Report on stay at ZAMG

Vienna, Austria
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Revision of LAEF Multiphysics



Supervised by: Christoph Wittmann (ZAMG) **Author:** Simona Taşcu (NMA) Taking into account the upgrade of ALADIN-LAEF system towards finer resolution (approximately 5 km horizontal resolution and 60 vertical levels), the main purpose of this stay was the revision of ALADIN-LAEF multiphysics for this new system. At the moment, for the current operational version (11 km horizontal resolution and 45 vertical levels) 16 namelists are used (Annex 1, provided by the colleagues from ZAMG).

Following the ideas and work of Christoph Wittmann (Austria) and Canberk Karadavut (Turkey), the goal of this stay was to increase the maintenance of the ALADIN-LAEF system by reducing with respect to multiphysics, the number of namelists from 16 to 4. Thereby, different namelist were created (by Christoph Wittmann) from ALARO-0 and ALARO-1 cy40 using different options which can be seen in figure 1, with target on convection, microphysics and turbulence schemes.

 EX00 ALARO-0 EX01 ALARO-1 EX02 ALARO-1 MIXLENS"ELT" EX03 ALARO-1 MIXLENS"ELT" EX04 ALARO-1 MIXLENS"ELT" EX05 ALARO-1 MIXLENS"ELT" EX06 ALARO-1 MIXLENS"ELT" EX07 ALARO-1 MIXLENS"ELT" EX08 ALARO-1 MIXLENS"ELT" EX09 ALARO-1 MIXLENS"ELT" EX01 ALARO-2 Smith General optim in conscimution/scope EX13 ALARO-1 Smith General optim in conscimution/scope EX14 ALARO-1 Smith General optim in conscimution/scope EX13 ALARO-1 Smith General optim in conscimution/scope EX14 ALARO-1 Smith General optim in conscimution/scope EX13 ALARO-1 Smith General optim in conscimution/scope EX14 ALARO-1 Smith General optim in conscimution/scope EX15 ALARO-0 IENTCH EX15 ALARO-0 IENTCH EX16 ALARO-0 IENTCH EX17 ALARO-0 ALINENS" ELT EX18 ALARO-0 MIXLENS"ELT EX19 ALARO-0 MIXLENS"ELT EX14 ALARO-0 MIXLENS"ELT EX21 ALARO-0 MIXLENS"ELT EX22 ALARO-0 MIXLENS"ELT EX23 ALARO-0 MIXLENS"ELT EX24 ALARO-0 MIXLENS"ELT EX24 ALARO-0 MIXLENS"ELT EX24 ALARO-0 MIXLENS"ELT EX25 ALARO-0 MIXLENS"ELT EX24 ALARO-0 MIXLENS"ELT EX25 ALARO-0 MIXLENS"ELT EX26 ALARO-0 MIXLENS"ELT EX27 ALARO-0 MIXLENS"ELT EX28 ALARO-0 MIXLENS"ELT EX29 ALARO-0 MIXLENS"ELT EX29 ALARO-0 MIXLENS"ELT EX20 ALARO-0 MIXLENS"ELT EX20 ALARO-0 MIXLENS"ELT EX21 ALARO-0 MIXLENS"ELT EX22 ALARO-0 MIXLENS"ELT EX23 ALARO-0 MIXLENS"ELT EX24 ALARO-0 MIXLENS"ELT EX33 ALARO-0 MIXLENS"ELT EX34 ALARO-0 MIXLENS"ELT EX34 ALARO-0 MIXLENS"ELT EX34 ALARO-0		Sensitivity tests: Experiment list
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 EX09 LAB12=F. EX10 ALRO-0 gavity wave drag computation LGWD=.F. EX11 ALRO-0 Smith Gerard option in condensation/wap EX12 ALRO-1 Smith Gerard option in condensation/wap EX13 ALRO-1 FAR/RRTM relation scheme EX14 ALRO-1 FAR/RRTM relation scheme EX15 ALRO-1 FAR/RRTM relation scheme EX16 ALRO-1 SCR/RRTM relation scheme EX17 ALRO-1 SCR/RRTM relation scheme EX18 ALRO-1 SCR/RRTM relation scheme EX19 ALRO-1 SCR/RRTM relation scheme EX19 ALRO-1 SCR/RRTM relation scheme EX20 ALRO-0 MIXEN="EL1" EX21 ALRO-0 MIXEN="EL1" EX22 ALRO-0 MIXEN="EL1" EX23 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX25 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX25 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX25 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX25 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX25 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX24 ALRO-0 MIXEN="EL1" EX25 ALRO-0 MIXEN="EL1" EX34 ALRO-0 MIXEN="EL1" EX34 ALRO-0 MIXEN="EL1" 	EX08	ALARO-1 ACRANEB2
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 EX11 ALARO-D smith Gerard optim: in condensation/erag EX12 ALARO-1 Smith Gerard optim: in condensation/erag EX13 ALARO-1 SMR/RTM relation scheme EX14 ALARO-1 FMR/RTM relation scheme EX14 ALARO-1 FMR/RTM relation scheme EX15 ALARO-1 SMR/RTM relation scheme EX16 ALARO-1 SMR/RTM relation scheme EX16 ALARO-1 SMR/RTM relation scheme EX17 ALARO-1 SMR/RTM relation scheme EX18 ALARO-1 SMR/RTM relation scheme EX19 ALARO-1 SMR/RTM relation scheme EX20 ALARO-0 MIXEN="EL12" EX21 ALARO-0 MIXEN="EL12" EX22 ALARO-0 MIXEN="EL12" EX23 ALARO-0 MIXEN="EL12" EX24 ALARO-0 MIXEN="EL12" EX34 ALARO-0 INFORT. ISCMF=FAISE. LCVQQM=F. LCVQGD=T, Smith Gerard, MIXLEN="2" EX34 ALARO-0 INFORT. ISCMF=FAISE. LCVQQM=F. LCVQQD=T, Smith Gerard, MIXLEN="2" EX34 ALARO-0 INFORT. ISCMF=FAISE. LCVQQM=F. LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="2" EX34 ALARO-0	EX10	ALARO-0 gravity wave drag computation LGWD=. F.
 EX12 ALARO-1 Smith Gerard option in conclusation/enage EX13 ALARO-1 Smith Gerard option in conclusation/enage EX14 ALARO-1 FMR/RITM radiation scheme EX15 ALARO-0 ISCMF=FALSE. EX15 ALARO-0 LISCMF=FALSE. EX17 ALARO-0 LISCMF=FALSE. EX18 ALARO-0 LISCMF=FALSE. EX19 ALARO-0 LISCMF=FALSE. EX19 ALARO-0 LISCMF=FALSE. EX19 ALARO-0 AUXLEN="Z EX20 ALARO-0 AUXLEN="Z". EX21 ALARO-0 AUXLEN="Z". EX22 ALARO-0 AUXLEN="Z". EX23 ALARO-0 AUXLEN="Z". EX24 ALARO-0 AUXLEN="EL2" EX24 ALARO-0 AUXLEN="EL2" EX24 ALARO-0 AUXLEN="EL2" EX25 ALARO-0 AUXLEN="EL2" EX24 ALARO-0 AUXLEN="EL2" EX25 ALARO-0 AUXLEN="EL2" EX26 ALARO-0 AUXLEN="EL2" EX27 ALARO-0 AUXLEN="EL2" EX28 ALARO-0 AUXLEN="EL2" EX29 ALARO-0 AUXLEN="EL2" EX39 ALARO-0 AUXLEN="EL2" EX39 ALARO-0 DERCHT, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z". EX39 ALARO-0 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z". EX39 ALARO-0 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z". EX34 ALARO-0 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z". EX34 ALARO-1 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z". EX34 ALARO-1 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="EL5". EX34 ALARO-1 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="EL5". EX34 ALARO-1 DERTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="EL5". EX34 ALARO-1 DERTCH, ISC	EX11	ALARO-0 Smith Gerard option in condensation/evap
 EX13 ALARO-D FMR/RRTM radiation scheme EX14 ALARO-I FMR/RRTM radiation scheme EX14 ALARO-I FMR/RRTM radiation scheme EX15 ALARO-D on LENTCH EX16 ALARO-O non LENTCH EX16 ALARO-O LCVQQM=F, LCVQQD=F EX17 ALARO-O LCVQQM=F, LCVQQD=F EX18 ALARO-O LCVQQM=F, LCVQQD=F EX19 ALARO-O prognostic updaft LCVPRO downk a&LCDDPRO → FALSE EX20 ALARO-OMINLEN="Z. EX21 ALARO-OMINLEN="Z." EX22 ALARO-OMINLEN="Z." EX22 ALARO-OMINLEN="EL2" EX23 ALARO-OMINLEN="EL2" EX24 ALARO-OMINLEN="EL4" EX25 ALARO-OMINLEN="EL4" EX26 ALARO-OMINLEN="EL4" EX27 ALARO-OMINLEN="EL4" EX28 ALARO-OMINLEN="EL4" EX29 ALARO-ON LENGIT, LSCMF=FALSE, LCVQQM=F, LCVQQD=T, Smith Gerard, MINLEN="2" EX30 ALARO-O LUPICHT EX31 ALARO-O LUPICHTEF FALSE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MINLEN="2", LGWD=FALSE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MINLEN="2", LGWD=FALSE, LCVQQM=F, LCVQQD=T, Smith, Gerard=, MINLEN="2", LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith, Gerard=, MINLEN="2", LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=, TRUE, MINLEN="2", LFPG ML=F, LSCM=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=, TRUE, MINLEN="2", LFPG ML=F, LSCM=FALSE, LNEWD=FALSE, LNEWD=FALSE,	EX12	ALARO-1 Smith Gerard option in condensation/evap
