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).