1. Run control keywords

NAME	DEFAULT VALUE	TYPE	DESCRIPTION	MODEL	VALID ENTRIES	UNITS
MODEL		CHARACTER	Model	TWOLAYERS TWOCOMPONENTS	TWOLAYERS TWOCOMPONENTS	-
DISTR1	.FALSE.	LOGICAL	Flag to enable grainsize analysis for component 1. If .TRUE. the user must indicate the weights of the different grainsize classes	TWOLAYERS TWOCOMPONENTS	.TRUE. .FALSE.	-
DISTR2	.FALSE.	LOGICAL	Flag to enable grainsize analysis for component 2. If .TRUE. the user must indicate the weights of the different grainsize classes	TWOCOMPONENTS	.TRUE. .FALSE.	-
DEPRATES	.FALSE.	LOGICAL	Flag to enable deposition rates calculation. If .TRUE. the user must supply the grainsize of each nth component via the data file “componentn.dat”	DEPRATES	.TRUE. .FALSE.	-
ONLY_DEPRATES	.FALSE.	LOGICAL	If .TRUE. it is possible to run only the depositional model	DEPRATES	.TRUE. .FALSE.	-
USR_Z_DYNPR	.FALSE.	LOGICAL	Flag to enable the calculation of depth averaged dynamic pressure at user requested heights	PROFILES	.TRUE. .FALSE.	-
USR_Z_C	.FALSE.	LOGICAL	Flag to enable the calculation of the particle volumetric concentration at user requested heights	PROFILES	.TRUE. .FALSE.	-

USR_Z_T	.FALSE.	LOGICAL	Flag to enable the calculation of the flow temperature	PROFILES	.TRUE. .FALSE.	-
USR_PCX_SOL	.FALSE.	LOGICAL	Flag to enable the calculation of flow field variables at user requested percentiles	PROFILES DEPRATES	.TRUE. .FALSE.	-
PROBT		DOUBLE PRECISION	Significance level for the two-tailed T-Student test	TWOLAYERS TWOCOMPONENTS	-	-
ZDYNPR(i)		DOUBLE PRECISION ARRAY	User requested height(s) for the calculation of depth averaged dynamic pressure	PROFILES	-	m
ZC(i)		DOUBLE PRECISION ARRAY	User requested height(s) for the calculation of particle volumetric concentration	PROFILES	-	m
ZT(i)		DOUBLE PRECISION ARRAY	User requested height(s) for the calculation of depth averaged flow temperature	PROFILES	-	m
PCX(i)		DOUBLE PRECISION ARRAY	User requested percentile(s) for the calculation of flow field variables	PROFILES DEPRATES	-	-
PNSAVGGUESS	1.d0	DOUBLE PRECISION	Guessed initial value of average Rouse number	TWOLAYERS TWOCOMPONENTS	-	-
PNSMAXGUESS	1.d0	DOUBLE PRECISION	Guessed initial value of maximum Rouse number	TWOLAYERS TWOCOMPONENTS	-	-
PNSMINGUESS	1.d0	DOUBLE PRECISION	Guessed initial value of minimum Rouse number	TWOLAYERS TWOCOMPONENTS	-	-
ZSFAVGGUESS	1.d0	DOUBLE PRECISION	Guessed initial value of average shear flow thickness	TWOLAYERS TWOCOMPONENTS	-	m

Z0AVGGUESS	1.d-4	DOUBLE PRECISION	Guessed initial value of average reference level in the Rouse equation	TWOLAYERS TWOCOMPONENTS	-	m
Z0MINGUESS	1.d-4	DOUBLE PRECISION	Guessed initial value of minimum reference level in the Rouse equation	TWOLAYERS TWOCOMPONENTS	-	m
Z0MAXGUESS	1.d-4	DOUBLE PRECISION	Guessed initial value of maximum reference level in the Rouse equation	TWOLAYERS TWOCOMPONENTS	-	m
ZLAM		DOUBLE PRECISION	Layer thickness	TWOLAYERS TWOCOMPONENTS	-	m
ZLAMS		DOUBLE PRECISION	Sublayer thickness	TWOLAYERS TWOCOMPONENTS	-	m
ZLAM_MASSIVE		DOUBLE PRECISION	Thickness of the fine massive layer on top of the laminated layer	DEPRATES	-	m
C0	0.75	DOUBLE PRECISION	Particle volumetric concentration at the reference height z0	TWOLAYERS TWOCOMPONENTS	-	-
KS		DOUBLE PRECISION	Substrate roughness	TWOLAYERS TWOCOMPONENTS	-	m
SLOPE_GROUND		DOUBLE PRECISION	Substrate slope	PROFILES	-	°
SLOPE_GROUND_MIN		DOUBLE PRECISION	Minimum substrate slope for the ensemble simulations	PROFILES	-	°
SLOPE_GROUND_MAX		DOUBLE PRECISION	Maximum substrate slope for the ensemble simulations	PROFILES	-	°
DELTA_SLOPE		DOUBLE PRECISION	Substrate slope step for the ensemble simulations	PROFILES	-	°
MU		DOUBLE PRECISION	Gas viscosity	TWOLAYERS TWOCOMPONENTS	-	Pa s

