TTM3: Regional Climate Models

- This includes the coupled models up to the Regional Climate System Model as well as their components.
- This also includes the very-high resolution climate models, the ensemble runs and the Med Sea sub-basin runs.
- Time scale is from months to century
- Also includes the pre-required studies/works allowing to match the observations and climate model scales
- Also includes the regional climate model evaluation
- Also includes the regional climate model improvement
General Strategy:
- Promote the development of Regional Climate System Models (and of each component)
- Promote regional reanalysis for the various components
- Combine data-rescue, in-situ observations, satellite products, very-high resolution modelling, components modelling to validate and improve (new parameterizations) the regional climate system models.
- Set-up water budget oriented diagnostics and process-oriented (or SOP-oriented) diagnostics
- Target: the Mediterranean Sea (with its sub-basins) and its whole catchment basin (hindcast 1960-2010, LOP/EOP/SOP, 21st century)
- Perform multi-component regional climate change scenarios in the new IPCC-AR5 frame and provide data
- Provide data for the regional climate modelling needs of the WGs (database)
- Perform stream1-simulations at the beginning of HyMeX (hindcast, scenario), stream2 after the EOP/SOP and model improvement work
Modelling: General Strategy

Data Rescue

In-situ

Satellite

Reanalysis (regional)

Very-high resol. or process models

Validation

Integrated Analysis

Intercomparison

Regional Climate Modeling

atmosphere

Regional Climate System Model

land

surface

hydrology

river

ocean

process understanding

variability

model improvement

scenarios

LOP/EOP/SOP

Hindcast 1960-2010

All temporal scales

21\textsuperscript{st} century

model improvement

scenarios

LOP/EOP/SOP

Hindcast 1960-2010

All temporal scales

21\textsuperscript{st} century
The climate models used for hindcast and scenarios will be run with the same set-up for the LOP/EOP/SOP periods.
Participating Models

**Atmo. of the RESM**
High-resolution RCM
(WRF, ALADIN, RegCM, COSMO-CLM, TAU, IIBR)
Ensemble runs (ICTP, CLM)

**Surface/hydro/river of the RESM**
Calvet, CNRM (SURFEX / TRIP)
Struglia, ENEA (IRIS)
Anav, LMD-LSCE (ORCHIDEE/LPJ)
Ludwig, CEFREM
Hoff, PIK

**Ocean of the RESM**
Straits models (Gib, Sic., Turk., Otranto)
Sub-basin (GoL, Aeg-Lev, GoG, Adri)
High-resolution Med Sea
(NEMO-MED36, MITgcm, MERCATOR)

**Regional Earth System Model**
- ENEA
- CNRM
- LMD
- MPI
- UCLM
- IMKTRO/KIT
- GUF
- INGV
- LATMOS
- IC3
- Belgrade

**HyMeX**
**Scenarios: Med-CORDEX exercise**

**Med-CORDEX**
(S. Planton, S. Somot, P. Ruti, L. Li, F. Giorgi, P. Lionello)

- **TIER2**
- **TIER1**
- **CORE**

- **RCP4.5** and/or **RCP8.5**
- **ERA-Interim** driving
- **ERA40** driving
- **NCEP** driving

- **Control for AORCM**
- **AORCM**
- **RESM / Med sea**
- **Big-Brother**

- **GCM-driven run**
- **1950-2100**

- **Ensemble runs (internal variability)**

- **Other RCP scenarios**
- **Other GCMs**

- **50 km**
- **25 km**
- **10 km**
**TTM3a: LOP/EOP/SOP runs (2010-20XX) with focus on the SOP (2012-2014)**
Sarantis Sofianos, Univ Athens
Karine Béranger, ENSTA
Sophie Bastin, LATMOS

**TTM3b: Long-term hindcast runs 1960-2010**
Gianmaria Sannino, ENEA
Jean-Christophe Calvet, CNRM
Samuel Somot, CNRM

**TTM3c: Regional climate change scenario, MedCORDEX**
Paolo Ruti, ENEA
Miguel Gaertner, UCLM
Laurent Li, LMD

**TTM3d: Diagnostics, validation and integrated analysis (model-obs-satellite)**
Annarita Mariotti, ENEA, UMD
Damià Gomis, Marta Marcos, Gabriel Jordà IMEDEA

**TTM3e: Improvement of the Regional Climate Model parameterizations**
Sophie Belamari, CNRM
Achim Wirth, LEGI
Objectives of the TTM3 meeting