 EX14 ALARO-1 PMR/RRTM mediation acheme EX15 ALARO-0 to LSYMF=FALSE. EX16 ALARO-0 LSYMF=FALSE. EX17 ALARO-0 LCYCQMs=F_LCYCQD=F EX18 ALARO-0 LCYCQMs=F_LCYCQD=F EX19 ALARO-0 AUXLEN="EL" EX20 ALARO-0 AUXLEN="EL" EX21 ALARO-0 AUXLEN="EL" EX22 ALARO-0 AUXLEN="EL" EX22 ALARO-0 AUXLEN="EL" EX23 ALARO-0 AUXLEN="EL" EX24 ALARO-0 AUXLEN="EL" EX25 ALARO-0 AUXLEN="EL" EX26 ALARO-0 AUXLEN="EL" EX27 ALARO-0 AUXLEN="EL" EX28 ALARO-0 AUXLEN="EL" EX29 ALARO-0 AUXLEN="EL" EX30 ALARO-0 AUXLEN="EL" EX31 ALARO-0 AUXLEN="EL" EX33 ALARO-0 AUXLEN="ELS" EX33 ALARO-0 AUXLEN="ELS". EX34 ALARO-0 AUXLEN="ELS". EX33 ALARO-0 AUXLEN="ELS". EX34 ALARO-0 AUXTENTEL ELSCMF=FAISE. EX34 ALARO-0 AUXTENTEL ELSCMF=FAISE. EX34 ALARO-1 LENTCH. 	EX13	ALARO-0 FM R/RRTM radiation scheme
 EXIS ALARO-0 no LENTCH EXIS ALARO-0 no LENTCH EXIS ALARO-0 no LENTCH EXIS ALARO-0 LCVQQM=F, LCVQQD=F EXIS ALARO-0 LCVQQM=F, LCVQQD=F EXIS ALARO-0 LCVGQM=F, LCVQQD=F EXIS ALARO-0 AUXLEN="EL1" EX20 ALARO-0 AUXLEN="EL1" EX21 ALARO-0 AUXLEN="EL1" EX22 ALARO-0 AUXLEN="EL1" EX23 ALARO-0 AUXLEN="EL1" EX24 ALARO-0 AUXLEN="EL1" EX25 ALARO-0 AUXLEN="EL1" EX26 ALARO-0 AUXLEN="EL4" EX27 ALARO-0 AUXLEN="EL4" EX28 ALARO-0 AUXLEN="EL4" EX29 ALARO-0 AUXLEN="EL5" EX20 ALARO-0 AUXLEN="EL5" EX21 ALARO-0 AUXLEN="EL5" EX32 ALARO-0 AUXLEN="EL5" EX33 ALARO-0 LENCHT, LSCM=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="2" EX33 ALARO-0 DLENTCH, LSCM=FAISE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MIXLEN="2", LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=: TRUE, MIXLEN="2", LFPG ML=F, LANO-0 AUXLEN=="ALSE. EX33 ALARO-0 DLENTCH, LSCM=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=: TRUE, MIXLEN="2", LFPG ML=F, LNEWD=FAISE. EX34 ALARO-0 DLENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=: TRUE, MIXLEN="2", LFPG ML=F, LCWD=FAISE. EX35 ALARO-0 DLENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=: TRUE, MIXLEN="2", LFPG ML=F, LCWD=FAISE. EX34 ALARO-1 DUXD=FAISE. EX35 ALARO-1 DUXD=FAISE. EX35 ALARO-1 DUXD=FAISE. EX34 ALARO-1 LCVCQM=F, LCVQQD=F EX34 ALARO-1 LCVCQM=F, LCVCQQ	EX14	ALARO-1 FMR/RRTM rachation scheme
EX16 ALRO-DISCMPERAISE. EX17 ALRO-DISCMPERAISE. EX18 ALRO-DICYCQM=F, IG VCQD=F EX18 ALRO-OLCYCQM=F, IG VCQD=F EX19 ALRO-OMIXLEN="EL12" EX20 ALRO-OMIXLEN="EL12" EX21 ALRO-OMIXLEN="EL12" EX22 ALRO-OMIXLEN="EL12" EX22 ALRO-OMIXLEN="EL12" EX23 ALRO-OMIXLEN="EL12" EX24 ALRO-OMIXLEN="EL12" EX25 ALRO-OMIXLEN="EL12" EX26 ALRO-OMIXLEN="EL12" EX27 ALRO-OMIXLEN="EL12" EX28 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX29 ALRO-OMIXLEN="EL12" EX20 ALRO-OMIXLEN="EL12" EX20 ALRO-OMIXLEN="EL12" EX30 ALRO-OMIXLEN="EL12" EX30 ALRO-OMIXLEN="EL12" EX31 ALRO-OMIXLEN="EL12" EX33 ALRO-OMIXLEN="EL12" EX34 ALRO-O IENTCH, ISCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith Gerard, MIXLEN="2" EX34 ALRO-O IENTCH, ISCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith Gerard, MIXLEN="2", LCWD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="2", LCWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="2", LFPCML=F, LCWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="2", LFPCML=F, LCWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="2", LFPCML=F, LCWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="EL5", LFPCML=F, LCWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="EL5", LFPCML=F, LCWCM=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLEN="EL5", LFPCML=F, LCVCQM=F, LCVCQD=F, Smith/Gerard=TRUE, MIXLEN="EL5", LFPCML=F, LCVCQM=F, LCVCQD=F, LCVCQD=F, LCVCQD=F, LCVCQD=F, LCVCQD=F, LCVCQD=F, LCVCQM=F, LCVCQM=F	EX15	ALARC-O no LENTCH
 EXIT ALARO-DICVQQM=F,IGVQQD=F EXIS ALARO-DICVQQM=F,IGVQQD=F EXIS ALARO-ONTRUEN="Z EXIS ALARO-ONTRUEN="Z EXIZ ALARO-ONTRUEN="Z" EXIZ ALARO-ONDENCIT. LSCMF=FAISE, LCVQQM=F, LCVQGD=T, Smith Gerard, MIXLEN="Z" EXII ALARO-ON ON ENTOR, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MIXLEN="Z", LCWD=FAISE, LCWQD=FAISE, LCWQQD=T, Smith, Gerard=TRUE, MIXLEN="Z", LDWD=FAISE, LCWGQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z", LDWD=FAISE, LCWGQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z", LDWD=FAISE, LCWGQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z", LDWGM=FAISE, LCWGQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="EI", LPRGML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="EI", LPRGML=F, LCVQQM=F, LCVQQD=F, LENCTH=F, LSCMF=FAISE, LCVQQM=F, LCVQQD=F, LENCTH=F, LSCMF=FAISE, LCVQQM=F, LCVQQD=F, LENCTH=F, LSCMF=FAISE, L	EX16	ALARO-0 LSCM F=FALSE.
EX18 ALARO-D prognostic updraft LCVPRO downskraftLCDDPRO → FALSE EX19 ALARO-D ALRO-OPTICENSE UCVPRO downskraftLCDDPRO → FALSE EX20 ALARO-OMIXLENs="EL1" EX21 ALARO-OMIXLENs="EL1" EX22 ALARO-OMIXLENs="EL1" EX23 ALARO-OMIXLENs="EL1" EX24 ALARO-OMIXLENs="EL1" EX25 ALARO-OMIXLENs="EL1" EX26 ALARO-OMIXLENs="EL1" EX27 ALARO-OMIXLENs="EL1" EX28 ALARO-OMIXLENs="EL1" EX29 ALARO-OMIXLENs="EL1" EX29 ALARO-OMIXLENs="EL1" EX29 ALARO-OMIXLENs="EL1" EX29 ALARO-OMIXLENs="EL1" EX29 ALARO-OMIXLENs="EL1" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX29 ALARO-OMIXLENs="KL0" EX30 ALARO-OMIXLENs="KL0" EX31 ALARO-OMIXLENs="KL0" EX33 ALARO-OMIXLENs="KL0" EX33 ALARO-OMIXLENs="KL0" EX34 ALARO-OMIXLENs="KL0" EX34 ALARO-OMIXLENs="KL0" EX34 ALARO-OMIXLENs="KL0" EX34 ALARO-OMIXLENs="KL0" EX34 ALARO-OMIXLENs="LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith Gerard, MIXLENs="Z" EX34 ALARO-OMIXLENSE, LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENs="Z" EX34 ALARO-OMIXLENSE, LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENs="Z" EX44 ALARO-OMIXLENSE, LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENs="EL5", LPRCML=F, LCWD=FAISE, LNEWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENs="EL5", LPRCML=F, LCWD=FAISE, LNEWD=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENSE", EX34 ALARO-O MO LENTCH, LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENSE", EX34 ALARO-O MO LENTCH, LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENSE", EX34 ALARO-O MO LENTCH, LSCMF=FAISE, LCVCQM=F, LCVCQD=T, Smith/Gerard=TRUE, MIXLENSE", EX34 ALARO-I LENTCH=F, LSCMF=FAISE, LCVCQM=F, LCVCQD=F, LSCMF=FAISE, EX44 ALARO-I LENTCH=F, LSCMF=FAISE, LCVCQM=F, LCVCQD=F, LSCMF=FAISE, EX44 ALARO-I CCTURS=MD1+retures pf parameters → NOT STABLE EX44 ALARO-I CCTURS=MD1+retures pf parameters → NOT STABLE EX44 ALARO-I CCTURS=MD1+retures pf parameters → NOT STABLE EX	EAT	ALAROO LCVGQM=F
BALROO prognous quarks LCV PRO downstratic DDPRO → PALSE EX20 ALAROO-MIXELRN="Z" EX21 ALAROO-MIXELRN="EL1" EX22 ALAROO-MIXELRN="EL1" EX23 ALAROO-MIXELRN="EL1" EX24 ALAROO-MIXERN="EL4" EX25 ALAROO-MIXERN="EL4" EX26 ALAROO-MIXERN="EL4" EX27 ALAROO-MIXERN="EL4" EX28 ALAROO-MIXERN="EL4" EX29 ALAROO-MIXERN="EL4" EX28 ALAROO-NO LENGTI, ISCMF=FAISE, LCVQQM=F, LCVQCD=T, Smith Gerard, MIXLEN="Z" EX30 ALAROO INCENT, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX31 ALAROO INCENTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=:TRUE, MIXLEN="Z" EX33 ALAROO INCENTCH, ISCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=:TRUE, MIXLEN="Z", LPGGML=F, LGWD=FAISE, LNEWD=FAISE, LN	EX18	ALARO-0 LCV GQM=F, LG WGQ D=F