DENGAS		DOUBLE PRECISION	Gas density	TWOLAYERS TWOCOMPONENTS	-	kg m^{-3}
T_GAS		DOUBLE PRECISION	Magmatic gas temperature	PROFILES	-	K
T_AIR		DOUBLE PRECISION	Air temperature	PROFILES	293	K
T_PARTICLES		DOUBLE PRECISION	Particles temperature	PROFILES	-	K
RHO_PARTICLES		DOUBLE PRECISION	Particles density	PROFILES	-	kg m^{-3}
CP_AIR		DOUBLE PRECISION	Specific heat at constant pressure of air	PROFILES	1005	J kg^{-1} K^{-1}
CP_PARTICLES		DOUBLE PRECISION	Specific heat at constant pressure of the particles	PROFILES	-	J kg^{-1} K^{-1}
CP_GAS		DOUBLE PRECISION	Specific heat at constant pressure of the gas	PROFILES	-	J kg^{-1} K^{-1}
R_GAS		DOUBLE PRECISION	Gas constant of the magmatic gases	PROFILES	-	J kg^{-1} K^{-1}
P_AIR		DOUBLE PRECISION	Atmospheric pressure	PROFILES	101325	Pa
DENS_ENT		DOUBLE PRECISION	Density of the entrained particle	TWOLAYERS	-	kg m^{-3}
DM_ENT		DOUBLE PRECISION	Diameter of the entrained particle	TWOLAYERS	-	m
DEP_MEDIAN		DOUBLE PRECISION	Median of the total deposit	DEPRATES	-	m
RHOS_MEDIAN		DOUBLE PRECISION	Density of the median of the total deposit	DEPRATES	-	kg m^{-3}
DAVGEQSPH(i)		DOUBLE PRECISION ARRAY	Average diameter of the equivalent sphere of particles in the median grainsize class of component 1 or 2	TWOLAYERS TWOCOMPONENTS	-	phi

PHI50(i)		DOUBLE PRECISION ARRAY	Particle equivalent diameter of the median size of component 1 or 2. Ignored if DISTR1=.TRUE.	TWOLAYERS TWOCOMPONENTS	-	phi
D50MM(i)		DOUBLE PRECISION ARRAY	Particle equivalent diameter of the median size of component 1 or 2. Ignored if DISTR1=.TRUE.	TWOLAYERS TWOCOMPONENTS	-	mm
SORTING(i)		DOUBLE PRECISION ARRAY	Sorting of grainsize distribution of component 1 or 2. Ignored if DISTR1=.TRUE	TWOLAYERS TWOCOMPONENTS	-	phi
NCLASS(i)		INTEGER ARRAY	Number of classes in the grainsize distribution of components. Ignored if DISTR2=.TRUE.	TWOLAYERS TWOCOMPONENTS	-	-
RHOS(i,j)		DOUBLE PRECISION ARRAY	Particle density of component i and class j (j=0 for median grainsize)	TWOLAYERS TWOCOMPONENTS DEPRATES	-	kg m^{-3}
RHOLAW(i)		CHARACTER ARRAY	Use correlation laws for calculating size-dependent particle density	TWOLAYERS TWOCOMPONENTS DEPRATES	POLLENA AVERNO2 AMS POMPEI SIAL_XX FEM_XX LITHIC MERCATO ASTRONI CUSTOM	-

RHO_CUSTOM(i)		CHARACTER ARRAY	Type of user defined density	DEPRATES	CONSTANT VARIABLE	-
CDLAW(i)		CHARACTER ARRAY	Drag law for component i	TWOLAYERS TWOCOMPONENTS DEPRATES	SPHERE HAIDLEV SWAMOJ GANSER CHIEN TRANCONG DELLINO HOLZSOMM DIOGMELE DIOG2017 DIOG2018	-
CIRCEQARD(i,j)		DOUBLE PRECISION ARRAY	Equal projected area circle diameter of component i	GANSER		m
CIRCULARITY(i,j)		DOUBLE PRECISION ARRAY	Circularity of component i	TRANCONG		-
COREY(i,j)		DOUBLE PRECISION ARRAY	Corey shape factor of component i (if undefined, then DLONG(i), DMED(i), DSHORT(i) are needed)	SWAMOJ		-
CROSSSPHER(i,j)		DOUBLE PRECISION ARRAY	Crosswise sphericity of component i	HOLZSOMM		m
FLATRATIO(i,j)		DOUBLE PRECISION ARRAY	Flatness ratio of component i (if undefined, then SUREQSPHD(i) and VOLEQSPHD(i) are needed	TRANCONG		m

