



The effects of the RAW filter on the climatology and forecast skill of the SPEEDY model

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In a recent study, Williams (2009) introduced a simple modification to the widely used Robert–Asselin (RA) filter for numerical integration. The main purpose of the Robert–Asselin–Williams (RAW) filter is to avoid the undesired numerical damping of the RA filter and to increase the accuracy.

In this presentation, the effects of the modification are comprehensively evaluated in the SPEEDY atmospheric general circulation model. First, we search for significant changes in the monthly climatology due to the introduction of the new filter. After testing both at the local level and at the field level, we find no significant changes, which is advantageous in the sense that the new scheme does not require a retuning of the parameterized model physics.

Second, we examine whether the new filter improves the skill of short and medium term forecasts. January 1982 data from the NCEP Reanalysis are used to evaluate the forecast skill. Improvements are found in all the model variables (except the relative humidity, which is hardly changed). The improvements increase with lead time and are especially evident in medium-range forecasts (96 to 144 hours). For example, in tropical surface pressure predictions, five-day forecasts made using the RAW filter have approximately the same skill as four-day forecasts made using the RA filter.

The results of this work are encouraging for the implementation of the RAW filter in other models currently using the RA filter.

References

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