 EX21 ALARO-OMILEN="Z EX21 ALARO-MILEN="EL" EX22 ALARO-OMILEN="EL" EX23 ALARO-OMILEN="EL" EX24 ALARO-OMILEN="EL" EX25 ALARO-OMILEN="EL" EX25 ALARO-OMILEN="EL" EX26 ALARO-OMILEN="EL" EX27 ALARO-OMILEN="EL" EX28 ALARO-OMILEN="EL" EX29 ALARO-OMILEN="ALY" EX29 ALARO-OMILEN="EL" EX29 ALARO-OMILEN="EL" EX29 ALARO-OMILEN="EL" EX29 ALARO-OMILEN="EL" EX29 ALARO-ON ENGTI, LSCMF=FAISE, LCVGQM=F, LCVQGD=T, Smith Gerard, MIXLEN="Z" EX31 ALARO-ON ENGTI, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith Gerard, MIXLEN="Z" EX32 ALARO-ONENTULI=T EX33 ALARO-ONENTULI=F EX34 ALARO-ONENTULI=F EX34 ALARO-ONENTULI=F EX34 ALARO-ONENTULI=F EX35 ALARO-ONENTULI_SCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith Gerard, MIXLEN="Z", LCWD=FAISE, LCWED=FAISE, LCWED=FAISE, LCWED=T, Smith/Gerard=.TRUE, MIXLEN="Z", LCWED=FAISE, LCWED=FAISE, LCWED=FAISE, LCWED=T, Smith/Gerard=.TRUE, MIXLEN="Z", LEPEGML=F, LCWED=FAISE, LCWED=FAISE, LCWED=FAISE, LCWED=FAISE, LCWED=T, Smith/Gerard=.TRUE, MIXLEN="Z", LPEBCML=F, LCWED=FAISE, LCWEQM=F, LCWEQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPEGML=F, LCWED=FAISE, LCWEQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPEGML=F, LCWEQM=F, LCWEQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPEGML=F, LCWEQANE, LCWEQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPEGML=F, LCWEQM=F, LCWEQM=F, LCWEQME=F, LCW	EA19	ALARO-0 prognostic updnatt LCVPRO downdrastLCDDPRO → FALSE
EX22 ALARO-OMINEENe "EL1" EX22 ALARO-OMINEENe "EL1" EX23 ALARO-OMINEENe "EL4" EX24 ALARO-OMINEENe "EL4" EX25 ALARO-OMINEENe "EL4" EX26 ALARO-OMINEENe "EL4" EX27 ALARO-OMINEENe "AC" EX28 ALARO-OMINEENe "AC" EX29 ALARO-OMINEENe "AC" EX29 ALARO-OMINEENE "AC" EX20 ALARO-OMINEENE "EL4" EX20 ALARO-OMINEENE "EL4" EX20 ALARO-OMINEENE "EL5CMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX31 ALARO-OLPROMUME F EX32 ALARO-OLDENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FAISE, LNW WD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="Z", LP80ML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="Z", LP80ML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LP80ML=F, LGNG DE FTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LCVQQM=F, LCVQQD=T, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LCVQQM=F, LCNQQD=T, LSCMF=FAISE, LCVQQD=F, Smith/Gerard=.TRUE, MIXLEN="EL5", LCVQQM=F, LCNQQD=T, LSCMF=FAISE, L	EA20 EX21	ALARGO-MIXLENE Z
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	EA21	ALARGO-MINER ELI
Introduction Intervent EX34 ALARO-OMIKLENSE TEL4" EX35 ALARO-OMIKLENSE TEL4" EX35 ALARO-OMIKLENSE TEL4" EX36 ALARO-OMIKLENSE TEL4" EX36 ALARO-OMIKLENSE TAYC" EX37 ALARO-OMIKLENSE TEL4" EX38 ALARO-OMIKLENSE TEL5CMF=FAISE, LCVQQM=F, LCVQGD=T EX30 ALARO-ODO DENCHT, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLENSE"Z" EX31 ALARO-ODO DENTOH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLENSE"Z", LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith, Gerard=, MIXLENSE"Z", LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLENSE"Z", LPRGML=F, LGWD=FAISE, LCVGQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLENSE"Z, LPRGML=F, LGWD=FAISE, LCVQQD=T, Smith/Gerard=TRUE, MIXLENSE"Z, LPRGML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLENSE"EL5", LPRGML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLENSE"EL5", LPRGML=F EX38 ALARO-1 DENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLENSE"EL5", LPRGML=F EX44 ALARO-1 ICVCQM=F, LCVQQD=F EX38 ALARO-1 ICVCQM=F, LCVQQD=F EX39 ALARO-1 ICVCQM=F, LCVQQD=F EX40 ALARO-1 ICVCQM=F, LCVQQD=F EX41 ALARO-1 ICVCQM=F, LCVQQD=F EX43 ALARO-1 ICVCQM=F, LCVQQD=F EX44 ALARO-1 ICCVGQM=F,	EX22 EX22	ALARGOOMINLENE "ELT"
Intervent Intervent EX25 ALARO-OMIXLENE" ALG" EX26 ALARO-OMIXLENE" ALG" EX27 ALARO-OMIXLENE" ALG" EX28 ALARO-O no LENCHT, LSCMF=FAISE, LCVGQM=F, LCVQGD=T EX29 ALARO-O INCENCHT, LSCMF=FAISE, LCVGQM=F, LCVQD=T, Smith Gerard, MIXLEN="Z" EX30 ALARO-O INFULL=T EX31 ALARO-O INFULL=T EX33 ALARO-O INFULL=T EX33 ALARO-O INFULL=T EX33 ALARO-O INFUELSE EX34 ALARO-O INFUELSE EX35 ALARO-O INFUELSE, LEVCQM=F, LCVCQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FALSE, LEVEWD=FALSE, LEVEWD=FALSE, LEVEWD=FALSE, LEVEWD=FALSE, LEVEWD=FALSE, LEVEWD=FALSE, LEVEMD=FALSE, LEVEWD=FALSE, LEVEMD=FALSE, LEVEMDE=FALSE, LEVEMD=FALSE, LEVEMD=FALSE, LEVEMD=FALSE, LEVEMD=FAL	EX24	ALAROOMIKLENE ELS ALAROOMIKLENE ELS
Intervent Intervent Intervent Intervent	EX:25	ALARO OMICLES - ELS
EX27 ALARO-OMIXLE N="RLO" EX28 ALARO-O no LENCHT, ISCMF=FAISE, LCVGQM=F, LCVQGD=T, Smith Gerard, MIXLEN="Z" EX29 ALARO-O LENCHT, ISCMF=FAISE, LCVGQM=F, LCVQGD=T, Smith Gerard, MIXLEN="Z" EX30 ALARO-O LENUMX=FAISE, EX31 ALARO-O no LENTCH, ISCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith Gerard, MIXLEN="Z" EX33 ALARO-O no LENTCH, ISCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, MIXLEN="Z", LGWD=FAISE, LNEWD=FAISE, LNEWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, MIXLEN="Z", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, MIXLEN="Z", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, MIXLEN="Z", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWG=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWG=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWG=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=, TRUE, MIXLEN="EIS", LPRGML=F, LGWG=F, LCVGQM=F, LCVGQD=T, LCVGQM=F, LCVGQM=F, LCVGQD=F, LCVGQM=F, LCVGQD=F, LENCH=F, ALARO-1 CGTURS=FAISE, LF, CHTRES MD2+reture of parameters → NOT STABLE EX44 ALARO-1 CGTURS=GNSEF+reture of parameters → NOT STABLE EX45 <td< th=""><th>EX26</th><th>ALAROOMIKLEN="AVC"</th></td<>	EX26	ALAROOMIKLEN="AVC"
Intervent ALARO-0 no LENCHT, LSCMF=FAISE, LCVQQM=F, LCVQQD=T EX28 ALARO-0 no LENCHT, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX30 ALARO-0 LENCHT, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX31 ALARO-0 LENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX32 ALARO-0 DENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z", LGWD=FAISE, LNEWD=FAISE, LNEWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="Z", LFWD=FAISE, LNEWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="Z", LFWGML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LCVQQD=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX33 ALARO-1 DENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX34 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX34 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX34 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX34 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVQQM=F, LCVQQD=F, LCVQQD=F, LCVQQD=F, LCVQQD=F, LCVQQD=F EX34 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVGQM=F, LCVGQD=F, LCV	EX 27	ALA BO-DATIVE N="FED"
 EX29 ALARO-0 no LENCHT, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX30 ALARO-0 LENUMX=FAISE. EX31 ALARO-0 LENUMX=FAISE. EX32 ALARO-0 LENUMX=FAISE. EX33 ALARO-0 LENUMX=FAISE. EX34 ALARO-0 LENUMX=FAISE, LCVQQM=F, LCVQQD=T, Smith Gerard, MIXLEN="Z" EX34 ALARO-0 LENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FAISE, LNEWD=FAISE. EX35 ALARO-0 no LENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=:TRUE, MIXLEN="Z", LPRGML=F, LGWD=FAISE, LNEWD=FAISE. EX36 ALARO-0 no LENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=:TRUE, MIXLEN="Z", LPRGML=F, LGWD=FAISE, LNEWD=FAISE. EX37 ALARO-0 no LENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LPRGML=F LPRGML=F, LGWD=FAISE, LNEWD=FAISE. EX37 ALARO-1 no IENTCH, LSCMF=FAISE, LCVQQM=F, LCVQQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LPRGML=F LPRGML=F EX38 ALARO-1 LCVGQM=F, LCVGQD=F EX49 ALARO-1 LCVGQM=F, LCVGQD=T EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LPRGML=F → NOT STABLE EX44 ALARO-1 LPRGML=F → NOT STABLE EX44 ALARO-1 CGTURS=MC01+rotume pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=MC01+rotume pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=EF 1+rotume pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 1+rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=EF 0++rotume pf parameters → NOT	EX28	ALARO-0 no LENCHT LSCMF=FAISE. LCVGOM=F. LCVGGD=T
