

Treatment of microphysics for the evaluation of “3MT” in ARPEGE/ALADIN-MF

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Goal of this note : make the strategy for the handling of microphysics more explicit, in order to evaluate “3MT” in ARPEGE/ALADIN-MF

The evaluation of « 3MT » in ARPEGE/ALADIN-MF is an important action in the work plan of the GMAP/PROC team for 2009. The goal is to precisely evaluate the potential of the “3MT” developments performed by the ALARO team for an operational use: treatment of sub-grid convection, multi-scale aspects. The difficulties of this work are: 1) how to combine “3MT” with the shallow convection schemes used in ARPEGE/ALADIN-MF/AROME; 2) the use of cloudiness computed by the turbulence and shallow convection schemes inside “3MT”; 3) the treatment of microphysics.

Points (1) and (2) can be treated in parallel to point (3), by first using the microphysics of ARPEGE/ALADIN-MF recoded by the ALARO team inside the APLMPHYS algorithmic of 3MT.

Point (3) is more difficult because the use of APLMPHYS (the routine treating microphysics in 3MT) offers on the one hand new possibilities (management of the geometry of evaporating precipitations) and on the other hand raises a number of questions: the need to recode the microphysics parametrization with no guarantee of feasibility and reproducibility, complexity, not yet clearly proven benefits especially at the kilometric scale, specific solution based on a geometric treatment of cloudy and precipitating areas. We wish to increase our understanding of the APLMPHY algorithm and study more in depth its forces and weaknesses. Several actions will be needed to reach this goal. One point will be to study with the ALARO team the possibility to enhance the consistency between the microphysics scheme of ARPEGE/ALADIN-MF and its recoded version in APLMPHYS (see document by Yves Bouteloup). We wish that the treatment of sub-grid precipitating areas becomes optional in the APLMPHYS scheme, in order to perform a thorough comparison between the microphysics scheme of ARPEGE/ALADIN-MF and its recoded version in APLMPHYS. This will also allow to evaluate the behaviour of this sub-grid treatment with respect to horizontal resolution, linked with the stretched grid in ARPEGE and down to the resolutions of AROME. After these studies, we will have the required scientific results to decide on the best option for the treatment of microphysics in 3MT for ARPEGE/ALADIN-MF, namely: 1) use of the ARPEGE/ALADIN-MF microphysics recoded in APLMPHYS, 2) direct use of the ARPEGE/ALADIN-MF microphysics without APLMPHYS, 3) a treatment of sub-grid microphysics different of the one presently designed in APLMPHYS (to take into account the ongoing PHD work of S. Turner, ...).