Data Description for Sciencehub Research Effort:

Simulating Lightning NOX Production in CMAQ: Evolution of Scientific Updates

1. The Monthly\_Sum…csv files, there are 4 fields:

* month (for the year marked as the file name)
* “NO”: the column total lightning NO (LTNO) for hNLDN
* “NOb”: the column total lightning NO (LTNO) for mNLDN
* “NOp”: the column total lightning NO (LTNO) for pNLDN

1. NLDNstrike\_RC…CSV files are used to derive the relationship between convective precipitation and lightning flashes, the fields are:

* Year
* Month
* nldn\_strike: total monthly lightning flashes
* rc\_tot: tot monthly convective rainfall

1. The LTNG\_COLUMN\_NO\_\*July.gz.tar files, which contain model produced daily lightning NO column for each model case over the space and these files are in IOAPI format with the following header information:

dimensions:

TSTEP = UNLIMITED ; // (24 currently)

DATE-TIME = 2 ;

LAY = 1 ;

VAR = 1 ;

ROW = 299 ;

COL = 459 ;

variables:

int TFLAG(TSTEP, VAR, DATE-TIME) ;

TFLAG:units = "<YYYYDDD,HHMMSS>" ;

TFLAG:long\_name = "TFLAG " ;

TFLAG:var\_desc = "Timestep-valid flags: (1) YYYYDDD or (2) HHMMSS

" ;

float NO(TSTEP, LAY, ROW, COL) ;

NO:long\_name = "NO " ;

NO:units = "mol/s " ;

NO:var\_desc = "Column NO produced from lightning

" ;

// global attributes:

:IOAPI\_VERSION = "$Id: @(#) ioapi library version 3.1 $

" ;

:EXEC\_ID = "CCTM\_ckLTNG

" ;

:FTYPE = 1 ;

:CDATE = 2016140 ;

:CTIME = 184003 ;

:WDATE = 2016140 ;

:WTIME = 184003 ;

:SDATE = 2011182 ;

:STIME = 10000 ;

:TSTEP = 10000 ;

:NTHIK = 1 ;

:NCOLS = 459 ;

:NROWS = 299 ;

:NLAYS = 1 ;

:NVARS = 1 ;

:GDTYP = 2 ;

:P\_ALP = 33. ;

:P\_BET = 45. ;

:P\_GAM = -97. ;

:XCENT = -97. ;

:YCENT = 40. ;

:XORIG = -2556000. ;

:YORIG = -1728000. ;

:XCELL = 12000. ;

:YCELL = 12000. ;

:VGTYP = 7 ;

:VGTOP = 5000.f ;

:VGLVLS = 1.f, 0.9975f ;

:GDNAM = "WRF\_CMAQ\_2WAY " ;

:UPNAM = "LTNG\_INIT " ;

:VAR-LIST = "NO " ;

:FILEDESC = "Gridded lightning NO production from CMAQ

/from/ LTNG\_INIT /Vers

ion/ CMAQ