 EX30 ALARO-0 IVFULL=T ALARO-0 IVFULL=T ALARO-0 IVFULL=T EX31 ALARO-0 IVFULL=T EX32 ALARO-0 INFURMX=FALSE. EX33 ALARO-0 INFUCH, LSCMF=FALSE, LCVQQM=F, LCVQQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FALSE, LRWWD=FALSE, LLCWQQM=F, LCVQQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FALSE, LRWWD=FALSE, LNEWD=FALSE, LNEWD=FALSE, LNEWD=FALSE, LNEWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="Z", LFRGML=F, LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGWD=FALSE, LNEWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGWD=FALSE, LCVQQM=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGVGQA=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGVGQA=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LSCMF=FALSE, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LGVGQD=F, LCVQQD=F, LCVQQD=T, Smith/Gerard=TRUE, MIXLEN="ELS", LFRGML=F, LSCMF=FALSE, LNEWD=FALSE, LNEW	EX29	ALARO-0 to LENCHT LSCMF= FAISE LCVCOM=F LCVCGD=T Smith Gerard MDXLEN="Z"
 EX31 ALARO-0 LRNUMX=FALSE. EX32 ALARO-0 D.PRGM L=F EX33 ALARO-0 no LENTCH, LSCMF=FALSE, LCVCQM=F, LCVCQD=T, Smith Gerard, MIXLEN="Z", LGWD=FALSE, LNE WD=FALSE, LCVCQM=F, LCVCQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FALSE, LNE WD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="Z", LFRG ML=F, LGWD=FALSE, LNE WD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LPRG ML=F, LGWD=FALSE, LNE WD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LFRG ML=F, LGWD=FALSE, LEW DD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LFRG ML=F, LGWD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LFRG ML=F, LGWD=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LFRG ML=F EX33 ALARO-10 to LENTCH, LSCMF=FALSE, LCVCQM=F, LCVCQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LFRG ML=F EX43 ALARO-11LENTCH=F, LCVCQD=F EX44 ALARO-11LENTCH=F, LCVCQD=T EX44 ALARO-11LENTCH=F, LCVCQD=T EX44 ALARO-11LCVCQM=T, LCVCQD=T EX44 ALARO-11LCWCQD=FALSE, LNEWD=FALSE. EX44 ALARO-11CGTURS=MD1+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=MD1=dfank+reture → not stable EX50 ALARO-1 CGTURS=MD1=dfank+reture → not stable EX51 ALARO-1 CGTURS=MD1=dfank+reture → not stable EX54 ALARO-1 CGTURS=MD1=dfank+reture → not stable EX54 ALARO-1 modif turbulencs: mixing kngth: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulencs: mixing kngth: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulencs: mixing kngth: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulencs: mixing kngth: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulencs: mixing kngth:	EX30	ALABO-0 LVFULL=T
 EX32 ALARO-0 LPBGM L= F EX33 ALARO-0 no LENTCH, LSCMF=FAISE., LCVGQM=F, LCVGQD=T, Smith Gerard, MIXLEN="Z", LGWD=FAISE, LSWD=FAISE, LCVGQM=F, LCVGQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FAISE, LNEWD=FAISE, LENGD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=:TRUE., MIXLEN="Z", LGPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=:TRUE., MIXLEN="Z", LGPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=:TRUE., MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=:TRUE., MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LPRGML=F, LGWG=F, LCVGQD=F, LCVGQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LPRGML=F, LGWG=F, LCVGQD=F EX34 ALARO-1 LENTCH=.F, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=:TRUE, MIXLEN="EIS", LPRGML=F EX44 ALARO-1 LENTCH=.F, LSCMF=FAISE. EX44 ALARO-1 LENTCH=.F, LSCMF=FAISE. EX44 ALARO-1 LENTCH=.F, LSCMF=FAISE. EX44 ALARO-1 LCVGQM=F, LCVGQD=T EX44 ALARO-1 LCVGGMI=F ANDT STABLE EX44 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX45 ALARO-1 LCOEF KTKE=F. (→ LPTKE) EX51 ALARO-1 LCOEF KTKE=F. (→ LPTKE) EX51 ALARO-1 LCOEF KTKE=F. (→ LPTKE) EX51 ALARO-1 CGTURS=MD1=defami-reture → not stable EX54 ALARO-1 modif turbulence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F EX56 ALARO-1 modif turbulence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F EX56 ALARO-1 modif turbulence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F EX56 ALARO-1 modif turbulence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F EX56 ALARO-1 modif turbulence: mixing length:	EX31	ALARO-0 LENUMX = FALSE
EX33 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith Gerard, MIXLEN="Z" EX34 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="Z", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F, LGWGQM=F, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX37 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX38 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX38 ALARO-1 LCVCQM=F, LCVGQD=F EX39 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LPRGML=F EX44 ALARO-1 LCVGQM=F, LCVGQD=F EX44 ALARO-1 LENTCH=F, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EIS", LCVGQM=F, LCVGQM=T, LCVGQM=F, LCVGQD=F EX44 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=MD1+reture → not stable	EX32	ALARO-0 LP RGM L= F
 EX34 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith, Gerard, MIXLEN="Z", LGWD=FALSE, LNEWD=FALSE. EX35 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="Z", LPRGML=F, LGWD=FALSE, LNEWD=FALSE. EX36 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="EL5", LPRGML=F, LGWD=FALSE, LNEWD=FALSE. EX37 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="EL5", LPRGML=F, LGWD=FALSE, LNEWD=FALSE. EX37 ALARO-0 no LENTCH, LSCMF=.FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="EL5", LPRGML=F EX38 ALARO-1 LCVGQM=F, LCVGQD=F EX39 ALARO-1 LENTCH=F, LSCMF=.FALSE. EX44 ALARO-1 LENTCH=F, LSCMF=.FALSE. EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LGWD=.FALSE., LNEWD=.FALSE. EX44 ALARO-1 LGWD=.FALSE., LNEWD=.FALSE. EX44 ALARO-1 CGTURS=MD1+rotume pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=MD1+rotume pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=EF B+rotume pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=EF B+rotume pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=EF B+rotume pf parameters → NOT STABLE EX51 ALARO-1 CGTURS=EF B+rotume pf parameters → NOT STABLE EX54 ALARO-1 CGTURS=MD1=nof maint infihrillation) EX53 ALARO-1 CGTURS=MD1=mix mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F EX56 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F, LCVGQD=F, LENTCH=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LCVGQM=F, LCVGQD	EX33	ALARO-0 no LENTCH, LSCMF=.FALSE., LCVGQM=F, LCVGQD=T, Smith Gerard, MIXLEN="Z"
EX35 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="Z", LPBGML=F, LGWD=FALSE, LNEWD=FALSE. EX36 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="ELS", LPBGML=F, LGWD=FALSE, LNEWD=FALSE. EX37 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="ELS", LPBGML=F EX37 ALARO-0 no LENTCH, LSCMF=FALSE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="ELS", LPBGML=F EX38 ALARO-1 LCVGQM=F, LCVGQD=F EX39 ALARO-1 LENTCH=.F., LSCMF=.FALSE. EX40 ALARO-1 LENTCH=.F, LCVGQD=T EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LCWD=FALSE, LNEWD=.FALSE. EX44 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=MO1+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=MO1+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=MO1+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=MNE+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=MNE+reture pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=MD1=default+reture → not stable EX51 ALARO-1 CGTURS=MD1=default+reture → not stable EX53 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSCMF	EX34	ALARO-0 no LENTCH, LSCM F=.FALSE., LCVGQM=F, LCVGQD=T, Smith, Gerard, MIXLEN="Z", LGWD=.FALSE., LNEWD=.FALSE.
