Necessary changes from NESTED_CH to NESTED_NA in the codes
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1. CMN_SIZE

The NESTED_NA domain need to be defined. Set the grid parameters IGLOB and JGLOB accordingly:

```
=======================================================================
#if   defined( NESTED_CH )
      ! Parameters for the 0.5x0.667 CHINA NESTED GRID
      INTEGER, PARAMETER :: IGLOB      = 121
      INTEGER, PARAMETER :: JGLOB      = 133
      INTEGER, PARAMETER :: LGLOB      = 72
=======================================================================
#elif defined( NESTED_NA )
      ! Parameters for the 0.5x0.667 NORTH AMERICA NESTED GRID
      INTEGER, PARAMETER :: IGLOB      = 151
      INTEGER, PARAMETER :: JGLOB      = 121
      INTEGER, PARAMETER :: LGLOB      = 72
=======================================================================
```

2. lai_mod.f

There are no code changes, however the simulation would stop in the very beginning if there are no correct input files for SUBROUTINE READISOLAI_05x0666. Pay attention to the dimensions of the input files.

```
=============================================================================
FILENAME = TRIM( DATA_DIR ) //
     &      'leaf_area_index_200412/avhrrlai.global.geos.05x0666.2000'

      CALL READ_BPCH2( FILENAME, 'AVHRR', 1,
     &                 TAU0,      IGLOB,   JGLOB,
     &                 1,         ARRAY,  QUIET=.TRUE. )
=============================================================================
```

When the arrays in the READ_BPCH2 process are defined as (IGLOB, JGLOB), then the high-res 05x0666 input files should be cut into NESTED_NA window domains by offline IDL programs.

3. regrid_1x1_mod.f

SUBROUTINE DO_THE_REGRIDDING_05x0666_3D needs to be changed. When reading the other kind input files, global high-res 05x0666 data (arrays in (I05x0666, J05x0666), (540, 361)), it should be cut into the NESTED_NA domain online in this subroutine, so as to keep the computation array consistency.

The codes for the NESTED_CH region is list in the first paragraph (contents between ===) and the second paragraph for NESTED_NA need to be added after that. The indices of INDATA need to be set accordingly:

```
      ============================================================================
      #if   defined( GRID05x0666 ) && defined( NESTED_CH )

            !-----------------------------------------------
            ! Regrid GEOS 05x0666 grid to nested China grid
            !-----------------------------------------------

            ! China nested grid has corners (70E,11S) and (150E,55N)
            ! which corresponds to 05x0666 indices (376,159) and (496,291)
            OUTDATA(1:IIPAR,1:JJPAR,1) = INDATA( 376:496, 159:291,1)
      ============================================================================
      #elif defined( GRID05x0666 ) && defined( NESTED_NA )

            !-------------------------------------------------------
            ! Regrid GEOS 05x0666 grid to nested North America grid
            !-------------------------------------------------------

            ! North America nested grid has corners (140W,10N) and (40W,70N)
            ! which corresponds to 05x0666 indices (61,201) and (211,321)
            OUTDATA(1:IIPAR,1:JJPAR,1) = INDATA( 61:211, 201:321, 1 )
      ============================================================================
```

Similarly, SUBROUTINE DO_THE_REGRIDDING_05x0666_2D needs to be changed too.

4. commsoil.h

The land boxes need to be recalculated and the correspondence parameter with 9999? in the code needs to be clarified. The number for NLAND will become apparent from the regridding of the lai*global and vegtype.global files.

```
      ============================================================================
      #elif defined( GRID05x0666 ) && defined( NESTED_CH )

            ! There are 8261 land points for the 0.5 x 0.666 CHINA nested grid
            INTEGER, PARAMETER :: NLAND = 8261

      #elif defined( GRID05x0666 ) && defined( NESTED_NA )

            !%%% NOTE: still to be determined
            INTEGER, PARAMETER :: NLAND = 9999?
      ============================================================================
```

5. lightning_nox_mod.f

There are two changes in FUNCTION GET_OTD_LIS_SCALE.

