WCRP Community-wide Consultation on Model Evaluation and Improvement – CPTEC /Brazil

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 NWP modeling, aerosol and trace gases interaction with atmospheric dynamics and its impact on air quality on global/ regional scales and weather/seasonal prediction. Regional data assimilation.

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)
- One of the deficiency of current models is the precipitation skills, mainly in tropical regions. It is necessary to review the parameterization of convection and their interactions with boundary layer, radiation (including aerosols) and surface processes (land and sea).
- The spectral dynamic core with sigma vertical coordinates has problems also. There is systematic errors due to the representation of topography (Gibbs effect) and horizontal diffusion near step mountains. For very high resolution (10-20km) the Gaussian transform dominates the cost of computation (around 90%).
- Development of efficient global parameterization to run global environmental forecasting.
- Biomass burning (bb) emissions (aerosol and trace gases) and the injection layer associated of the flaming phase are key uncertainties as well as aerosol radiative/microphysics properties. On line and interactive injection layer of bb emissions should be improved in models. In terms of aerosols, the effect on changing the available CCN should be included in convective parameterizations.

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?
- Development of more appropppriated metrics to evaluate the models results. There is a big lack for metrics that effectivelly evaluate seasonal predictions and climate simulations.
- Data assimilation methods for short range forecasting and severe impact weather events.
-Biomass burning observation by remote sensing suffers the lack of a continuous monitoring around the all areas of world affected by vegetation fires.
- The relationship between the observed fire radiative power and biomass rate comsumption is the most promising way to quantity the emissions. A strong connection between communities involved in field estimations of biomass or carbon density and remote sensing should be incentivated.

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?
- Development of more efficient global assimilation schemes that should be able to use more satellite and environmental data and able to run on operational basis.

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)?
- Development of new global dynamical cores with non-structure grids, computationaly efficient, that can be used operationaly.
- Development of cloud-based parameterization schemes, computationaly efficient, that can be used operationaly.
- International working groups focused on the development of accurate biomass burning emissions estimates, aerosol characterization and its integration in a modeling framework should accelerate the needed progress in this area .

Q6: Any other suggestions/issues to be raised?
It is an important issue that the same global model should be able to run NWP, seasonal predictions and climate simulations, including global changes.

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