EX36 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LPBGML=F, LGWD=FAISE, LNEWD=FAISE, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LPBGML=F EX37 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LPBGML=F EX38 ALARO-1 LCVGQM=F, LCVGQD=F EX39 ALARO-1 LENTCH=.F. EX40 ALARO-1 LENTCH=.F, LSCMF=FAISE. EX41 ALARO-1 LCVGQM=T, LCVGQD=T EX42 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LGWD=_FAISE, LNEWD=FAISE. EX44 ALARO-1 LGWD=_FAISE, LNEWD=FAISE. EX44 ALARO-1 CGTURS=RMD1+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX51 ALARO-1 CGTURS=MD1=default+reture → not stable EX53 ALARO-1 CGTURS=MD1=default+reture → not stable EX54 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+retu	EX35	ALARO-0 no LENTCH, LSCMF=.FALSE., LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="Z", LPRGML=F, LGWD=.FALSE., LNEWD=.FALSE.
EX37 ALARO-0 no LENTCH, LSCMF=FAISE, LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE, MIXLEN="EL5", LPBGML=F EX38 ALARO-1 LCVGQM=F, LCVGQD=F EX39 ALARO-1 LENTCH=F, LSCMF=FAISE. EX40 ALARO-1 LENTCH=F, LCVGQD=T EX41 ALARO-1 LCVGQM=T, LCVGQD=T EX42 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 LCVGQM=T, LCVGQD=T EX44 ALARO-1 CGTURS=MD1+returns of parameters → NOT STABLE EX44 ALARO-1 CGTURS=RMC01+returns of parameters → NOT STABLE EX45 ALARO-1 CGTURS=RD1+returns of parameters → NOT STABLE EX46 ALARO-1 CGTURS=FB +returns of parameters → NOT STABLE EX45 ALARO-1 CGTURS=BH =returns of parameters → NOT STABLE EX50 ALARO-1 CGTURS=BD1=returns of parameters → NOT STABLE EX51 ALARO-1 CGTURS=MD1=returns of notist antifrbrillation) EX53 ALARO-1 CGTURS=MD1=returns + not stable EX54 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F, modif micro+conv: LABI2=F, LCVGQM=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSCMGEEY=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F, modif mi	EX36	ALARO-0 no LENTCH, L9CMF=FAISE., LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="EL5", LPRG ML=F, LGWD=FAISE., LNEWD=.FAISE.
EX38 ALARO-1 LCVGQM=F, LCVGQD=F EX39 ALARO-1 LENTCH=F. EX40 ALARO-1 LENTCH=F., LSCM F=FALSE. EX41 ALARO-1 LENTCH=F., LSCM F=FALSE. EX41 ALARO-1 LCVGQM=T, LCVGQD=T EX42 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX43 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX44 ALARO-1 CGTURS=MD1+retume pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=MD1+retume pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=QNSE+retume pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=EF B+retume pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=FF +retume pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=F B+retume pf parameters → NOT STABLE EX51 ALARO-1 CGTURS=MD1=default+retume → not stable EX53 ALARO-1 CGTURS=MD1=default+retume → not stable EX54 ALARO-1 modif fur bulence: mixing length: EL5, CGTURS=MD2+retume, LPRGML=F EX55 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+retume, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSCM F=F, LSMGCDEV=T, LXRCBEV=F EX56 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+retume, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LSCMF=F, LSMGCDEV=T, LXRCBEV=F EX57	EX37	ALARO-0 no LENTCH, LSCMF=.FAISE., LCVGQM=F, LCVGQD=T, Smith/Gerard=.TRUE., MIXLEN="EL5", LPRG ML=F
EX39 ALARO-1 LENTCH=F. EX40 ALARO-1 LENTCH=F., LSCMF=FALSE. EX41 ALARO-1 LCVGQU=T, LCVGQD=T EX42 ALARO-1 LCVGQU=T, LCVGQD=T EX42 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX43 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX44 ALARO-1 CGTURS=MD1+returns pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=MD1+returns pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=REMC01+returns pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=EB H-returns pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=EB H-returns pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=MD1=returns eff parameters → NOT STABLE EX50 ALARO-1 CGTURS=MD1=returns eff parameters → NOT STABLE EX51 ALARO-1 CGTURS=MD1=returns eff parameters → not stable EX53 ALARO-1 CGTURS=MD1=returns + returns → not stable EX54 ALARO-1 modif turnse: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F EX55 ALARO-1 modif turnse: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LSMGCDEV=T, LXR-CDEV=F EX55 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQ=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F EX58	EX38	ALARO-1 LCVGQM=F, LCVGQD=F
EX40 ALARO-1 LENTCH=F., LSCMF=FALSE. EX41 ALARO-1 LCVGQM=T, LCVGQD=T EX42 ALARO-1 LGWD=FALSE, LNEWD=FALSE. EX43 ALARO-1 LGWD=FALSE, LNEWD=FALSE. EX44 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=GONE + reture pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=GONE + reture pf parameters → NOT STABLE EX51 ALARO-1 CGTURS=MD1=default+ reture → not stable EX53 ALARO-1 CGTURS=MD1=default+ reture → not stable EX54 ALARO-1 modif furbalence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif furbalence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX56 ALARO-1 modif furbalence: mixing length: ELS, CGTURS=MD2+reture, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX57 ALARO-1 modif furbalence: mixing length: ELS, CGTUR=QNSE+reture, LPRGML=F EX58 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXR-CDEV=F	EX39	ALARO-1 LENTCH=.F.
EX41 ALARO-1 LCVGQM=T, LCVGQD=T EX42 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX43 ALARO-1 LFRGML=F → NOT STABLE EX44 ALARO-1 CGTURS=mD1+reture pf parameters → NOT STABLE EX44 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=EFB+reture pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=F + (→ LPTKE) EX51 ALARO-1 CGTURS=MD1=default+reture → not stable EX53 ALARO-1 CGTURS=MD1=default+reture → not stable EX54 ALARO-1 CGTURS=MD1=default+reture → not stable EX54 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGM=F, LSMGCDEV=T, LXR-CDEV=F EX57 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LSMGCDEV=T, LXR-CDEV=F EX58 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F EX58 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T,	EX40	ALARO-1 LENTCH=.F., LSCMF=.FALSE.
EX42 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX43 ALARO-1 LGWD=FALSE., LNEWD=FALSE. EX44 ALARO-1 CGTURS=MD1+rotume pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=RMC01+rotume pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=RMC01+rotume pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=EFB+rotume pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=EFB+rotume pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=EFB+rotume pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=MD1=default+rotume → not stable EX51 ALARO-1 CGTURS=MD1=default+rotume → not stable EX53 ALARO-1 GGTURS=MD1=default+rotume → not stable EX54 ALARO-1 modif fur bulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F LSCMF=F_LSMGCDEV=T_LXRCDEV=F LARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LSMGCDEV=T, LXR-CDEV=F EX55 ALARO-1 modif furbulence: mixing length: EL5, CGTURS=MD2+rotume, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LCVGQM=F, LSMGCDEV=T, LXR-CDEV=F EX57 ALARO-1 modif furbulence: mixing length: EL5, CGTUR=QNSE+rotume, LPRGML=F, LSMGCDEV=T, LXR-CDEV=F EX58 ALARO-1 modif furbulence: mixing length: EL5, CGTUR=QNSE+rotume, LPRGML=F, LSMGCDEV=T, LXR-CDEV=F	EX41	ALARO-1 LCVGQM=T, LCVGQD=T
