Contribution ID: **63** Type: **Poster presentation**

Numerical treatment of physics contribution in ALADIN System

In a NWP model a prognostic equation is being solved (simplified):
\begin{equation}
\frac{\partial\psi}{\partial t} + u \frac{\partial\psi}{\partial x}=L+N+P
\end{equation}
where l is the linear part of the dynamics contribution, N is the non-linear part from dynamics and P is the physics tendency.

In a semi-implicit semi-lagrangian treatment, the future value of the variable is computed from the averaged values of the linear term L from the future value at the arrival point and the former value at the origin point of the trajectory. The non-linear term from dynamics N can be iterated through the predictor corrector scheme or extrapolated using stable extrapolation SETTLS scheme.

The problem is how, where and when to compute the contribution from the physics parametrisations. IFS uses semi-lagrangian averaging of physics parametrisations (SLAVEPP) scheme and computes physics contribution after the dynamical terms.

ALADIN System computes contributions of the parametrized processes before the semi-lagrangian interpolation and before the semi-implicit adjustment, the physics tendencies are interpolated to the orig
in point. The scheme is considered only first order accurate.

It is also possible to do averaging of the physics tendencies along the trajectory using an extrapolation scheme for the physics contributions that is similar to the SETTLS scheme employed in the dynamics. The effect on the forecasted weather is minimal, although the dependency of the tendency on the time step length has been reduced. The treatment of the physics tendency in the predictor corrector scheme is limited to interpolating the value to the new origin point.

Primary author: Dr TUDOR, Martina (DHMZ)

Presenter: Dr TUDOR, Martina (DHMZ)

Session Classification: Posters

Track Classification: Annual Seminar