General open issue discussed in the round table

- Register to the mailing list:
  http://www.hymex.org/private/teams/
  hymex-ttm3x@cnrm.meteo.fr
- TTM3 database: more discussions to be done, a long-term strategy, data amount estimate (IPSL, MedCLIVAR, ENEA, DMI)
- Regional Earth System Model: to be changed … Regional Climate System Model
- A simulation table grouping TTM3a, TTM3b, TTM3c runs: to be done
- Models participating to hindcast and scenarios are mainly going to participate to TTM3a
- Decadal forecast, seasonal forecast, hindcast forecast: we could open a new TTM3x if enough participants with leaders
- Belgrade center will be contacted for a new RCSM (ETA)
- INGV will be contacted for the Adriatic Sea and Otranto strait modelling
- Define standard outputs: email round to start. based on previous projects ENSEMBLES, CIRCE, SESAME and on the CMIP5 and CORDEX standards, variables, frequency, … see also the CORDEX lists on the web site.
- Explicit the list of already-funded proposals, the funding-requiring proposals, …
TTM3a: LOP/EOP/SOP runs (2010-20XX) with focus on the SOP (2012-2014)
Sarantis Sofianos, Univ Athens; Karine Béranger, ENSTA; Sophie Bastin, LATMOS

TTM3a_IIP: TTM3a_IIP-HyMeX_bastin_sofianos_beranger_v1_2june2010.odt

Open issues discussed:

• TTM3b and TTM3c models will participate to TTM3a runs
• Same models but with higher resolution or more complex set-up will be used
• Specific outputs for SOP periods to interact with TTM1, TTM2
• ERA-Interim for the LOP as LBC: up to 2013-2015 at least
• Use of satellite data to force component models: common forcing only based on satellite products seems impossible but some products can be used (SW, soil moisture) perhaps through data assimilation (TTM2a) … satellite products will be more used as evaluation issue
• Common forcings: express of interest, not a first step, dedicated working group (as it is not an easy task), use the HyMeX database for distributing the common forcing
• Use of 1D ocean, atmosphere, coupled models (link with TTM3e): no inputs
Open issues discussed:

- Current development phase of the components and RCSMs: see posters, talk
- ERA40-ERAInterim temporal inhomogeneity: RCM downscaling does not smooth it
- Common forcings for:
  - ocean model (air-sea fluxes, river, atlantic, bathymetry, grid, initial conditions, spin-up methodology),
  - land-surface (atmosphere forcing, initial conditions)
  - atmosphere model (SST, GHG, aerosols, solar constant)
- Test of higher-resolution SST analyses: OISST at ENEA, MF-CMS products
- Use of higher-resolution aerosols database: contacts have to be taken (G.Kallos, F.Solmon)
- Initial conditions for ocean simulations: can be extracted from interannual MedAtlas-II (Rixen’s contact, could be distributed by CNRM)
Open issues discussed:

- How to meet the IPCC-AR5 deadlines (together)? (Paper submitted before July 2012): fast track between global models and regional models

- No GCM-RCM matrix filling goal, as many GCM as possible to maximize the spread

- GCM possible involved: INGV, CNRM, MPI, LMD, (Hadley Center)

- LBCs available from end of 2010 (contacts with GCM groups: OK)

- Decide a common emission scenario: following CORDEX (RCP4.5 or RCP8.5)

- ICTP grand-ensemble proposal: only if funding
See: TTM3d_IIP-HyMeX_mariotti_gomis_jorda_marcos_16march2010.doc

Open issues:

- TTM3d: list of proposals leaded by a center + contributing centers (many proposals already but still room for other ones)

- TTM3d proposals have to respect the « HyMeX spirit » meaning collaborations between the components and between the in-situ, satellite and modelling community. People from the different communities are required to work together. Proposals not only from modellers are waited. This is one of the places to tackle HyMeX science issue

- Define well-documented observing sites as evaluation points and well-defined events as case study: MEDOC air-sea site, Lampedusa site, Valencia-SMOS soil moisture, list to be enhanced

- How to interact with the other TTM3x and the other TTM, TTO and TS in HyMeX?

- Participation to output definition
TTM3e: Improvement of the Regional Climate Model parameterizations
Sophie Belamari, CNRM; Achim Wirth, LEGI

See: recently added IIP for TTM3e, draft

Ocean: Convection, Mixed-layer dynamics, Gravity currents, Shear flow & Overflow (Gibraltar)
Atmosphere: Air-sea fluxes (including skin temperature and sea state impacts), Radiative scheme, Turbulence, convection and clouds physics

Open issues:

- How to gather more participants? See in each modelling centers depending on the observations

- participation to simulation definition

- not every parametrisations will be tackled.

- Needs have been identified for gravity currents, shear flow & overflow, air-sea fluxes, radiative scheme, turbulence, convection and clouds physics

- Interaction with the other TTM3x and particularly with TTM1 (atmosphere param.) and TTM2 (land-surface param): to be discussed