Section 3

PARAMETERS

Section 3.1 lists (alphabetically) and defines the PARAMETERs that are used for defining the dimensions of major arrays in MM5. The PARAMETERs listed in section 3.2 are either used as constants or are for setting the dimensions of minor arrays.

3.1 Major PARAMETERs

IARASC will Arakawa-Schubert cumulus scheme be used, (0=no;1=yes).

IEXMS will explicit moisture scheme be used, (0=no:1=yes).

IFDDA will FDDA be employed, (0=no;1=yes).

IHUGE total first dimension of common block variables **ALLARR** and **INTALL**

(= MIX*MJX*MKX*NVARX+MIXM*MJXM*MKXM*NVARMX
+MIX*MJX*NVARSX+MIX*MKX*NSPGD*8+MIX*MKX*NSPGX*8
+MIXM*MKXM*NSPGX*8+MJX*MKX*NSPGD*8+MJX*MKX*NSPGX*8
+MJXM*MKXM*NSPGX*8+MIX*4*NSPGX+MJX*4*NSPGX
+MIX*MKX*8+MJX*MKX*8+NVARI+NVARP+NVARNI+NVARNR+MEXALL
+13*MIXF*MJXF*MKXF+(19+NVAR) *MIXF*MJXF
+NTIM*NVAR*MIXF*MJXF+5*NVAR+5*NIOBF+4*1*NIOBF+6*NIOBF
+NTIM*NVAR+NVAR*NCHA+NCHA+NTIM
+3*MIXNH*MJXNH*KXP1NH+5*MIXNH*MJXNH*MKXNH
+4*MIXNH*MKXNH*NSPGX+4*MJXNH*MKXNH*NSPGX
+4*MIXNH*KXP1NH*NSPGX+4*MJXNH*KXP1NH*NSPGX
+MIXNH*MJXNH*MKXNH+MIXNH*MJXNH+9*MIXV*MJXV*MKXV
+4*MIXIC*MJXIC*MKXIC+8*MIXIC*MKXIC*NSPGX
+8*MJXIC*MKXIC*NSPGX+MIXR*MJXR*MKXR)

IICE will mixed phase precipitation physics be employed (0=no;1=yes).

IIHUGE	first dimension of common block variable **INTALL** (=**NVARI**+**NVARNI**+**NVARNR**+**NSELIT**+**Z***MIXR**+**MJXF**+3***NVAR+NTIM*** **NVAR**+**NCHA**+**NCHA***NVAR**)
INAV	will the Navy PBL be employed, (0=no;1=yes).
INHYD	will this simulation be non-hydrostatic (0=no;1=yes).
IRATIO	= **IRAX**.
IRAX	ratio between coarse grid and fine grid (=3).
IRDDIM	will full radiation (LWRAD and SWRAD) be employed (0=no;1=yes).
IRHUGE	first dimension of common block variable ALLARR =(**IHUGE**-**IIHUGE**)
KX	= **MKX**.
KXP1	= **MKX**+1.
KXP1NH	= (**KXP1**-1)*INHYD**+1.
MAXNES	maximum number of domains.
MAXSES	maximum number for **MAXNES** (default value = 10).
MEXALL	= **NSPLIT***3+**MKX***NSPLIT**+**MIX***MJX***NSPLIT***2+3***MKX** ***MKX***MKX***KXP1**+**MKX.**
MIX	maximum dimension (all domains) in the y-direction.
MIXA	maximum dimension of Arakawa-Schubert moisture arrays in y-direction (= (**MIX**-1) ***IARASC**+1).
MIXF	= (**MIX**-1) ***IFDDA**+1.
MIXIC	= (**MIX**-1)***IICE**+1.
MIXM	maximum dimension of moisture arrays in y-direction (= (**MIX**-1)***IEXMS**+1)
MIXNH	= (**MIX**-1)***INHYD**+1.
MIXR	= (**MIX**-1)***IRDDIM**+1.
MIXV	= (**MIX**-1)***INAV**+1 (for Navy PBL).
MJX	maximum dimension (all domains) in the x-direction.
MJXA	maximum dimension of Arakawa-Schubert moisture arrays in x-direction (= (**MJX**-1)***IARASC**+1).
MJXF	= (**MJX**-1)***IFDDA**+1.
MJXIC	= (**MJX**-1)***IICE**+1.

