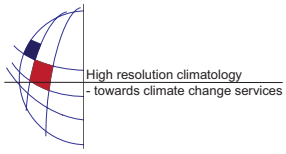
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-316, 2010
10th EMS / 8th ECAC



Initialization of the Eta Model using a backward-first version of the iterative Matsuno style scheme

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A new version of the dynamic initialization technique using an iterative Matsuno or a "super-Matsuno" style scheme is tested when applied in the Eta Model. While in a version tested previously the scheme was used forward only for one hour continuing with a normal integration forward using the full model, with the new version the integration is started backward first (BF) and run for one hour with all irreversible physics switched off, this being followed by a one hour forward integration using the full model, thereby completing the initialization. This “BF super-Matsuno initialization” is considered to be a procedure cleaner than the previous forward-only (FO) version, in the sense that with the BF version there is an initialization stage distinct from the model integration from the resulting initial state, now done using an unchanged model. In addition, if an initial spin-up were to be in place due to an imbalance of the moisture field with the model’s precipitation schemes, this spin-up should be largely reduced or eliminated given that the first hour of forward integration prior to the initial state is not a part of the forecast. As with the previous version, the advantage is taken of the Eta model’s split time-differencing, in the sense that the super-Matsuno scheme is used for the gravity-inertia terms only, as opposed to the use for the full model as done by Fox-Rabinovitz when introducing the method.
Test performed show that the BF scheme, just as the previous FO scheme, results in an integration very much free of noise. The model integration results with and without initialization after 6 h are however very similar. Even so, an integration with a reduced or eliminated initial noise and/or spin-up should have advantages for a variety of applications, such as those depending on model values that include the initial hours of the forecast, e.g., those addressing wind energy and water budget purposes, and those requiring knowledge of a model-balanced initial state.