ISOMETRIC(i)	.TRUE.	DOUBLE PRECISION LOGICAL	Flag to define that component i is isometric	GANSER		-
LONGSPHER(i,j)		DOUBLE PRECISION ARRAY	Lengthwise sphericity of component i	HOLZSOMM		m
SHAPEFACT(i,j)		DOUBLE PRECISION ARRAY	Shape factor of component i	DELLINO DIOGMELE		-
SPHERICITY(i,j)		DOUBLE PRECISION ARRAY	Sphericity of component i	HAIDLEV GANSER CHIEN HOLZSOMM DIOG2016		-
FRACTDIM(i,j)		DOUBLE PRECISION ARRAY	Fractal dimension of component i	DIOG2016		m
FRACTAL(i)	.FALSE.	DOUBLE PRECISION LOGICAL	If .TRUE. the drag law uses fractal dimension as shape descriptor, otherwise sphericity	DIOG2016	.TRUE. .FALSE.	-
VOLEQSPHD(i,j)		DOUBLE PRECISION ARRAY	Volume equivalent sphere diameter of component i	GANSER		m
DOTESTCHI(i)	.TRUE.	LOGICAL ARRAY	Flag to enable Chi Squared test of the grainsize distribution of the two components	TWOLAYERS TWOCOMPONENTS	.TRUE. .FALSE.	-
SIGLEVCHI(i)		DOUBLE PRECISION ARRAY	Significance level of the Chi Squared test of the two components	TWOLAYERS TWOCOMPONENTS		-

SENSCHI(i)	0.05	DOUBLE PRECISION ARRAY	Sensitivity of the Chi Squared test in rearranging weight fractions of the two components	TWOLAYERS TWOCOMPONENTS		-
DPHI(i)		DOUBLE PRECISION ARRAY	Grainsize step in the distribution of the two components	TWOLAYERS TWOCOMPONENTS DEPRATES		phi
PHIMIN(i)		DOUBLE PRECISION ARRAY	Minimum phi of the distribution (maximum dimension) of the two components	TWOLAYERS TWOCOMPONENTS DEPRATES		phi
PHIMAX(i)		DOUBLE PRECISION ARRAY	Maximum phi of the distribution (minimum dimension) of the two components	TWOLAYERS TWOCOMPONENTS DEPRATES		phi
INPUT_WEIGHT	-	CHARACTER	Type of input for the weight of the classes. If WT, the code read the weights as weight fractions, if MASS as mass in gr	TWOLAYERS TWOCOMPONENTS DEPRATES	WT MASS	
WTOT_SAMPLE	-	DOUBLE PRECISION	Total mass of the sample. If not provided and if INPUT_WEIGHT=MASS, the code recalculate this	TWOLAYERS TWOCOMPONENTS DEPRATES		gr
WEIGHT(i,j)		DOUBLE PRECISION ARRAY	Weights of the grainsize class of component i	TWOLAYERS TWOCOMPONENTS DEPRATES		gr or (%)
NCOMP		INTEGER	Number of components considered in the deposit	DEPRATES		-
MERGE_CLASSES(i)	.F.	LOGICAL ARRAY	Flag to enable merging of grainsize classes	DEPRATES	.TRUE. .FALSE.	-

PN_CUT	.T.	LOGICAL ARRAY	Flag to avoid considering classes with Pn>5 in the deposition rates calculations	DEPRATES	.TRUE. .FALSE.	-
SENSMERGE(i)	-	DOUBLE PRECISION ARRAY	Sensitivity of grainsize classes merging	DEPRATES		-
RHO_FLOW(k)	-	DOUBLE PRECISION ARRAY	Flow density	DEPRATES	-	kg m^{-3}
ZTOT_FLOW(k)	-	DOUBLE PRECISION ARRAY	Flow thickness	DEPRATES	-	m
USH_FLOW(k)	-	DOUBLE PRECISION ARRAY	Flow shear velocity	DEPRATES	-	m s^{-1}
PNS_FLOW(k)	-	DOUBLE PRECISION ARRAY	Flow average Rouse number	DEPRATES	-	m s^{-1}
N_SOLUTIONS	-	INTEGER	Number of solutions for DEPRATES (valid if only DEPRATES is used)	DEPRATES	-	-

i = component
j = grainsize class
k = number of solutions for DEPRATES (if only this model is run).