EX43 ALARO-1 LP RGM L= F → NOT STABLE EX44 ALARO-1 CGTURS=MD1+reture pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=RMC01+reture pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=QNSE+reture pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=FB-Preture pf parameters → NOT STABLE EX50 ALARO-1 LCOEF KIKE=.F. (→ LPTKE) EX51 ALARO-1 CGTURS=MD1=default+reture → not stable EX53 ALARO-1 GGTURS=MD1=default+reture → not stable EX54 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, LCVGQD=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX56 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LCNCQEV=F EX57 ALARO-1 modif turbulence: mixing length: EL5, CGTUR=QNSE+reture, LPRGML=F EX57 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F EX58 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F EX58 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F, LSMGCDEV=T, LXR-	EX42	ALARO-1 LGWD=_FALSE_, LNEWD=_FALSE.
EX44 ALARO-1 CGTURS=MD1+returns pf parameters → NOT STABLE EX45 ALARO-1 CGTURS=RMC01+returns pf parameters → NOT STABLE EX46 ALARO-1 CGTURS=QNSE+returns pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=EFB+returns pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=EFB+returns pf parameters → NOT STABLE EX51 ALARO-1 CGTURS=() (turn off moist antiFibrillation) EX53 ALARO-1 CGTURS=MD1=default+reture → not stable EX53 ALARO-1 CGTURS=MD1=default+reture → not stable EX54 ALARO-1 modif furbalence: mixing length: EL5, CGTURS=MD2+returne, LPRGML=F EX55 ALARO-1 modif furbalence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, LCVGQD=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX56 ALARO-1 modif furbalence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LCVGQM=F, LCVGM=F, LSMGCDEV=T, LXR-CDEV=F EX57 ALARO-1 modif furbalence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F EX58 ALARO-1 modif furbalence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F, LSMGCDEV=T, LXR-CDEV=F, MIRL=RONSE+reture, LPRGML=F	EX43	ALARO-1 LPRGM L= $F \rightarrow NOT$ STABLE
 EX46 ALARO-1 CGTURS=RMC01+returns pf parameters → ROT STABLE EX46 ALARO-1 CGTURS=EFB+returns pf parameters → NOT STABLE EX47 ALARO-1 CGTURS=EFB+returns pf parameters → NOT STABLE EX50 ALARO-1 CGTURS=FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	EX44	ALARG-1 CGTURS=MD1+returne pt parametersi → NOT STABLE
EX46 ALARO-1 CGTURS=QRSE+returns [n parameters → NOT STABLE EX47 ALARO-1 CGTURS=EF B+returns [n parameters → NOT STABLE EX50 ALARO-1 LCOEF KTKE =.F. (→ LPTKE) EX51 ALARO-1 CGTURS=MD1=wid=auh+returns → not stable EX53 ALARO-1 CGTURS=MD1=wid=auh+returns → not stable EX54 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F EX55 ALARO-1 modif urbulence: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F, LCVGQD=F, LENTCH=F, LSCMG=F, LCVGQD=F, LENTCH=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LCVGQM=F, LCVGQD=F, LCVGQD=F, LENTCH=F, LSCMG=L=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENCTCH=F, LSCMG=F, LCVGQD=F, LENCTH=F, LSCMG=F, LCVGQM=F, LCVGQM=F, LSMGCDEV=T, LXR-CDEV=F EX55 ALARO-1 modif undense: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENCTH=F, LSCMF=F, LSMGCDEV=T, LXR-CDEV=F EX57 ALARO-1 modif undense: mixing length: EL5, CGTURS=MD2+returns, LPRGML=F, MD2+returns, LPRGML=F, LCVGQM=F, LCVGQM=F, LSCMF=F, LSMGCDEV=T, LXR-CDEV=F	EX45	ALARO-1 CGT URS=RMC01+reture of parameters → NOT STABLE 11 ADD 1 CCTURS=ONOI+reture of parameters → NOT STABLE
 EX50 ALARO-1 UKS=EF B+returne pr parameters → ROT STABLE EX50 ALARO-1 LCOEF KTKE=F. (→ LPTKE) EX51 ALARO-1 LCOEF KTKE=F. (→ LPTKE) EX53 ALARO-1 CGT UKS=MD1=default+returne → not stable EX54 ALARO-1 modif turbulence: mixing length: EL5, CGT UKS=MD2+returne, LPRGML=F EX55 ALARO-1 modif i micro+comv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX56 ALARO-1 modif turbulence: mixing length: EL5, CGT UKS=MD2+returne, LPRGM L=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENGTH=F, LSCM F=F, LSCM CEF V=F EX57 ALARO-1 modif turbulence: mixing length: EL3, CGT UKS=MD2+returne, LPRGM L=F EX58 ALARO-1 modif fuicro+comv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F EX57 ALARO-1 modif fuicro+comv: LAB12=F, LCVGQM=F, LCVCQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F, LCVGM=F, LCVGM=F, LSMGCDEV=T, LXR-CDEV=F EX58 ALARO-1 modif fuicro+comv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F EX59 ALARO-1 modif fuicro+comv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F 	EA40	ALARCEICGIURS PRODUCT
EX50 ALARO-1 DCDR KTKB= (→ LPTRE) EX51 ALARO-1 XDAMP=0 (turn off moist antiFibrillation) EX53 ALARO-1 CGTURS=MD1=default+reture → not stable EX54 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F EX55 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, LCVGQD=F, LENTCH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX56 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+reture, LPRGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENCTH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX57 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F EX58 ALARO-1 modif furbulence: mixing length: EL3, CGTUR=QNSE+reture, LPRGML=F, LSMGCDEV=T, LXR-CDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LCVGQM=F, LENCH=F, LSMGCDEV=T, LXR-CDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LSMGCDEV=T, LXR-CDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LSMGCDEV=F, LSMGCDEV=T, LXR-CDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR-CDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENCH=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENCH=F, Modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENCH=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, Modif micro+conv: LAB12=F, LCVGQM=F, LENCH=F, MOdif micro+conv: LAB12=F, LCVGQM=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F, LSMGCDEV=F,	EA4/ EX50	ALARCEI CGI UNDEEP DEPUTURE JE parameters \rightarrow ROI SIABLE ALARCEI CGI UNDEEP TVE E_{i} (i DTVE)
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EX56 ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+retume, LPBGML=F, modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENGTH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F EX57 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+retume, LPBGML=F EX58 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+retume, LPBGML=F, LSMGCDEV=T, LXR-CDEV=F, LSMGCDEV=T, LXR-CDEV=F, modif turbulence: mixing length: EL3, CGTUR=QNSE+retume, LPBGML=F	EX55	ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LCVGQD=F, LENTCH=F,
EX57 ALARO-1 modif turbulence: mixing length: EL3, CGTUR=QNSE+reture, LPRGM L=F EX58 ALARO-1 modif micro+com: LAB12=F, LCVQQM=F, LCVQQD=F, LENTCH=F, LSMGCDEV=T, LXR- CDEV=F, welf studence mixing length EL3, CGTUR=CONE+reture, LPRGML=F	EX56	ALARO-1 modif turbulence: mixing length: EL5, CGTURS=MD2+retune, LPRGML=F, modif micro+conv: LAB12=F, LCVCQM=F, LCVCQD=F, LENGTH=F, LSCMF=F, LSMGCDEV=T, LXRCDEV=F
EX58 ALARO-1 modif micro+conv: LAB12=F, LCVGQM=F, LCVGQD=F, LENTCH=F, LSMGCDEV=T, LXR- CDEV=F, worlf turbulence, mixing kneth-E13, CGTUE=ONSE+reture, LPBCML=F	EX57	ALARO-1 modif turbulence: mixing length; EL3. CGTUR=ONSE+reture, LPRGML=F
A REAL AND A	EX58	ALARO-1 modif micro+conv: LAB12=F, LCYGQM=F, LCYGQD=F, LENTCH=F, LSMGCDEV=T, LXR- CDEV=F, modif turbulence, micro-kenether L3, CCTUR=CONSEL-notme, LPBCMU=F

