



Tracer transport improvements and its impact on Numerical Weather Prediction

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The integrated forecasting system (IFS) of ECMWF has been extended in recent years for the simulation and assimilation of atmospheric trace gases and aerosols. The IFS uses a Semi-Lagrangian Advection (SLA) scheme, which does not formally conserve mass. The non-conservation was small enough to be tolerated for NWP applications in the past but it required a mass budget correction for the simulation of atmospheric composition. Therefore various mass fixer algorithms (MFA) have been implemented in the IFS to ensure tracer mass conservation within the advection scheme. These MFA have now also been applied to humidity and cloud fields. We will show the performance of the MFA in idealised cases, NWP 10-day forecast and longer model runs. We will discuss the impact of mass-fixed humidity fields on the simulated temperature fields. The atmospheric composition tracers can also be used to diagnose other properties of the SLA scheme such as shape preservation as well as properties of the transport by vertical diffusion and convection. We will show examples how tracers simulation and observation were used in this context.