



Adjustment parameters in the Betts–Miller scheme of convection over South America

Jorge Luís Gomes, Sin Chan Chou, and Lucas Lorena Guida
INPE, CPTEC, Cachoeira Paulista, Brazil (jorge.gomes@cppec.inpe.br)

The Eta model has been used operationally at CPTEC/INPE since 1996. This model uses the Betts-Miller-Janjic (BMJ) convection scheme. The BMJ scheme was developed based on the convective adjustment. For the construction of reference temperature and moisture reference profiles, three parameters were defined, namely, the stability weight; the saturation pressure departure values and the adjustment time period. To define an optimum set of parameters over South America, a number of experiments have been carried out at CPTEC/INPE and the better set was adopted for the operational runs. The set of parameters are homogeneous over the domain covered by the model and kept constant for the whole year. These homogeneous specified profiles should provide misleading representations of various vertical structures. In this work the Eta model was configured with 40-km grid sizes and vertical resolution was set to 38 layers. The model domain covers the whole South America and part of Central America. The BMJ was changed to permit different set of parameters values at each model grid. We noted in the control runs that the Equitable threat and bias scores of quantitative precipitation forecasts (QPF) shows a different skills depending of verify region. A pronounced high bias in precipitation forecast was verified at mountain slopes, near the peak over Minas Gerais State, which is located at southeast of Brazil. Experiments were done changing the saturation pressure departure values, only near the mountains peaks. We note that the changes in the saturation pressure departure experiments produced different distributions and amounts of total precipitation. Results indicate that the changes reduced the precipitation bias over the mountains. The Eta model that uses the BMJ scheme has the characteristic to produced most of model total precipitation. The experiments changed the partition of implicit and explicit precipitation.