Figure 1: Experiment list for the sensitivity tests.

The control impact of namelist changes (related to deep convection, microphysics and turbulence) was done by using MTEN tool (Moits Total Energy Norm - Storto, A. and Randriamampianina, R. (2010)) in order to evaluate the relative impact with respect to reference (ALARO-1 or ALARO-0).

A series of experiments for two weeks period starting with 18th May 2016 to 1st June 2016 were performed on HPCE in ECMWF and on ZAMG computer. The boundary conditions for ALADIN-LAEF ensemble were interpolated from ECMWF/EPS system (91 vertical levels) using GL tool (instead of 901 and e927 configurations) even if some scores show degradation. GL tool was used, in these experiments, to evaluate multiphysics impact.

In order to evaluate the ability of multiphysics and/or SPPT choices, the members of ALADIN-LAEF system were coupled in a dynamical mode with the first 16th members of ECMWF/EPS.

It is well known that a higher resolution, deterministic or ensemble systems, demands considerable power resources. In order to take into account the advanges of the finer resolution of ALADIN-LAEF at 5 km horizontal resolution, the new integration domain (Figure 2 - from Martin Bellus's report stay from 2016 at ZAMG, Vienna) was diminished.



Figure 2: ALADIN-LAEF integration domains: the current one at 11 km horizontal resolution (blue) and the new one at 5 km horizontal resolution (red).

Taking into account the sensitivity tests results, five versions namelist settings (four namelists) were used to create different settups of ALADIN-LAEF system (Table 1). The performance of each version was evaluated computing different verification scores (probabilistic and deterministic evaluation). For surface verification, analysed parameters were temperature at 2m, mean sea level pressure, wind speed at 10 m, relative humidity at 2m and total precipitation cumulated in 6 hours. For upper levels (500 and 850 hPa), the parameters were temperature, geopotential and wind direction. The surface verification was done against 1355 synop stations over Europe and upper levels verification was done using ECMWF analyses for 508x446 grid points.

