PROMISE Report for the LMD group: the 6-monthly progress

I] Data analysis

We are studying, during the West African monsoon onset, the vertical structure of the composite wind fields from the NCEP. The intra-seasonal signal that we have depicted in a previous study based on the 925hPa wind field seems to be persistent up to 600hPa and coherent with the vertical circulation at intra-seasonal scale. The work which has been done on the daily rainfall dataset (from the IRD, Institut de Recherches pour le Développement) and on the NCEP realanysis, and wich was presented at the first PROMISE meeting, is in press in GRL (Sultan and Janicot, 2000). It has also been presented (Janicot and Sultan, 2000) at the American Meteorological Society for the 24th Conference on Hurricanes and Tropical Meteorology (29 May-2 June, Ft. Lauderdale, Floride). The same composite analysis has been performed with the wind field from the ERA-15 reanalysis at 925hPa, pointing out the same results.

Now, we are beginning a new work on the intra-seasonal variability of the West African monsoon. We have pointed out some evidence of rainfall fluctuations at intra-seasonal time-scale, between 10 and 60 days. These fluctuations are coherent with an intra-seasonal wind field pattern at 925hPa. In order to isolate and to study this atmospheric fluctuation, we have begun to use the Local Mode Analysis (LMA) on the wind field from the NCEP reanalysis. This very new method (Goulet and Duvel, 2000) makes it possible to extract locally the most persistent oscillations that characterize the spatial and temporal structures of any field.

II] Modelling analysis

A new version of the LMD model with a zoom (ie. a high spatial resolution) (LMDZ) has been defined in order to carry out integrations for the study of climate change in tropical areas. This model, without the land-surface processes parameterization Sechiba has been integrated for 200 years successfully. The new version of the LMDZ with the Sechiba parameterization has been prepared during the first months of the project. The model will be integrated with the present day conditions and with doubled CO2 concentrations. The influence of climate change on monsoon depressions will be studied using the code TRACK of K. Hodges which has already been used during the SHIVA project (Sabre et al, 2000).
Moreover, in the perspective of a coupled model between our LMDZ GCM and a model of hydrology, a bibliographic study on the routing schemes for hydrology has been performed. This rooting scheme will be necessary to study the hydrological impact of climate change.

References

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