5.1 The parameter of ANN_AVG_FLASHRATE needs to be recalculated and clarified in the codes. The codes for the NESTED_CH region is list in the first paragraph and the second paragraph for NESTED_NA need to be added after that.

```
============================================================================
#elif defined( GRID05x0666 ) && defined( NESTED_CH )
      REAL*8, PARAMETER     :: ANN_AVG_FLASHRATE = 8.75523d0
============================================================================
#elif defined( GRID05x0666 ) && defined( NESTED_NA )
      REAL*8, PARAMETER     :: ANN_AVG_FLASHRATE = ?
============================================================================
```

5.2 when using the LCTH option, the parameter of SCALE should be defined. The codes for the NESTED_CH region are list in the first paragraph and the second paragraph for NESTED_NA needs to be modified.

```
      ================================================================================
      #elif defined( GEOS_5 ) && defined( GRID05x0666 ) & defined( NESTED_CH )

            !-------------------------------------
            ! GEOS-5: 0.5 x 0.666
            ! Nested grid simulation: CHINA
            !-------------------------------------
            IF ( LCTH ) THEN

               ! Note: These values are computed from geos5 Dec 2003-Feb 2009,
               !       and compared against OTD/LIS May 1995-Dec 2005
               !       (ltm, bmy, 7/10/09)
               IF ( LOTDLOC ) THEN
                  SCALE = ANN_AVG_FLASHRATE / 175.392d0
               ELSE
                  SCALE = ANN_AVG_FLASHRATE / 75.0679d0
               ENDIF
            ELSE
               WRITE( 6, '(a)' ) 'Warning: OTD-LIS GEOS5 scaling only for CTH'
               SCALE = 1.0d0
            ENDIF
      ================================================================================
      #elif defined( GEOS_5 ) && defined( GRID05x0666 ) & defined( NESTED_NA )

            !-------------------------------------
            ! GEOS-5: 0.5 x 0.666
            ! Nested grid simulation: N. AMERICA
            !-------------------------------------
            WRITE(6,*) 'OTD/LIS not yet available for GEOS5 Nested NA sim.'
            CALL FLUSH(6)
            SCALE = 1.0d0
      ================================================================================
```

NOTE: The ANN_AVG_FLASHRATE and SCALE values are determined from the OTD/LIS flash redistribution is computed. Contact Lee Murray for more information (ltmurray@seas.harvard.edu).

6. acetone_mod.f

SUBROUTINE OCEAN_SOURCE_ACET needs to be changed. The parameter of SCALE_FACTOR that balancing the acetone emission mass should be recalculated and clarified. The codes for the NESTED_CH region are list in the first paragraph and the second paragraph for NESTED_NA needs to be added.

```
      ================================================================================
      #if defined( GRID05x0666 ) && defined ( NESTED_CH )

            ! GEOS-5 0.5 x 0.667, scaled to 4x5 (dan, 11/6/08)
            ! This scale factor produces too little acetone. (tmf, 3/05/09)
            !REAL*8, PARAMETER :: SCALE_FACTOR = 0.0008d0
            REAL*8, PARAMETER :: SCALE_FACTOR = 0.015369d0
      ================================================================================
```

```
!=============================================================================
#elif  defined( GRID05x0666 ) && defined ( NESTED_NA )

      REAL*8, PARAMETER :: SCALE_FACTOR = ?
!=============================================================================
```

7. input.geos file

Changes need to be made in the following menus:

```
%%% SIMULATION MENU %%% :
...
Global offsets I0, J0   : 0 0
```

I0 and J0 are the global offset which are located in source code file grid_mod.f, i.e., the LL longitude and latitude indices for the NESTED_NA domain in the global context.

```
%%% NESTED GRID MENU %%%:
LL box of 4x5 BC region : 51 21
UR box of 4x5 BC region : 67 37
```

LL box: longitude and latitude indices of the grid box at the LOWER LEFT CORNER of the region in which 4 x 5 boundary conditions are being saved

UR box: the longitude and latitude indices of the grid box at the UPPER RIGHT CORNER of the 4 x 5 window region in which boundary conditions are being saved