High resolution climatology
- towards climate change services

The Sensitivity of a Long-Range Numerical Weather Forecast Model to Small Changes of Model Parameters

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Abstract

The sensitivity of the results of long-range numerical weather prediction to small changes in model parameters was studied. In the first case the modifications consisted of small changes of Earth radius in the interval from 0.000002 % to 0.5 % of the reference value a=6376000 m. The results were mutually compared and presented for the 500 hPa geopotential heights on the hemispheric maps. The results point to insignificant sensitivity to parameter changes during the first 10-11 days of integration. However, after this period the results diverge and become considerably different.

Another experiment was done by introducing minor changes of the gravitational acceleration in the interval of 1 % to 0.0001 % of the reference values. The final results were mutually compared and presented at the 500 hPa geopotential heights field hemisphere maps. Again, after 10-11 days of integration the final results have diverged becoming significantly different between each other. The reason of these discrepancies in reference to gravitational acceleration was not possible to detect.

The sensitivity on the computer round off error has not been defined in both cases.

The obtained results could be useful to assess the challenges of the long-range weather and climate prediction models.