The verification results of two weeks period showed similar behaviour for many verification scores and it was a little bit complicated to choose one version. The main purpose is to avoid clusters or a spread too large between members which belong to the same version. In figure 4, for BIAS score for temperature at 500 hPa, it can be noticed that for bias values (black lines) of the ensemble mean, VERSION 5 outperforms VERSION 4. Looking separately at each member, at the same forecast time, it can be seen that members which are run with ALARO-0 (EXP 00) are distant from the others. Thereby, VERSION 4 has a the better distribution of the members for temperature at 500 hPa. Similar results for other parameters for upper levels



Figure 3: Namelist settings versions.

and for surface, led to the choice that version 4 should be further investigated (to be combined with SPPT scheme).



Figure 4: BIAS for temperature at 500 hPa for all five versions.

The next step was to introduce SPPT scheme for VERSION4 and to reference ALARO-1, the SPPT used settings were the following (default settings):

- standard deviation = 0.5
- horizontal correlation length scale = 80000
- correlation time scale = 7200
- clippig ratio = 2.0

In figure 5 it can be seen the spectral pattern of the perturbation with the default setup of SPPT. More details can be found on Mihály Szűcs's reports from www.rclace.eu. The resulting

histogram of this spectral patterns can be observed in figure 6 which shows a strange distribution of random numbers (not gaussian). More experiments were made using different SPPT setups (if needed they are available upon request).



Figure 5: Spectral pattern at + 1 hour for: $TAU_SDT = 7200., XLCOR_SDT = 80000., SDEV_SDT = 0.5, NSEED_SDT = 1, XCLIP_RATIO_SDT = 2.0.$



Figure 6: Histogram for: $TAU_SDT = 7200., XLCOR_SDT = 80000., SDEV_SDT = 0.5, NSEED_SDT = 1, XCLIP_RATIO_SDT = 2.0.$

In figures 7, 8, 9 are presented the BIAS, RMSE and SPREAD scores for surface and upper levels (500 and 850 hPa) experiments with ALARO-1 (red), only ALARO-1 plus SPPT (green), VERSION4 (blue) and VERSION4 plus SPPT (magenta). Comparing all the experiments, it can be noticed some differences between the first two experiments (ALARO-1 and ALARO-1 plus SPPT) and the last two experiments (VERSION4 and VERSION4 plus SPPT). ALARO-1 with SPPT is more similar to the ALARO-1 and VERSION4 with SPPT is more similar to VERSION4. Similar results are obtained for other scores. For example, for percentage of outliers (Figure 10), it can be observed that VERSION4 and VERSION4 with SPPT have less outliers than ALARO-1 and ALARO-1 with SPPT. It is also obviously for figure 11 (BIAS for temperature of 2 m for each individual member) that the impact of SPPT with the default setup is rather small.



Figure 7: BIAS, RMSE and SPREAD for MSLP (a), wind speed (b), temperature at 2m (c), precipitation cumulated in 6 hours (d) for experiments with ALARO-1 (red), only ALARO-1 plus SPPT (green), VERSION4 (blue) and VERSION4 plus SPPT (magenta) for 18.05 - 01.06.2016 period.

In conclusion, in order to avoid too strong members clustering, ALARO-0 was excluded and a preliminary setup with new multiphysics was finally chosen (four namelist options for ALARO-1). Also, the introduction of SPPT scheme has just a small impact.

As a final conclusion of multiphysics, as Christoph said: *Multiphysics is 'endless' story* ... too many possibilities. :)

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Figure 8: BIAS, RMSE and SPREAD for geopotential (a), wind speed (b), temperature at 2m (c), relative humidity (d) at 850 hPa for experiments with ALARO-1 (red), only ALARO-1 plus SPPT (green), VERSION4 (blue) and VERSION4 plus SPPT (magenta) for 18.05 - 01.06.2016 period.



Figure 9: BIAS, RMSE and SPREAD for geopotential (a), wind speed (b), temperature at 2m (c), relative humidity (d) at 500 hPa for experiments with ALARO-1 (red), only ALARO-1 plus SPPT (green), VERSION4 (blue) and VERSION4 plus SPPT (magenta) for 18.05 - 01.06.2016 period.



Figure 10: Outliers for MSLP (a), wind speed (b), temperature at 2m (c), precipitation cumulated in 6 hours (d) for experiments with ALARO-1 (red), only ALARO-1 plus SPPT (green), VERSION4 (blue) and VERSION4 plus SPPT (magenta) for 18.05 - 01.06.2016 period.



Figure 11: BIAS for temperature at 2m for ALARO-1 (a), ALARO-1 with SPPT (b), VERSION4 (c) and VERSION4+SPPT (d) for 18.05 - 01.06.2016 period.

Annex 1

Microphysics setup for ALADIN-LAEF system at 11 km horizontal resolution

NAMELIST	MICROPHYSI CS	DNING	DEEP CONV.	TUNING	SHALLOW T	DNING	RADIATION	DNING	TURBULENC E	TUNING	GUST DIAG. TI	SNING	S CREENING EVEL DIAG.	TUNING
MP01	ALARO-XR		3MT		JFG87		JFG05		JFG06		RAFTUR		NSCRED	
MP02	ALARO-XR	НЗМ	3MT	D21, D3H	JFG87		JFG05	R1H, R3H, R4T	JFG06		RAFTUR/RAF TKE/RAFBRA	2 "	VISCREO/NISC RE1/NISCRE2	
MP03	ALARO-XR	M1L, M2L, MBL	3MT	ргн, рзц	JFG87		JFG05	R1L, R3L, R4T	JFG06		RAFTUR/RAF TKE/RAFBRA	2 4	VSCREO/NSC RE1/NSCRE2	
MPO4	ALARO-XR	NBL	3MT	ргн, рзг	JFG87		JFG05	R1L, R3L, R4T	JFG06		RAFTUR/RAF TKE/RAFBRA	2 4	VSCREQ/NSC RE1/NSCRE2	
MPOS	ALARO-XR	M1H, M2H, MBL	3MT	ргн, рзц	JFG87		JFG05	R1L, R3L, R4T	JFG06		RAFTUR/RAF TKE/RAFBRA	2 11	VSCREO/NSC RE1/NSCRE2	
MP06	ALARO-SM		3MT		JFG87		JFG05	R4F	JFG06	T2H, T3L	RAFTUR/RAF TKE/RAFBRA	2 4	VSCREQ/NSC RE1/NSCRE2	
MP07	ALARO-SM		3MT	D5T	JFG87		JFG05	R4T	JFG06	T21, T3H	RAFTUR/RAF TKE/RAFBRA	24	VSCREO/NSC RE1/NSCRE2	
MP08	LOPEZ		BG		KFB		ECMWF		CBR		RAFTKE		NSCREO	
MP09	LOPEZ		BG	DIT	KFB		ECMWF		CBR		RAFTUR/RAF TKE/RAFBRA	2 4	VSCREO/NSC RE1/NSCRE2	
MP10	LOPEZ		BG		KFB		ECMWF		CBR		RAFTUR/RAF TKE/RAFBRA	7	VSCREO/NSC RE1/NSCRE2	
MP11	LOPEZ		BG	D1 T	KFB	22	ECMWF		CBR		RAFTUR/RAF TKE/RAFBRA	2 4	VSCREQ/NSC RE1/NSCRE2	
MP12	ALARO-XR	M1L, M2L, MBL	3MT/CA	ргн, рзг	JFG87		JFG05	R1L, R3L, R4T	JFG06		RAFTUR/RAF TKE/RAFBRA	2 4	VSCREO/NSC RE1/NSCRE2	
MP13	ALARO-XR	M1H, M2H, MBL	3MT/CA	ргн, рзц	JFG87		JFG05	R1L, R3L, R4T	JFG06		RAFTUR/RAF TKE/RAFBRA	24	VSCREO/NSC RE1/NSCRE2	
MP14	ALARO-XR		3MT		JFG87		JFG05		JFG06		RAFTUR/RAF TKE/RAFBRA		LSCRSTOCH	NT5GN=10
MP15	LOPEZ		BG		KFB		ECMWF		CBR		RAFTKE	2 4	VSCREO/NSC RE1/NSCRE2	
MP16	LOPEZ		BG		KFB		ECMWF		CBR		RAFTKE		NSCREO	NTSGV=-10