WCRP
World Climate Research Programme

WCRP Community-wide Consultation on Model Evaluation and Improvement

Please complete the following template by writing your answers into the boxes below the questions, sending any supplementary material such as clearly labeled figures in a separate file. Please submit your response electronically by ***15 September 2009*** to Anna Pirani at apirani@princeton.edu.

Q1: Please state your particular area of interest, e.g. global or regional climate or NWP modeling, seasonal prediction, sea-ice feedbacks, monsoons, troposphere-stratosphere exchanges, etc.
Global and regional operational NWP modeling.

Q2: Given your interest, what would you consider/identify as the KEY uncertainties/deficiencies/problems of current models? What do you think should be evaluated/improved as a priority in models in terms of parameterization and/or interactions among processes? (Give references and/or one key figure where possible)
The parameterization of deep convection is the most deficient one in "large-scale" NWP models (Dx>5km). Many deficiencies are associated with this scheme (the onset of deep convection, the diurnal cycle, the intensity, the propagation, associated precipitation and clouds, etc). At horizontal scales between 2 and 20km, the parameterization of deep convection is even more complicated due to the resolved part by the dynamics.

In CSRM model, the representation of deep convection is also an issue. The numerics (advection, numerical diffusion, projection of physical tendencies in dynamical equations) has a much larger inpact than in "large scale" models and should be improved. The representation of PBL is also crucial for the onset of resolved convection.

Q3: Do you see a particular gap (in knowledge, in observations or in practice) that would need to be filled, or a particular connection between different modeling communities or between modeling, process studies and observations that should be made a priority?
In modelisation, need to enhance the connection between different modeling communities (Climat, NWP) and between modeling, process studies and observations.

Need to develop more sophisticated and better validated physical parameterizations.

In assimilation, need to improve the observation and the initialization of moisture, clouds and deep convection in a consistent way with the physics and the dynamics of the model.

Assessment of the predictability of deep convection

Q4: Do you see any particular resource or opportunity within the modeling/process study/observational/theoretical community (e.g. new results, new observations) that would be particularly useful and should be exploited to tackle this problem?
More wide use of CSRM and LES simulations to validate and develop physical parameterizations.

Model intercomparisons on 1D, 2D or 3D case studies associated with field campaigns.

Q5 What would best accelerate progress on the topics raised in questions 1-4? Do you have suggestions for new initiatives (new process studies, field campaigns, or new collaborative approaches, eg international

Working Groups, Climate Process Teams)?
Increase computational and staff ressources!

Develop new models with increased modularity, interoperability, efficiency (if not contradictory!), usable for academic community.

Develop international agreed metrics to compare NWP models (not only Z500 !)

Q6: Any other suggestions/issues to be raised?
No.