions for HYCOM, radiation coupling

2 month simulation (July-August 2000) No nesting

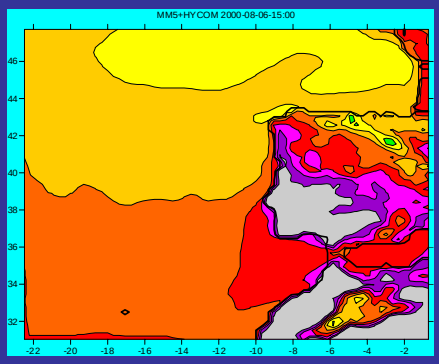


6 August 2000

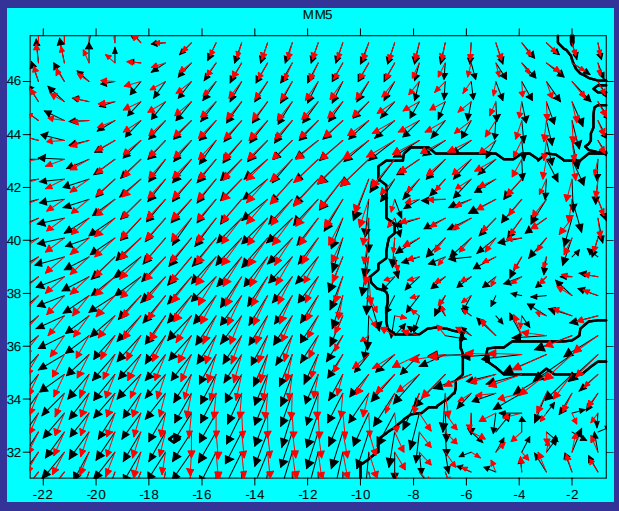
Uncoupled

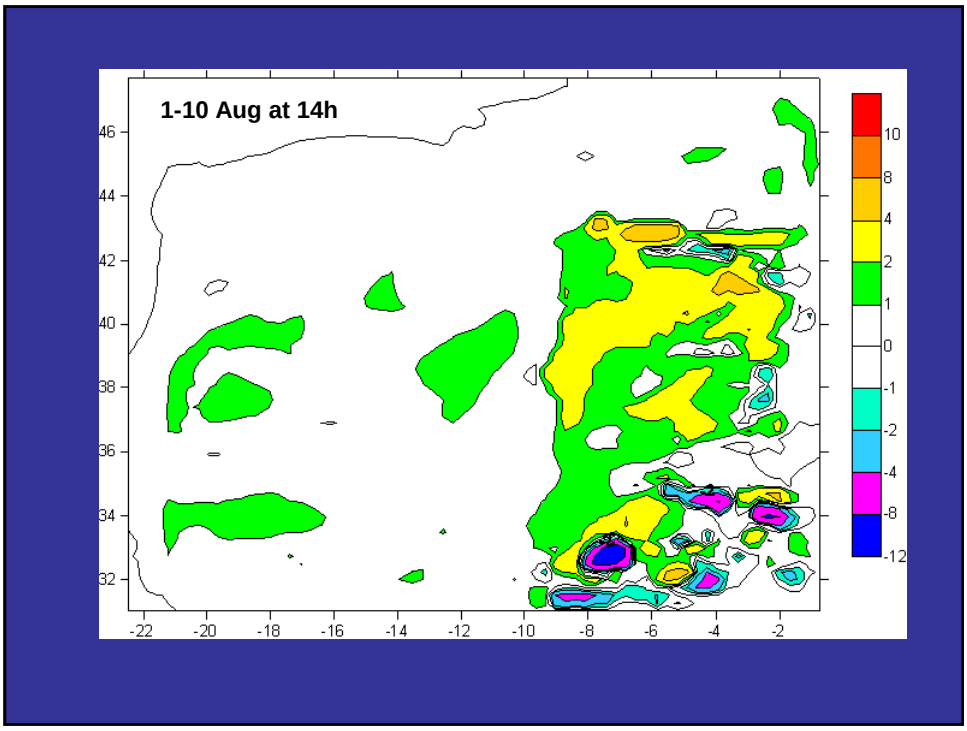


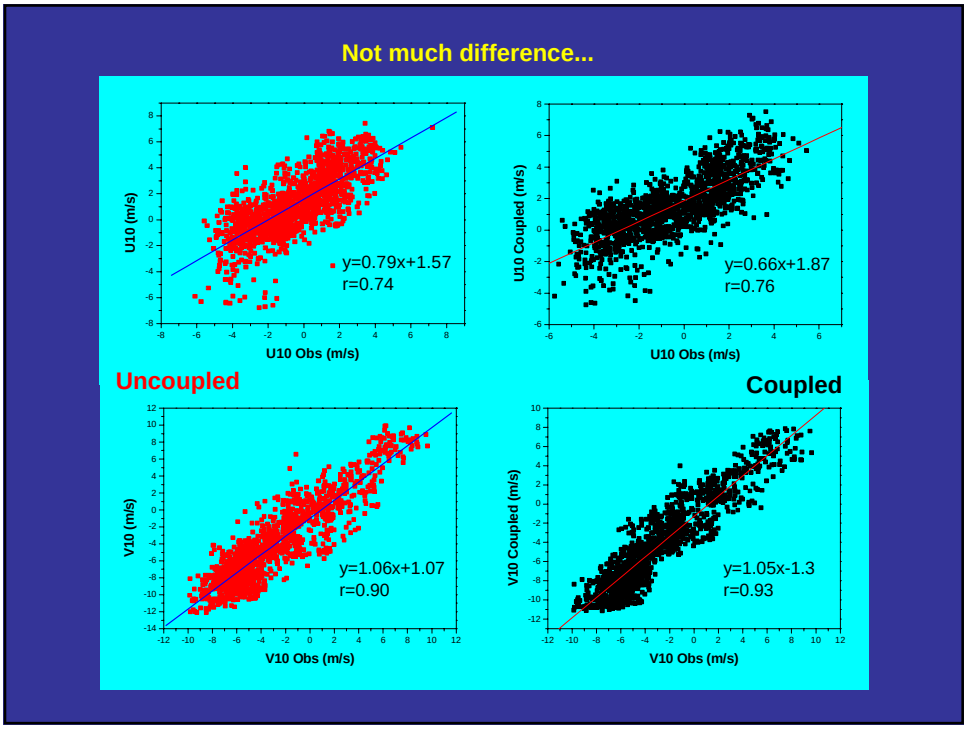
Coupled



Why warmer?




1-10 Aug at 14h
46
44
42
40
38
36
34
32
-22
-20
-18
-16
-14
-12
-10
-8
-6
-4
-2
10
8
4
2
1
0
-1
-2
-4
-8
-12


Not much difference...
U10 (m/s)
U10 Obs (m/s)
y=0.79x+1.57
r=0.74
U10 Coupled (m/s)
U10 Obs (m/s)
y=0.66x+1.87
r=0.76
Uncoupled
Coupled
V10 (m/s)
V10 Obs (m/s)
y=1.06x+1.07
r=0.90
V10 Coupled (m/s)
V10 Obs (m/s)
y=1.05x-1.3
r=0.93