MJXM	maximum dimension of moisture arrays in x-direction (= (**MJX**-1) ***IEXMS**+1)
MJXNH	= (**MJX**-1) ***INHYD**+1.
MJXR	= (**MJX**-1) ***IRDDIM**+1.
MJXV	= (**MJX**-1) ***INAV**+1 (for Navy PBL).
MKX	maximum dimension (all domains) in the vertical direction.
MKXA	maximum dimension of Arakawa-Schubert moisture arrays in vertical direction (= (**MKX**-1) ***IARASC**+1).
MKXF	= (**MKX**-1) ***IFDDA**+1.
MKXIC	= (**MKX**-1) ***IICE**+1.
MKXM	maximum dimension of moisture arrays in vertical direction (= (**MKX**-1) ***IEXMS**+1).
MKXNH	= (**MKX**-1) ***INHYD**+1.
MKXR	= (**MKX**-1) ***IRDDIM**+1.
MKXV	= (**MKX**-1) ***INAV**+1 (for Navy PBL).
NCHA	maximum number of changes (one variable, one date) when using **INOPRO** option.
NIOBF	maximum number of observations within observation-nudging time window (= 10000-1) ***IFDDA**+1).
NLNES	maximum number of domain levels.
NSPGD	number of dot-point slices affected by sponge or relaxation boundary conditions = 5).
NSPGM	= **NSPGX***8.
NSPGX	number of cross-point slices affected by sponge or relaxation boundary conditions (= 5).
NSPLIT	number of vertical modes to be used in the split-explicit scheme (=2).
NTIM	maximum number of surface-analysis times within analysis-nudging period.
NUMPROGS	space allocation for record-header information (for all the modeling system programs).
NUMVALS	space allocation for record-header variable definitions.
NUMVAR	= **NVARX**+**NVARMX**+**NVARSX**+72+**NVARI**+**NVARP**+27+11+46+26+9+20+1.
NVAR	maximum number of variables stored in array **SFCOBS** (= 8).

NVARI number of integer data stored in common /ADDR4/ (= 11).

NVARMX number of prognostic 3-D water-substance variables stored in common /ADDR1/ (= 4).

NVARNI number of nested integer variables (= 21).

NVARNR storage space for nesting (= 6***MAXSES**).

NVARP number of real data stored in common /ADDR4/ (= 23).

NVARSX Number of 2-D variables stored in common /ADDR2/ (= 39).

NVARX number of prognostic 3-D variables **UA**, **UB**, **VA**, **VB**, **TA**, **TB**, **QVA**, **QVB** (=8).

3.2 Minor PARAMETERs

G gravitational acceleration (= 9.8 m s^{-2}).

GAMMA standard atmosphere lapse rate (= 6.5E-3 K m^{-1}).

IA = **MBOTH**+2.

IFCT a parameter used for the positive-definite advection scheme (= 1).

IOR a parameter used for the positive-definite advection scheme (= 2).

IW1 = 2*(**NIMSL**+**MEQU**)+3.

IWW = **IA***(**IA**+2)+2*(**NIMSL**+**MEQU**).

KDIM = **MKX**.

KNUM number of cloud types (= 6 in ARASCH and = 1 in SHALLOW).

KNUMS dimension of **XMB** (= 1).

MBOTH = **MEQU**+**MNEQU**.

MEQU = 0 (needed for ZX4LP).

MINP = **MEQU**+**NIMSL**+2.

MNEQU = **KNUM**.

N1 = **MJX**.

N2 = **MIX.**

N1OS = **N1*****NONOS**+1-**NONOS**.

N2OS = **N2*****NONOS**+1-**NONOS**.

NCDIAG = (**NIJMAX**+1) ***NK***4.

NF number of nested grid points used for interpolation to coarse-grid location (= 9).

NIJMAX = larger of **MIX** or **MJX** for split-explicit - (currently set to **MJX**).

NIMSL = 2***MNEQU**.

NK = **KX**.

NK1 = **NK**+1.

NONOS = 1 (used in SINT).

NVERTS 7+8***NK**+7***NK*****NK**+**NK1*****NK1**.

P0 standard atmosphere sea-level pressure (= 101.325 cb).

PCONST constant added to sea-level pressure (= 10 mb).

R gas constant for dry air (= 287.04 J kg^{-1} K^{-1}).

RATE standard atmosphere lapse rate (= 6.5E-3 K m^{-1}).

RGAS gas constant for dry air (= 287.04 J kg^{-1} K^{-1}).

T0 reference temperature in VTLAPS (= 288.15 K).

TC reference temperature in SEAPRS (= 273.16+17.5 K).

T0L tolerance allowed in VCHEKE (= 1.E-9).

TSTRAT reference temperature for stratosphere in VTLAPS (= 218.15 K).

XKAPPA = R/c_p (= .287).

ZSTRAT reference height for stratosphere in VTLAPS (= 10769 m).